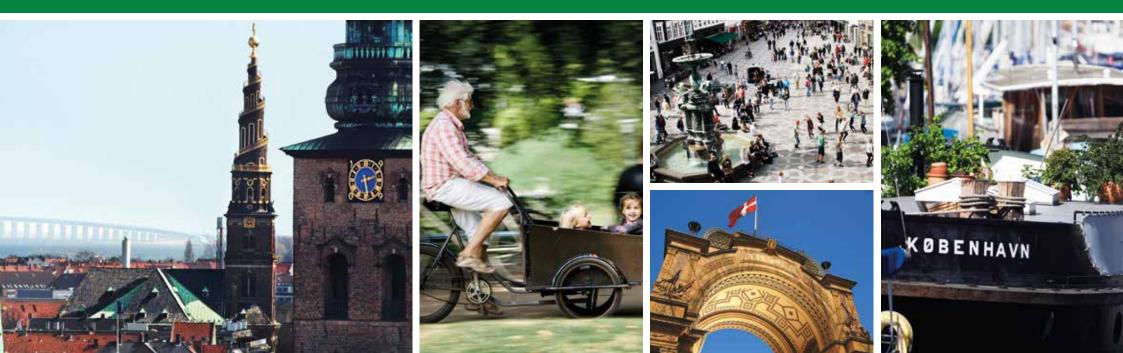
### 20<sup>th</sup> International Conference on Composite Materials 19-24 July 2015 - Copenhagen, Denmark

# ICCM20

### Programme and book of abstracts





### **Component Testing**

for accelerated development cycles, increased safety and simulation verification

Find out more about non-contact measurement for composite materials, component and material testing. Visit us on our booth E-North 011 during ICCM20, July 20<sup>th</sup>-22<sup>nd</sup> 2015 in Copenhagen.



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### Welcome

### Welcome to Copenhagen, Denmark and the 20<sup>th</sup> International Conference on Composite Materials (ICCM20).

The conference is the 20th in the series of conferences of the International Committee on Composite Materials (ICCM). The series of ICCM conferences have gone from success to success since the first two conferences, both termed ICCM1 were held in 1975 in Geneva, Switzerland and Boston, USA. We are very proud and delighted to be organising the conference in Copenhagen, Denmark in 2015. It is the first time that an ICCM conference has been organised in Scandinavia.

The scientific programme of the ICCM20 contains about 1450 presentations with full papers available in the conference proceedings, with the authors coming from 66 countries representing all three ICCM world regions, and with approximately 1800 registered participants. Thus, the ICCM20 is a truly international scientific event and the largest international conference in the field of composite materials to this date.

We are looking forward to a technically excellent conference, and we are very grateful to the many organisers of the conference "Themes" and "Tracks" for helping us put the programme together. Their names are listed in the International Organising Committee that is printed in this book. More importantly, we are grateful to the authors for their efforts in producing their outstanding contributions to the programme. The full programme is printed in this book including very brief abstracts, but you may also want to use the online version of the programme and the proceedings containing the full papers **www.ICCM20.org** or the version we have for smartphones and tablets that is accessible through the special ICCM20 App. Please download the ICCM20 app at ITunes or Google Play.

We hope that you will enjoy the conference and its many events, all of which are described in this book, and we also hope that you will enjoy your stay in Copenhagen. Conference updates on events and practical matters will be issued throughout the conference via TV screens placed throughout the conference venue (Bella Center) and through the conference App. If you require any assistance during the conference please do not hesitate to contact the ICCM20 secretariat or us for help.

A special thanks to MCI Copenhagen and the Scandinavian Organising and Scientific Committee, without whom the conference would not have been possible.

#### **Conference chairmen**



Ole Thybo Thomsen Southampton University & Aalborg University



Christian Berggreen Technical University of Denmark



Bent F. Sørensen Technical University of Denmark



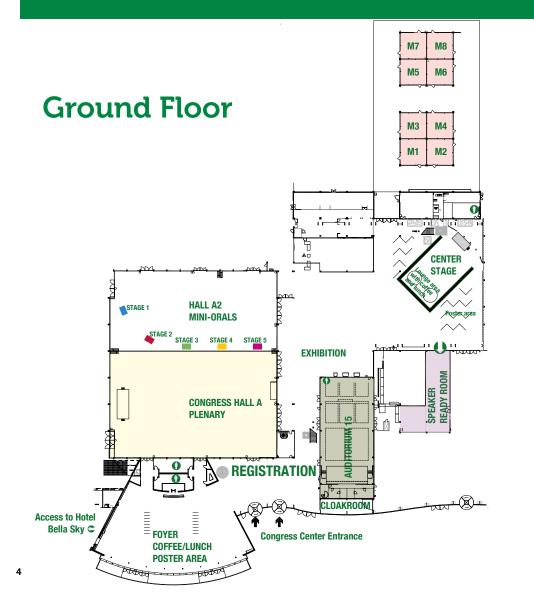
Use this QR code to download the ICCM20 App and create your own profile

### Venue overview

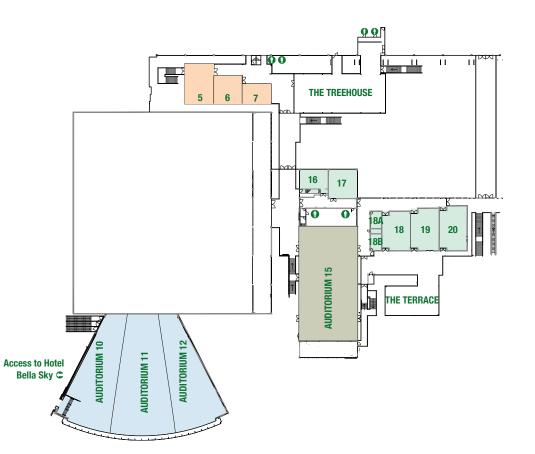
Bella Center is an all modern state-of-the art congress and fair centre integrated with the largest hotel in Scandinavia, AC Hotel Bella Sky Copenhagen. A unique location in the middle of Ørestaden – with its own Metro station and surrounded by Scandinavia's largest shopping mall, the Royal Golf Center and preserved nature - Bella Center ensures the best possible conditions for every type of event, only 10 minutes away from the centre of Copenhagen and Copenhagen International Airport.

Visit Fields (Scandinavia's largest shopping mall) here: www.fields.dk





**First Floor** 



### SIEMENS

Did you know that our 75 meter long blade is the biggest serial produced blade for wind turbines? Visit us at stand 001 at ICCM20 and learn more!

# Think inside the box

### The new SWT-7.0-154

On the outside, our new 7 MW turbine isn't new at all. But we found a smart way to significantly increase the energy output of our proven SWT-6.0-154. Instead of "thinking outside the box," we actually thought "inside the box" and made some upgrades within the nacelle.

Siemens' unique experience with offshore wind power opens the door to fantastic opportunities. When we decided to improve the energy output of our largest offshore wind turbine, we used our expertise to approach product development in a new way. Instead of following the conventional wisdom, which tells us that "bigger is always better," we started with a proven product. We looked closely at every detail of the wind turbine and made as few upgrades as possible. Upgrades we knew would yield the greatest results – and so we created the new SWT-7.0-154.

#### Do you think both inside and outside of the box?

Then you might be our next colleague. At Siemens we highly value autonomous and independent employees. In addition you will become part of a team with talented peers giving you great professional development. We have many challenging open positions and we look forward to hearing how you can be part of the solution.

Visit us at stand 001 at ICCM20 and hear more about our new 7 MW turbine and Siemens as a workplace.

▲ The prototype in Østerild, Denmark was installed only a few months after the product launch at EWEA Offshore trade show in Copenhagen.

If you want to know more about what it is like to work and live in Denmark, please read more at www.siemens.dk/moving-to-denmark

### www.siemens.dk/job

### **General Information**

### Registration and Information desk opening hours

Onsite registration is open:

 Sunday 19. July:
 16.00 - 20.00

 Monday 20 July:
 7.30 - 18.00

 Tuesday 21 July:
 8.00 - 18.00

 Wednesday 22 July:
 8.00 - 18.00

 Thursday 23 July:
 8.00 - 18.00

 Friday 24 July:
 8.00 - 12.00

#### Speaker Ready room opening hours

 Sunday 19 July:
 16.00 - 20.00

 Monday 20 July:
 7.30 - 17.00

 Tuesday 21 July:
 7.30 - 17.00

 Wednesday 22 July:
 7.30 - 15.00

 Thursday 23 July:
 7.30 - 15.00

 Friday 24 July:
 7.30 - 11.00

### **Exhibition opening hours**

 Monday 20 July:
 9.30 - 18.00

 Tuesday 21 July:
 9.30 - 18.00

 Wednesday 22 July:
 9.30 - 17.00

### **Internet Access**

Wireless internet is complimentary throughout the meeting. Network name: BC-guest. No password required.

### Catering

Refreshments and lunch (lunch bags) will be provided in the exhibition area and in the Foyer during the official coffee and lunch breaks.

For your convenience, the Bella Center has a kiosk open daily from 10 am, where you may purchase food, drinks and necessaries.

### Certificate of attendance

The registration desk will issue a certificate of attendance upon request.

### Cloakroom

Please do not leave any bags or other personal belongings unattended at any time, whether inside or outside the sessions rooms. The cloakroom is located in the registration area. There is a fee of DKK 30,- pr day and both cash and credit card are accepted.

### Conference admission – delegate badge

Admission to the ICCM20 is by badge only. Carrying the badge is mandatory for all participants. No one will be allowed admission to sessions, exhibition or social events without a badge.

### **Congress secretariat**

MCI Copenhagen Project Manager: Lisbeth Vestergaard Grove Attn: ICCM20 Vestre Gade 18, 1 2605 Brøndby, Denmark

Phone: +45 32472952 Urgency: +45 20782800 @: lccm20@mci-group.com



#### **Emergency Services**

In case of an emergency, please contact the staff at the Bella Center. Police – Ambulance – Fire Brigade - dial 112 Interacting by smartphone

### The ICCM20 app

Please download the ICCM20 app at ITunes or Google Play in order to receive important updates, vote during the sessions, receive reminders and to get evaluations directly on your smartphone

#### Official congress language

The official language is English. No simultaneous translation will be provided

#### **Smoking policy**

The Bella Center is a non-smoking facility

### **Public Transportation**

Copenhagen is known for its well-developed transportation system.

Bella Center is located outside the city center but can be easily reached from both city center and airport by bus and Metro.

Bus: Bus 250S departs from Copenhagen Central Station and stops at Bella Center. Metro: Metro line M1 (Vestamager) stops at Bella Center.

From Airport: From the airport the Bella Center can be reached by taking the M2 metro line to Christianshavn and then transfer with the M1 train to Vestamager, or by regional train (destination airport) to Ørestad and then change for the Metro line for 1 stop.

Tickets: Tickets for public transport can be purchased at any train station, credit card ok, but on board the bus it is cash only.



#### Shops

The shops in Copenhagen are open daily from 10.00 to 18.00, department stores and shopping malls until 20.00.

### Copenhagen

The Danish capital is busily turning itself into a dynamic and trendy metropolis, attracting attention with everything from exciting architecture to design, art and shopping. New fashion houses, food temples, trendy boutiques and music venues are shooting up all over the city. Copenhagen has everything to offer - high standard hotels, excellent shopping, a friendly population, a safe atmosphere and wonderful sightseeing. The city is vibrating with youthful exuberance while reveling in its fascinating history. Old historical buildings, modern design and dynamic new buildings and boutiques attract trendsetters and design conscious people from all over the world as well as history and art lovers



### //General Information

#### Social programme

#### Welcome Reception in Tivoli Gardens

The Welcome Reception will take place Monday 20 July from 19.00 – 20.00 in Tivoli Gardens. Busses will depart from the Bella Center after the last sessions end around 18.00. Access to Tivoli, welcome drinks and snacks are included. Access is by badge only. Extra tickets purchased in advance will be handed out upon registration. Transportation back to your hotel is on your own.



### Social programme

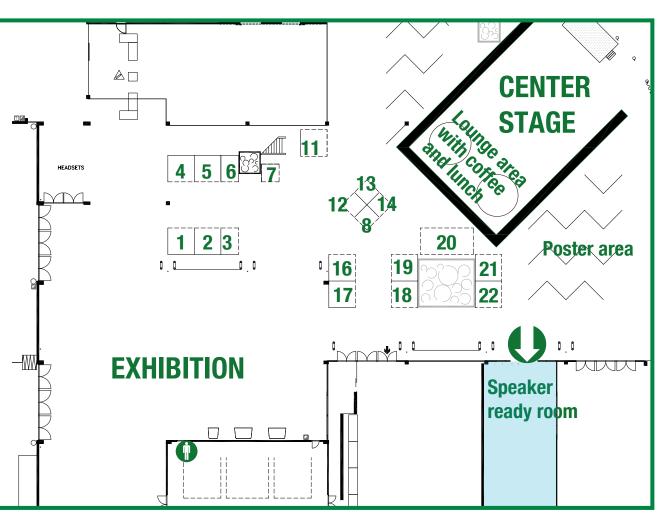
#### Conference Dinner "Midsummer Dinner"

The Conference Dinner will take place at the Bella Center Thursday 23 July in the exhibition area (Hall E). Welcome drinks will be served from 19.30 and the party ends at 23.30. Tickets for the Conference Dinner will be handed out upon registration. Please bring your ticket to participate in the dinner.



#### Exhibition

	Stand No.	Company name
	1	Siemens Wind Power A/s
	2	ICCM21 / Chinese Society of Composite Materials
	3	METRAVIB, ACOEM
	4	DTU
	5	Instron
	6	MTS Systems GmbH
	7	JEC
	8	LaVision
	11	GOM / Zebicon A/S
	12	Maney Publishing
	13	Surface Measurement Systems
	14	Photron (Europe)Ltd.
F,	16	Correlated Solutions
	17	ECCM17
	18	ICCM22 BID/Brazil
	19	FORCE Technology
	20	Shimadzu Europa GmbH
	21	Flir Systems
	22	ICCM22 BID/Melbourne



### General Information//



### **ICCM Sponsors and Exhibitors**

The Organising Committee gratefully acknowledge the support and participation of the following companies:

**Platinum Sponsor:** 



Silver Sponsors:











### International Scientific Committee

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### Α

Adrian Mourits Alan K. T. Lau Albert Turon Alessandro Croce Alessandro Pegoretti Alex Kalamkarov Alexander Bismarck Andrea Bernasconi Andreas Echtermever Andrew Lona

### В

Bill Clyne Bo Madsen Brian Havman Brian N. Cox Brian N. Legarth

### С

Carlos D. Gonzalez Chiara Bisagni Christian Berggreen Christian Hühne Costas Soutis

### D

Dan Zankert Daniel J. Inman Daniel Therriault Daniel Wagner David Kisailus

### Е

Edith Mäder Emile Greenhalgh Endel larve Erik Lund

### F

Fabrice Pierron Federico Paris Francesca Cosmi Frank W. Zok Fredrik Fosberg Fu-Kuo Chang

Geoff Gibson Georg Mair Geraelv Czel Giulio Alfano Golam Newaz Gregory M. Odegard Guiiun Xian Göran Fernlund

G

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Ι

J

### Hans Lilholt Hatsuo Ishida Helga Füredi-Milhofer

Ichiro Taketa Ignaas Verpoest Jacques Lamon

Jae-Hung Han

Frédéric Lani

### James P. Thomas

Janice Barton Javier Llorca Jay Kudva Jefferv W. Baur Jim Thomason Jinsong Leng Joachim Hausmann Johan Hoefnagels John Botsis John Summerscales

Klaus Drechsler Kristofer Gamstedt

### Q

Larry Dzral Lars Berglund Lars Chr. T. Overgaard B.-L. ("Les") Lee Leif Asp

Larissa Gorbatikh

### Μ

Maciei Wysocki Magnus Burman Marcin Kaminski Marino Quaresimin Mark Battlev Martin Fagerström Masaki Hoio Mathias Stolpe Matt Jevons

Michael Wisnom Pérez Minoru Taya Miroslav Cerny

Naravana R. Aluru

Paolo Ermanni Pascal Huber Pascal Lava Paul J. Falzon Paul Robinsson Paul Weaver Pedro Camanho Per Isaksson Per S. Heagem Peter Davies Peter Horst Peter Middendorf Peter Mitschang Philippe Boisse Philippe Noury Pierre Ladeveze

### Qinada Yana

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Ζ

Valter Carvelli

Victor Birman

Veronique Michaud

Wim van Paepegem

Xavier Balandraud

Yapa Rajapakse

Yentl Swolfs

Zafer Gürdal

R

Ralf Schlediewski Ramesh Talreja Ramzi Othman Remko Akkerman Richard A. Vaia **Richard Trask** Robert J Youna Rogier Nijssen Rui Miranda Guedes

### S

S. Mark Spearing Sam Kaddour Samit Roy Sayata Ghose Serge Abrate Shinji Ogihara Silvestre Pinho Simon Frost Soraya Piemente Staffan Lundström Stefan Hallström Stepan Lomov Stephen Pickering Steve Hallett Steven R. Nutt Su Su Wang Sung Ha Suong V. Hoa Suresh G. Advani Sylvain Drapier

### Т

Theodore P. Philippidis Thomas Kruse Tobias Wille Tom L. Andersen Tom Turner Tony Belcher

### ប

Urs Meier

### **Scandinavian Organising and Scientific Committee**

### Denmark:

Professor Ole Thybo Thomsen, General Chair, Southampton University & Aalborg University

Professor Bent F. Sørensen, Scientific Chair, Technical University of Denmark

Associate Professor Christian Berggreen, Program Chair, Technical University of Denmark

Mr. Lars Friis Farsøe, The Danish Plastics Federation, Division of Composite Materials

Dr. Povl Brøndsted, Technical University of Denmark, Department of Wind Energy

Dr. Kim Branner, Technical University of Denmark, Department of Wind Energy

Professor Erik Lund, Aalborg University, Department of Mechanical and Manufacturing Engineering

Professor Janice Barton, Univ of Southhampton & Aalborg University, Department of Mechanical and Manufacturing Engineering

Associate Professor Brian Nyvang Legarth, Technical University of Denmark. Department of Mechanical Engineering

#### Sweden:

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Professor Dan Zenkert, Royal Institute of Technology, Department of Aeronautical and Vehicle Engineering

Professor Janis Varna, Luleå University of Technology, Department of Engineering Sciences and Mathematics

Professor Kristofer Gamstedt, Uppsala University, Department of Engineering Sciences

Professor Lars Berglund, Royal Institute of Technology, Wallenberg Wood Centre

Professor Kristiina Oksman, Luleå University of Technology, Department of Applied Physics and Mechanical Engineering

#### Norway:

Professor Andreas Echtermeyer, Norwegian University of Science and Technology, Department of Engineering Design and Materials

Professor Brian Hayman, Oslo University, Department of Mathematics

# Michael William Hver Miguel Ángel Rodríguez

Ν

Nancy R. Sottos Norbert Blanco

Ρ Jun Takahashi

### К K. H. Leong Karl Schulte Kim Branner Kim Kose

### Scientific programme

The overall theme for the ICCM20 is "Sustainable Composite Solutions to Global Challenges", which reflects the very important role that composite materials have in developing future sustainable low carbon foot print and low CO2 emission technologies that are so essential and a prerequisite for providing the basis for further development and improvement of the living conditions of the people of the world.

The themes chosen for ICCM20 will cover all relevant aspects of the science and technology of composite materials included in but not limited to the overall professional theme areas of Nanocomposites, Structures and Design, Damage and Failure, Fatigue, Dynamic Effects, Novel Material Systems, Experimental Characterization, Health/Condition Monitoring, Smart/Adaptive Material Systems, Manufacturing, Applications as well as covering special sessions within education/skills/training and technology transfer.

#### How to navigate in the scientific programme

Remember that you can also search for all presentations in your ICCM20 app.

The **session number** is made of 4 digits: XYZZ X = day (Monday = 1, Tuesday = 2 ...) Y = session number this day ZZ = room code

The programme number is made of the above 4 digits and adding the order of the presentations in the session: XYZZ-VV X = day (Monday = 1, Tuesday = 2 ...) Y = session number this day ZZ = room code VV = presentation order in the session

In the printed program, the rooms located closely to each other are, see table below and venue map page 4.

Break out room	Room code		Break out room	Room code
Congress Hall A	01		Meeting room 6	12
Auditorium 15	02		Meeting room 7	13
Auditorium 10	03	1	M1	14
Auditorium 11	04	1	M2	15
Auditorium 12	05	1	M3	16
Meeting room 18	06	1	M4	17
Meeting room 19	07	1	M5	18
Meeting room 20	08	1	M6	19
Meeting room 17	09	1	M7	20
Meeting room 16	10	1	M8	21
Meeting room 5	11		Center Stage	22

### How to navigate the poster and mini-oral programme

The poster presentations at the ICCM20 are fully integrated in the scientific programme. The poster sessions will include a short 3 minutes long oral overview presentation (termed "mini-oral") of each poster (maximum of 3 slides) given in plenum to the entire conference. This will be followed by a poster session that will take place in the Exhibition area and Foyer of the Bella Center and where the presented posters will be on display and open for discussion.

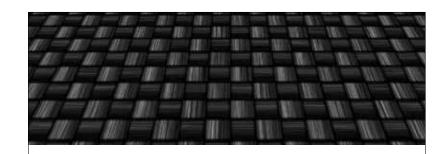
The Posters are on display from Monday 20 July at 9.00 and until Wednesday 23 July at 16.30.

The numbers in the mini-oral programme is also the number of the posters : the numbers are as follows: PXXZ-W P=Poster

XX = session – (session 100 from 9:30  $\,$  and session 200 from 13:00)

Z = Stage number for presentation (stages 1,2,3,4,5) W = presentation order in the session (20 presentations in each session)





### The Industry's Composite Laboratory

- Material selection
- Structural design
- Manufacturing processes
- Mechanical testing
- Chemical and thermal analysis
- Ultrasound and X-ray analysis

The Industry's Composite Laboratory is a partnership lead by FORCE Technology, an Advanced Technology Group (GTS) providing development, consultancy and service within testing, sensors, materials, production optimisation etc.

### Visit us at the ICCM20 conference at stand no. 019!





### **Programme at a glance**

### Monday 20 July

	Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16	Meeting room 5			
8:30	Opening Ceremony													
8:50	PETER SCALA LECTURE	by: Ramesh Talreja, Texa	s A&M University, USA: Ir	tegration of manufacturin	g and failure analyses fo	r sustainable design of co	mposites							
9:45	COFFEE BREAK													
10:15	1101 Processing	1102 Nano Compo-	1103 Multifunctional	1104 Fatigue 1	1105 Structural Analy-	1106 Processing	1107 Process Model-	1108 Biocomposites 1	1109 Interfaces and	1110 Ceramic Matrix	1111 Textile-Based			
	- Manufacturing	sites 1	Composites - Sensing		sis and Optimization 1	- Preforming Techno-	ling 1		Interphases 1	Composites	Composites and Fibre			
	Technology 1		and Actuation 1			logies					Architecture 1			
12:15	LUNCH BREAK													
13:30	INDUSTRY SESSION - ex	xhibitors will be presentin	g latest news in the indus	stry										
15:00	1201 Processing	1202 Nano Compo-	1203 Multifunctional	1204 Fatigue 2	1205 Structural Analy-	1206 Process Induced	1207 Process Model-	1208 Biocomposites 2	1209 Interfaces and	1210 Foams, Cellular	1211 Textile-Based			
	- Manufacturing	sites 2	Composites - Sensing		sis and Optimization 2	Effects 1	ling 2		Interphases 2	and Lattice Materials 1	Composites and Fibre			
	Technology 2		and Actuation 2								Architecture 2			
16:20	COFFEE BREAK													
16:40	1301 Processing	1302 Nano Compo-	1303 Multifunctional	1304 Fatigue 3	1305 Structural Analy-	1306 Process Induced	1307 Process Model-	1308 Biocomposites 3	1309 Interfaces and	1310 Foams, Cellular	1311 Textile-Based			
	<ul> <li>Manufacturing</li> </ul>	sites 3	Composites - Sensing		sis and Optimization 3	Effects 2	ling 3		Interphases 3	and Lattice Materials 2	Composites and Fibre			
	Technology 3		and Actuation 3								Architecture 3			
18:00	BUS DEPARTURE FOR th	ne WELCOME RECEPTION	at tivoli gardens											

	Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16	Meeting room 5
8:30	PLENARY SPEECH by: S	. Mark Spearing, Universi	ty of Southampton, United	Kingdom: High resolutior	n computed tomography	studies of composite mate	erials: The data rich mec	hanics opportunity			
9:30	Mini Oral Session I in										
	Congress Hall A2										
11:00	Poster Session in the Ex	hibition area and the Foy	ver								
	LUNCH BREAK										
	Mini Oral Session II in										
	Congress Hall A2										
14:10	Poster Session in the Ex	chibition area and the Foy	er								
15:00	2101 Processing	2102 Nano Compo-	2103 Multifunctional	2104 Fatigue 4	2105 Structural Analy-	2106 Process Induced	2107 Process Model-	2108 Biocomposites 4	2109 Interfaces and	2110 Foams, Cellular	2111 Textile-Based
15:00	- Manufacturing	2102 Nano Compo- sites 4	Composites - Sensing	2104 Fatigue 4	2105 Structural Analy- sis and Optimization 4	2106 Process Induced Effects 3	2107 Process Model- ling 4	2108 Biocomposites 4	2109 Interfaces and Interphases 4	2110 Foams, Cellular and Lattice Materials 3	Composites and Fibre
	- Manufacturing Technology 4			2104 Fatigue 4				2108 Biocomposites 4		/	
	- Manufacturing		Composites - Sensing	2104 Fatigue 4				2108 Biocomposites 4		/	Composites and Fibre
16:20	- Manufacturing Technology 4 COFFEE BREAK 2201 Processing	sites 4 2202 Nano Compo-	Composites - Sensing and Actuation 4 2203 Multifunctional	2104 Fatigue 4 2204 Fatigue 5	sis and Optimization 4	Effects 3 2206 Process Induced	ling 4 2207 Process Model-		Interphases 4 2209 Interfaces and	and Lattice Materials 3 2210 Ductile and	Composites and Fibre Architecture 4
16:20	- Manufacturing Technology 4 COFFEE BREAK 2201 Processing - Manufacturing	sites 4	Composites - Sensing and Actuation 4 2203 Multifunctional Composites - Sensing		sis and Optimization 4	Effects 3	ling 4		Interphases 4	and Lattice Materials 3 2210 Ductile and Pseudo-ductile Com-	Composites and Fibre Architecture 4 2211 Textile-Based Composites and Fibre
16:20 16:40	- Manufacturing Technology 4 COFFEE BREAK 2201 Processing	sites 4 2202 Nano Compo-	Composites - Sensing and Actuation 4 2203 Multifunctional		sis and Optimization 4	Effects 3 2206 Process Induced	ling 4 2207 Process Model-		Interphases 4 2209 Interfaces and	and Lattice Materials 3 2210 Ductile and	Composites and Fibre Architecture 4

### >>> Monday 20 July

Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8	Center Stage
Opening Ceremony				,			•			
PETER SCALA LECTUR	E by: Ramesh Talreja, Texas A	A&M University, USA: Inte	gration of manufacturing ar	nd failure analyses for sust	ainable design of composi	tes				
COFFEE BREAK										
1112 Graphene,	1113 Dynamic Material	1114 Fracture and	1115 Fracture and	1116 Fracture and Da-	1117 Constitutive	1118 Joints - Design,	1119 In-situ Micro-Me-	1120 Applications -	1121 Multifunctional	
Graphene-Based	Behaviour	Damage - Microme-	Damage - Laminate	mage - Delamination 1	Models 1	Manufacturing and	chanical Testing	Offshore and Subsea	Composites - Energy	
Composites 1		chanics 1	Scale 1			Testing 1			Storage and Harvesting 1	
LUNCH BREAK										
INDUSTRY SESSION - e	exhibitors will be presenting	latest news in the industry	1							
1212 Graphene,	1213 X-ray Computed	1214 Fracture and	1215 Fracture and	1216 Fracture and Da-	1217 Constitutive	1218 Joints - Design,	1219 Applications -	1220 Applications -	1221 Multifunctional	1222 Workshop:
Graphene-Based	Tomography 1	Damage - Microme-	Damage - Laminate	mage - Delamination 2	Models 2	Manufacturing and	Aerospace 1	Automotive and Rail 1	Composites - Energy	Applications - Industry
Composites 2		chanics 2	Scale 2			Testing 2			Storage and Harvesting	Needs 1
									2	
COFFEE BREAK						-			<b>1</b>	
1312 Graphene,	1313 X-ray Computed	1314 Fracture and	1315 Fracture and	1316 Fracture and Da-	1317 Constitutive	1318 Joints - Design,	1319 Applications -	1320 Applications -	1321 Multifunctional	1322 Workshop:
Graphene-Based	Tomography 2	Damage - Microme-	Damage - Laminate	mage - Delamination 3	Models 3	Manufacturing and	Aerospace 2	Automotive and Rail 2	Composites - Energy	Applications - Industry
Composites 3		chanics 3	Scale 3			Testing 3			Storage and Harvesting	Needs 2
									3	
BUS DEPARTURE FOR 1	he WELCOME RECEPTION AT	TIVOLI GARDENS								

### >>> Tuesday 21 July

Neeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8	Center Stage
PLENARY SPEECH by: S	. Mark Spearing, University	of Southampton, United K	ingdom: High resolution cor	nputed tomography studie	s of composite materials:	The data rich mechanics of	opportunity			
									2121 Special	
									Symposium on active	
									composites - 1	
UNCH BREAK										1
									2321 Special Symposium	
									on active composites - 2	
									-	
									-	
									2521 Special Symposi-	
									um on active composites	
									- 3	
2112 Graphene,	2113 X-ray Computed	2114 Fracture and	2115 Fracture and	2116 Fracture and Da-	2117 Pressure Vessels	2118 Joints - Design,	2119 Applications -	2120 Dynamic Fracture		2122 Workshop on
Graphene-Based	Tomography 3	Damage - Microme-	Damage - Laminate	mage - Delamination 4	and Piping 1	Manufacturing and	Aerospace 3	1		quality in scientific
Composites 4		chanics 4	Scale 4			Testing 4				publication 1
OFFEE BREAK										
212 Graphene,	2213 X-ray Computed	2214 Fracture and	2215 Fracture and	2216 Fracture and Da-	2217 Pressure Vessels	2218 Joints - Design,	2219 Applications -	2220 Applications - Bio	2621 Special	2222 Workshop on
Graphene-Based	Tomography 4	Damage - Microme-	Damage - Laminate	mage - Delamination 5	and Piping 2	Manufacturing and	Aerospace 4	& Medical 1	Symposium on active	quality in scientific
Composites 5		chanics 5	Scale 5			Testing 5			composites - 4	publication 2
ND OF DAY										

### //Programme at a glance

### Wednesday 22 July

	Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16	Meeting room 5
8:30	PLENARY SPEECH by:	Yapa D. S. Rajapakse, Offi	ce of Naval Research, Virgi	nia, USA: Extreme loadi	ing of composite materials	in naval applications	·			·	
9:30	3101 Processing - Manufacturing Technology 6	3102 Nano Compo- sites 6	3103 ONR Special Symposium on Marine Composites 1	3104 Fatigue 6	3105 Structural Analy- sis and Optimization 6	3106 Process Induced Effects 5	3107 Process Model- ling 6	3108 Fibre reinforce- ment	3109 Interfaces and Interphases 6	3110 Damage Tole- rance of Composite Structures 1	3111 Textile-Based Composites and Fibre Architecture 6
10:50	COFFEE BREAK										
11:20	3201 Processing - Manufacturing Technology 7	3202 Nano Compo- sites 7	3203 ONR Special Symposium on Marine Composites 2	3204 Fatigue 7	3205 Structural Analy- sis and Optimization 7	3206 Process Induced Effects 6	3207 Process Model- ling 7	3208 Biocomposites 6	3209 Interfaces and Interphases 7	3210 Damage Tole- rance of Composite Structures 2	3211 Textile-Based Composites and Fibre Architecture 7
13:00	LUNCH BREAK								•		
14:00	3301 Processing - Manufacturing Technology 8	3302 Nano Compo- sites 8	3303 ONR Special Symposium on Marine Composites 3	3304 Fatigue 8	3305 Structural Analy- sis and Optimization 8	3306 Process Induced Effects 7	3307 Process Model- ling 8	3308 Biocomposites 7	3309 Recycling of Composites and Sustainability 1	3310 Damage Tole- rance of Composite Structures 3	3311 Textile-Based Composites and Fibre Architecture 8
15:20	COFFEE BREAK				1		I		1	1	
15:40	3401 Processing - Manufacturing Technology 9	3402 Nano Compo- sites 9	3403 ONR Special Symposium on Marine Composites 4	3404 Fatigue 9	3405 Structural Analy- sis and Optimization 9	3406 Experimental Methods for Process Characterisation 1	3407 Short Fibre Composites 1	3408 Biocomposites 8	3409 Recycling of Composites and Sustainability 2	3410 Damage Tole- rance of Composite Structures 4	3411 Textile-Based Composites and Fibre Architecture 9
16:50											
17:15	General Assembly										
19:15	END OF DAY										

### Thursday 23 July

	Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16	Meeting room 5
8:30	PLENARY SPEECH by: Ig	naas Verpoest, Katholieke	e Universiteit Leuven, Belg	jium: From fibres to tapes	, from synthetic to natura	al fibres: a new generation	n of textile composites an	d their applications			
9:30	4101 Processing - Manufacturing Technology 10	4102 Nano Compo- sites 10	4103 ONR Special Symposium on Marine Composites 5	4104 Multifunctional Composites - Self-He- aling and Bio-inspired Designs 1	4105 Structural Analysis and Optimi- zation 10	4106 Experimental Methods for Process Characterisation 2	4107 Fibres 1	4108 Biocomposites 9	4109 Liquid Composi- tes Moulding 1	4110 Sandwich Struc- tures and Materials 1	4111 Multifunctional Composites - Adaptive Response and Recon- figuration 3
10:50	COFFEE BREAK										
11:20	4201 Processing - Manufacturing Technology 11	4202 Nano Compo- sites 11	4203 ONR Special Symposium on Marine Composites 6	4204 Multifunctional Composites - Self-He- aling and Bio-inspired Designs 2	4205 Structural Analysis and Optimi- zation 11	4206 Experimental Methods for Process Characterisation 3	4207 Short Fibre Composites 2	4208 Biocomposi- tes 10	4209 Liquid Composi- tes Moulding 2	4210 Sandwich Struc- tures and Materials 2	4211 Multifunctional Composites - Coupled Properties and Mul- ti-physics Models 1
13:00	LUNCH BREAK										
14:00	PLENARY SPEECH by: J	insong Leng: Stimulus-res	sponsive polymer compos	ites: a path towards activ	e shape changing structu	ures					
15:00	4301 Processing - Manufacturing Technology 12	4302 Nano Compo- sites 12	4303 ONR Special Symposium on Marine Composites 7	4304 Multifunctional Composites - Self-He- aling and Bio-inspired Designs 3	4305 Applications - Bio & Medical 2	4306 Experimental Methods for Process Characterisation 4	4307 Short Fibre Composites 3	4308 Biocomposi- tes 11	4309 Recycling of Composites and Sustainability 3	4310 Fibres 2	4311 Multifunctional Composites - Adaptive Response and Recon- figuration 4
16:20	COFFEEBREAK			<u>.</u>					1		
16:40	4401 Processing - Manufacturing Technology 13	4402 Nano Compo- sites 13	4403 Sandwich Struc- tures and Materials 3	4404 Multifunctional Composites - Self-He- aling and Bio-inspired Designs 4	4405 Applications - Bio & Medical 3	4406 Experimental Methods for Process Characterisation 5	4407 Textile-Based Composites and Fibre Architecture 10	4408 Biocomposi- tes 12	4409 Recycling of Composites and Sustainability 4	4410 Fibres 3	4411 Multifunctional Composites - Adaptive Response and Recon- figuration 5
19:30	Conference dinner at Be	ella Center, Exhibtion Area							•	•	
23:30	END OF DAY										

### >>> Wednesday 22 July

Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8	Center Stage
PLENARY SPEECH by: Yap	a D. S. Rajapakse, Office o	f Naval Research, Virginia	, USA: Extreme loading of	composite materials in na	val applications			·		
3112 Graphene, Graphene-Based Composites 6	3113 Matrix Materials 1	3114 Fracture and Damage - Materials Scale 1	3115 Models Homo- genization – Micro to Macro 1	3116 Nanocomposites for Structural Light- weight - Modelling and Testing 1	3117 Ductile and Pseudo-ductile Com- posites 2	3118 Fire Resistance 1	3119 Applications - Aerospace 5	3120 New Structural Testing Methods 1	3121 Multifunctional Composites - Sensing and Actuation 6	3122 Tsai Award 1
COFFEE BREAK										'Young scientist award' - The Danish Plastics Federation – Composite Division
3212 Graphene, Graphene-Based Composites 7	3213 Matrix Materials 2	3214 Fracture and Damage - Microme- chanics 6	3215 Models Homo- genization – Micro to Macro 2	3216 Fracture and Da- mage - Delamination 6	3217 Ductile and Pseudo-ductile Com- posites 3	3218 Fire Resistance 2	3219 Applications - Aerospace 6	3220 New Structural Testing Methods 2	3221 Multifunctional Composites - Adaptive Response and Reconfi- guration 1	3222 Tsai Award 2
LUNCH BREAK										
3312 Graphene, Graphene-Based Composites 8	3313 Matrix Materials 3	3314 Fracture and Damage - Materials Scale 2	3315 Models Homo- genization – Micro to Macro 3	3316 Nanocomposites for Structural Light- weight - Modelling and Testing 2	3317 Ductile and Pseudo-ductile Com- posites 4	3318 Fire Resistance 3	3319 Applications - Civil Engineering 1	3320 New Structural Testing Methods 3	3321 Multifunctional Composites - Adaptive Response and Reconfi- guration 2	3322 Workshop on Failure of composites: current status and future directions 1
COFFEE BREAK						•	•			•
3412 Foams, Cellular and Lattice Materials 4	3413 Matrix Materials 4	3414 Fracture and Damage - Materials Scale 3	3415 Models Homo- genization – Micro to Macro 4	3416 Nanocomposites for Structural Light- weight - Modelling and Testing 3	3417 Manufacturing Up-Scaling and Auto- mation 1	3418 Sensors in Experi- mental Mechanics 1	3419 Applications - Civil Engineering 2	3420 New Structural Testing Methods 4	3421 Multifunctional Composites - Smart Structures 1	3422 Workshop on Failure of composites: current status and future directions 2
										Industry Session JEC Group
General Assembly										
END OF DAY										

### >>> Thursday 23 July

Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8	Center Stage
PLENARY SPEECH by: Ign	aas Verpoest, Katholieke L	Iniversiteit Leuven, Belgiur	n: From fibres to tapes, fro	m synthetic to natural fibre	s: a new generation of tex	tile composites and their a	applications			
4112 Composites with Metallic Components 1	4113 Ductile and Pseudo-ductile Com- posites 5	4114 Models Homo- genization – Micro to Macro 5	4115 Identification using Full-Field Mea- surements	4116 Dynamic Fracture 2	4117 Manufacturing Up-Scaling and Auto- mation 2	4118 Multiscale Model- ling of Structures 1	4119 Applications - Wind, Wave and Tidal Energy 1	4120 Sensors in Experi- mental Mechanics 2	4121 Multifunctional Composites - Smart Structures 2	
COFFEE BREAK	I	I		I					I	
4212 Composites with Metallic Components 2	4213 Hybrid Compo- sites 1	4214 Fracture and Damage - Materials Scale 4	4215 Digital Image Correlation 1	4216 Durability, Creep and Agressive Environ- ment 1	4217 Manufacturing Up-Scaling and Auto- mation 3	4218 Multiscale Model- ling of Structures 2	4219 Applications - Wind, Wave and Tidal Energy 2	4220 Sensors in Experi- mental Mechanics 3	4221 Multifunctional Composites - Smart Structures 3	
LUNCH BREAK	I	I		I					I	
PLENARY SPEECH by: Jin	song Leng: 404 Stimulus-	responsive polymer comp	osites: a path towards activ	ve shape changing structur	res					
4312 Composites with Metallic Components 3	4313 Hybrid Compo- sites 2	4314 Simulation of Progressive Failure 1	4315 Digital Image Correlation 2	4316 Durability, Creep and Agressive Environ- ment 2	4317 Impact and Dynamic Structural Analysis 1	4318 Multiscale Model- ling of Structures 3	4319 Applications - Ships and Boats	4320 Thermography 1	4321 Multifunctional Composites - Proces- sing and Integration 1	
COFFEE BREAK		1		1					Į.	
4412 Composites with Metallic Components 4	4413 Hybrid Compo- sites 3	4414 Simulation of Progressive Failure 2	4415 Digital Image Correlation 3	4416 Dynamic Fracture 3	4417 Impact and Dynamic Structural Analysis 2	4418 Multiscale Model- ling of Structures 4	4419 Applications - Civil Engineering 3	4420 Thermography 2	4421 Multifunctional Composites - Proces- sing and Integration 2	
Conference dinner at Bel	a Center, Exhibtion Area	1	1	1		1	1		1	
END OF DAY										

### //Programme at a glance

### Friday 24 July ൝

	Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16	Meeting room 5
8:30	PLENARY SPEECH by:	Richard A. Vaia, Air Force F	Research Laboratory, Ohio	USA - Materials for futu	re aerospace technologie	s: Challenges and opport	unities				
9:30	5101 Processing - Manufacturing Technology 14	5102 Nano Compo- sites 14	5103 Sandwich Struc- tures and Materials 4	5104 Fatigue 10		5106 Manufacturing Up-Scaling and Automation 4	5107 Processing - Manufacturing Technology 16	5108 Short Fibre Composites 4	5109 Process Induced Effects 8	5110 Fibres 4	5111 Multifunctional Composites - Coupled Properties and Mul- ti-physics Models 2
10:50	COFFEE BREAK										
11:20	5201 Processing - Manufacturing Technology 15	5202 Nano Compo- sites 15	5203 Sandwich Struc- tures and Materials 5	5204 Multifunctional Composites - Self-He- aling and Bio-inspired Designs 5	5205 Structural Design Criteria, Safety and Reliability	5206 Experimental Methods for Process Characterisation 6	5207 Liquid Composi- tes Moulding 3	5208 Short Fibre Composites 5	5209 Recycling of Composites and Sustainability 5	5210 Fibres 5	5211 Multifunctional Composites - Coupled Properties and Mul- ti-physics Models 3
13:00	LUNCH BREAK										
	Closing Ceremony										
	GOODBYE AND HOPE I	TO SEE YOU IN 2017 FOR T	HE ICCM21!								

### **>>>** Friday 24 July

	Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8	Center Stage
8:30	PLENARY SPEECH by: Richard A. Vaia, Air Force Research Laboratory, Ohio, USA - Materials for future aerospace technologies: Challenges and opportunities										
9:30	5112 Tribology and	5113 Damage Tole-	5114 Simulation of	5115 Durability,	5116 Dynamic	5117 Impact and	5118 Applications -	5119 Applications -	5120 Ultrasound and		
	Wear	rance of Composite	Progressive Failure 3	Creep and Agressive	Fracture 4	Dynamic Structural	Automotive and Rail 3	Civil Engineering 4	Acoustic Emission		
		Structures 5		Environment 3		Analysis 3					
10:50	COFFEE BREAK										
11:20	5212 Matrix materials	5213 Damage Tole-	5214 Simulation of	5215 Durability,		5217 Impact and	5218 Hybrid Compo-	5219 Applications -			
	5	rance of Composite	Progressive Failure 4	Creep and Agressive		Dynamic Structural	sites 4	Civil Engineering 5			
		Structures 6		Environment 4		Analysis 4					
13:00	LUNCH BREAK										
14:00	Closing Ceremony										
	GOODBYE AND HOPE TO	SEE YOU IN 2017 FOR T	HE ICCM21!								



### **Plenary Speakers**

Ramesh Talreja (Peter Scala award)

Department of Aerospace Engineering at Texas A&M University, USA

Ramesh Talreja's research career began in 1978 with a project dealing with fatigue of wind turbine blades made of glass/polyester for the Danish Wind Energy programme. His work over the next seven years led to the monograph, "Fatigue of Composite Materials", and continued with contributions to the field of damage and failure of composite materials. After more than fifteen years on the faculty of the Technical University of Denmark, he moved to the United States to join Georgia Institute of Technology as a professor of Aerospace



Engineering, and 10 years later, to head the Department of Aerospace Engineering at Texas A&M University. Professor Talreja has written numerous papers, book chapters, and most recently, the book, "Damage and Failure of Composite Materials" (with C.V. Singh), while serving on the editorial boards of 15 journals and editing several book volumes. His current interests are in cost-effective manufacturing of composites through engineering of defects.

### **Monday 20 July at 8.50** - PETER SCALA LECTURE: Integration of manufacturing and failure analyses for sustainable design of composites

### Ignaas Verpoest

Department of Materials Engineering, Katholieke Universiteit Leuven (KU Leuven), Belgium



Prof. Ignaas VERPOEST was a full professor at the Katholieke Universiteit Leuven (Belgium and guiding a group of 8 postdoc researchers and 25 PhD-students. He is the author of more than 210 journal papers, about 500 conference papers and 3 books, and holds 15 patents. Since September 2013, Ignaas Verpoest is emeritus professor at KU Leuven. Prof. Verpoest is holder of the Toray Chair in Composite Materials at KU Leuven. He was President of the European Society for Composite Materials (ESCM), and of the

International Committee on Composite Materials. Prof. Ignaas Verpoest won several awards, amongst others the Descartes Prize for Science Communication of the European Commission (2004), the International Fellowship of the Society for the Advancement of Materials Processing and Engineering (SAMPE, 2009) and of the International Committee on Composite Materials (ICCM, 2009). In 2014, he was awarded the 'Medal of Excellence in Composite Materials' of the University of Delaware. He is also co-founder and board member of the company Econcore, worldwide producer of innovative honeycomb cores.

### **Thursday 23 July at 8:30** - From fibres to tapes, from synthetic to natural fibres: a new generation of textile composites and their applications

### Yapa D. S. Rajapakse

Programme Manager, Solid Mechanics, Office of Naval Research (ONR), USA

Dr. Rajapakse manages the ONR Solid Mechanics Programme, with the current focus on Mechanics of Marine Composites and Composite Sandwich Structures. He received his Ph. D. degree in Applied Mechanics (Advisor: J.N. Goodier), and a M. S. degree in Mathematics, from Stanford University. He is a Fellow of 4 technical societies: American Society of Mechanical Engineers (ASME), Society of Engineering Science (SES), American Society for Composites (ASC), and American Academy of Mechanics. He has served on several



Editorial Boards of technical journals, including Composites Science and Technology, J. Sandwich Structures and Materials, J. Composite Materials, and Composites Part B. He has served SES as President, Vice-president, Member-Board of Directors. He has served ASME as Chairman of the Composite Materials Committee of the Applied Mechanics Division, and ASC as Chairman of the Polymer-Matrix Composites Division. He has organized ONR Symposia at the last four ICCM conferences. He has edited/coedited 32 books (e.g. Dynamic Failure of Materials and Structures, Blast Mitigation: Experimental and Numerical Studies). Jinsong Leng

Center for Smart Materials and Structures at Harbin Institute of Technology, China

Prof. Leng is Cheung Kong Chair Professor and Director of the Center for Smart Materials and Structures at Harbin Institute of Technology, China. His researches cover Sensors & Actuators, Stimulus Responsive Polymers (Shape Memory and Electro-Active Polymers) and their composites, Multifunctional Nanocomposites, Active Vibration Control, Structural Health Monitoring, and Active Morphing Structures. Prof. Leng has authored or co-authored over 260 scientific papers, 8 books/chapters, 29 issued pat-



ents and 15 pending patents. He is editor in Chief of International Journal of Smart and Nano Materials, Associate Editor of Smart Materials and Structures and Journal of Intelligent Materials Systems and Structures, and editorial board member of Composites A. Prof. Leng has been elected as an Executive Council Member of ICCM, Fellow of SPIE, Fellow of Institute of Physics (IOP), Fellow of Royal Aeronautical Society (RAeS), Fellow of Institute of Materials, Minerals, and Mining (IMMM) and Associate Fellow of AIAA.

Thursday 23 July at 14:00 - Stimulus-responsive polymer composites: a path towards active shape changing structures

### S. Mark Spearing

School of Engineering Sciences, Southampton University. UK

Mark Spearing is Professor of Engineering Materials in the School of Engineering Sciences at Southampton University. He has served as Head of the School of Engineering Sciences and currently as Provost and Pro Vice-Chancellor (International) for the University. Prior to his appointment at Southampton he was a Professor of Aeronautics and Astronautics at the Massachusetts Institute of Technology, from 1994-2004. His technical interests include advanced composites materials, processes and structural analysis,



design of Micro- and Nano-Systems, electronic packages and structural health monitoring. His work in composite materials has focused on understanding damage and failure processes with the aim of producing mechanism-based models to guide material development and design methods. He has been working in the field of composite materials since 1986, and attended his first ICCM in London in 1987. Spearing is an editor of the Journal of Composite Materials and also of Journal of Microelectromechanical Systems. He has published over 170 technical publications, including more than 100 in refereed journals. He holds five patents. In 2004 he received a Royal Society-Wolfson Research Merit Award.

**Tuesday 21 July at 8:30** - High resolution computed tomography studies of composite materials: The data rich mechanics opportunity

### Richard A. Vaia

Functional Materials Division of the Materials and Manufacturing Directorate, U.S. Air Force Research Laboratory (AFRL)

Richard A. Vaia is the Technology Director of the Functional Materials Division of the Materials and Manufacturing Directorate at the U.S. Air Force Research Laboratory (AFRL). The Division delivers functional materials and processing solutions that revolutionize AF aircraft, spacecraft, launch vehicles, and their structural, electronic and optical components. Rich serves on numerous editorial boards, Board of Directors and external



review panels, and has authored over 200 peer-reviewed papers and patents on polymer nanocomposites, complex nanoparticle architectures and their impact on developing adaptive soft matter. He received his PhD in Materials Science and Engineering at Cornell University in 1995, and is a Fellow of the Materials Research Society, American Physical Society, American Chemical Society (PMSE Division), and the Air Force Research Laboratory.

Friday 24 July at 8:30 - Materials for future aerospace technologies: Challenges and opportunities

Wednesday 22 July at 8:30 - Extreme loading of composite materials in naval applications

### **Keynote Speakers**

#### Monday 20 July

Time	Programme number	Presenter	Title	Room
10:15-10:55	1108-1	Larry Lessard, Aart van Vuure	FATIGUE BEHAVIOUR OF WOVEN FLAX/EPOXY COMPOSITES	Meeting Room 20
10:15-10:55	1111-1	Valter Carvelli	FATIGUE PERFORMANCE OF MICRO-FIBRILLATED CELLULOSE AND RUBBER NANOPARTICLE HYBRID EPOXY RESIN REIN- FORCED CARBON PLAIN WEAVE	Meeting Room 5
10:15-10:55	1118-1	Evangelos Ioannis Avgoulas	NUMERICAL AND EXPERIMENTAL INVESTIGATION OF CFRP TO PERFORATED STEEL JOITNS	M5
15:00-15.40	1203-1	Fu-Kuo Chang	A COMPOSITE INTELLIGENT WING WITH STATE-SENSING AND AWARENESS CAPABILITIES	Auditorium 10
15:00-15.40	1221-1	Emilie Greenhalgh	RECENT ADVANCES IN STRUCTURAL SUPERCAPACITORS FOR TRANSPORT APPLICATIONS	M8
16.40-17.20	1306-1	Göran Fernlund	BULK AND SURFACE POROSITY IN OUT-OF-AUTOCLAVE PREPREGS	Meeting Room 18

#### Tuesday 21 July

15:00-15:40	2105-1	Erik Lund	RECENT DEVELOPMENTS OF DISCRETE MATERIAL OPTIMIZA-	Auditorium 12
			TION OF LAMINATED COMPOSITE STRUCTURES	
15:00-15:40	2116-1	Masaki Hojo	CHARACTERIZATION OF FATIGUE R-CURVES BASED ON	M3
			GMAX-CONSTANT DELAMINATION TESTS IN CF/PEEK LAMI-	
			NATES	
16:40-17:20	2203-1	Ray Baughman	POWERFUL ARTIFICIAL MUSCLES FOR MORPHING COMPOSITES	Auditorium 10
16:40-17:20	2210-1	Michael Wisnom	HIGH PERFORMANCE PSEUDO-DUCTILE COMPOSITES	Meeting Room 16
16:40-17:20	2219-1	Thomas Kruse	BONDING OF CFRP PRIMARY AEROSPACE STRUCTURES - CRACK-	M6
			STOPPING IN COMPOSITE BONDED JOINTS UNDER FATIGUE	

### Wednesday 22 July

9:30-10:10	3103-1	Romesh Batra	DEFORMATIONS DUE TO EXPLOSIVE AND IMPLOSIVE LOADS	Auditorium 10
			OF SANDWICH CYLINDERS USING THIRD ORDER SHEAR AND	
			NORMAL DEFORMABLE THEORY (TSNDT)	
9:30-10:10	3112-1	lan Kinloch	STRUCTURAL GRAPHENE COMPOSITES: TAKING THE LESSONS	Meeting Room 6
			OF FUNDAMENTAL STUDIES THROUGH TO BULK COMPOSITES	
11:20-12:00	3204-1	Marino Quaresimin	MICROSCOPIC DAMAGE EVOLUTION IN OFF-AXIS PLIES UNDER	Auditorum 11
			FATIGUE LOADING	
11:20-12:00	3210-1	Pedro Camanho	CONSTITUTIVE MODELING AND EXPERIMENTAL CHARACTER-	Meeting Room 16
			IZATION OF THE NON-LINEAR STRESS-STRAIN BEHAVIOR OF	
			UNIDIRECTIONAL CARBON-EPOXY UNDER HIGH STRAIN RATES	
14:00-14:40	3322-1	Mike J. Hinton, Sam	FAILURE OF COMPOSITE: STATUS AND FUTURE DIRECTION	Center Stage
		Kaddour		
15:40-16:00	3403-1	Dayakar Penumadu	CHARACTERIZATION OF SINGLE CARBON FIBER MECHANICAL	Auditorium 10
			BEHAVIOR BY NANO-TENSILE TESTING	

#### Thursday 23 July

11:20-12:00	4201-1	Peter Mitschang	IMPREGNATION PERFORMANCE OF NON-ISOBARIC PROCESSES	Congress Hall A1
11:20-12:00	4206-1	Timotei Centea,	MULTI-SCALE MATERIAL AND PROCESS CHARACTERIZATION	Meeting Room 18
		Steven Nutt	FOR RESIN TRANSFER MOLDING: CASE STUDY FOR A BLENDED	
			EPOXY/PHENOLIC RESIN	
11:20-12:00	4211-1	Somnath Ghosh	MULTI-SCALE COMPUTATIONAL MODELING FRAMEWORK FOR	Meeting Room 5
			COUPLED ELECTROMAGNETICS AND MECHANICAL SIMULA-	
			TIONS IN MULTIFUNCTIONAL MATERIALS	
11:20-12:00	4218-1	Brian Cox	STOCHASTIC VIRTUAL TESTS FOR FIBER COMPOSITES	M5
16:40-17:20	4419-1	Urs Meier	LONG TERM RELIABILITY OF CFRP IN BRIDGE ENGINEERING	M6
16:40-17:20	4421-1	Scott White	MULTIFUNCTIONAL MICROVASCULAR COMPOSITES	M8

#### Friday 24 July

11:20-12:00	5204-1	Nancy Sottos	SINGLE CHANNEL MICROVASCULAR DELIVERY FOR SELF-HEAL-	Auditorum 11
			ING POLYMER COMPOSITES	
11:20-12:00	5210-1	Yuris Dzenis	SIMULTANEOUSLY STRONG AND TOUGH CONTINUOUS	Meeting Room 16
			NANOFIBERS: NEXT GENERATION REINFORCEMENT FOR NEW	
			STRUCTURAL SUPERCOMPOSITES?	



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### Center Stage programme

### Monday 20 July

	Center Stage
15:00	1222 Introduction of Industry Needs Workshop and Scope
15:05	1222-1 ANALYSIS-ENABLED PRODUCTION AND PERFORMANCE OF COMPOSITE WING STRUCTURES Richard Newley (GKN Aerospace), Richard Butler (University of Bath)
	The GKN - University of Bath partnership developments, such as FE formulations for laminate forming have already influenced manufacturing. New laminate rules will take longer to implement in design.
15:15	Panel Discussion Part 1
15:30	1222-2 EFFICIENT TRANSFER OF PROMISING RESEARCH RESULTS TO INDUSTRIAL APPLICATIONS USING ADAPTIVE PROCESSES Jan Bremer (BCT GmbH)
	Adaptive machining enables scalability and stability of fully automated processes. This is key to permit efficient transfer of research to industry, as for example in automated composite repair.
15:40	1222-3 A MULTIFUNCTIONAL DEVICE APPLYING FOR THE SAFE MAINTENANCE AT HIGH-ALTITUDE ON WIND TURBINES Peter Dahmann (Aachen University of applied Sciences), Stephan Kallweit (Aachen University of applied Sciences), Mohsen Bagheri (Aachen University of applied Sciences), Joseph Schleupen (Aachen University of applied Sciences) Developing this multifunctional climbing device, for scanning, repair and transportation, combines all the existing maintenance solutions for wind turbine blades into one weather-independent platform.
15:50	Panel Discussion Part 2
16:10	1222-4 OPTIMIZATION OF COMPOSITE ICE HOCKEY STICK DESIGN THROUGH FINITE ELEMENT ANALYSIS Adam Gans (Bauer Performance Sports)
	FEA is intrinsic to the design of composite sporting goods. We look to develop new measuring methods, a broader database of material properties, and better tools to predict performance and failure.
16:20	1322-1 STANDARD QUALIFICATION PLAN DEVELOPED TO ENCOURAGE INNOVATION OF NEW MATERIALS AT LOWER COSTS Michael Gower (NPL), <u>Graham Sims</u> (National Physical Laboratory)
	The development and experimental validation of a Standard Qualification Plan (SQP), satisfying minimum common require- ments, to reduce the substantial cost of qualifying new composites is reviewed.
16:30	Panel Discussion Part 3
17:00	1322-2 ENABLERS FOR THE INDUSTRIALIZATION OF INFUSION PROCESSES: MERGING RESEARCH AND APPLICATION DRIVEN EXPECTATIONS Paulin Fideu (Airbus ), Hauke Seegel (Composite Technology Center CTC GmbH), Claus Fastert (Composite Technology Center CTC GmbH), Cyrille Collart (Airbus )
	This paper presents the needs for the industrialization of infusion processes. Based on selected examples, remaining challenges are discussed and some solution approaches are proposed."
17:10	1322-3 CHALLENGES OF INDUSTRIALISATION IN CFRP-ASSEMBLY IN AEROSPACE INDUSTRY Joachim Piepenbrock (Composite Technology Center GmbH), Alexander Engels (Composite Technology Center GmbH)
17:20	Panel Discussion Part 4
17:45	Strategic direction and inuiting participants to continue participating through emails, app etc.
18:00	End of session

#### Tuesday 21 July

	Center Stage
15:00	<ul> <li>2122 Workshop on quality in scientific publication 1 Background and motivation for the workshop: Many scientists feel that the scientific culture of publication and peer review is close to collapse, in the sense that the amount of papers published is increasing dramatically while the overall quality of the published papers may not be at the same high level as was generally perceived in previous times. Many consider this to be a threat to the scientific culture at large. A pessimistic view is that this development threatens to undermine the entire scientific progress in general, and further poses a serious threat to the survivability of the peer review publication system in the long term. There are a number of issues:</li> <li>Editors perspective: For example - The same manuscript is sometimes found to be submitted simultaneously to multip- le journals. The review process does not work properly.</li> <li>Reviewers perspective: Reviewers often receive manuscripts for review that are of poor quality - the impression that possibly a student wrote the manuscript without guidance and thorough review from the supervisor is not uncommon. Poorly prepared manuscripts that include elementary mistakes are sent for review.</li> <li>Readers perspective: As an example a massive growth in the quantity of scientific publications in the field of composite materials has been experienced over the last years. Part of this may be due to increased activity in the research area at large, but the general quality of the papers by some is perceived to be declining (quantity over quality). Part of the explanation could be that not all reviews are being conducted with sufficient care and scrutiny to detail. Another issue is that the underlying mechanism that seem to be driving this development is the increasing pressure on scientists to publish many articles (quantity over quality); universities count publications and citations; scientific journals compete on impact factors, etc.</li> <li>The issues outlined above will be discusse</li></ul>
16:40	2222 Workshop on quality in scientific publication 2

### Wednesday 22 July

	Center Stage
9:30	3122 Tsai Award 1
	3122-1 MICROMECHANICAL CHARACTERISAZION OF FATIGUE DAMAGE INITIATION AND PROPAGATION IN CFRP USING SYNCHROTRON RADIATION COMPUTED TOMOGRAPHY Serafina Consuelo Garcea (University of Southampton), Ian Sinclair (University of Southampton), Simon Mark Spearing (University of Southampton)
	Micromechanisms of fatigue damage have been assessed using in situ and ex situ X-ray computed tomography. Fibre failures along the 0° ply splits and in the bulk composite were detected and quantified.
	3122-2 A MULTISCALE DAMAGE INITIATION MODEL FOR CNT-ENHANCED EPOXY POLYMERS Nithya Subramanian (Arizona State University), Ashwin Rai (Arizona State University), Aditi Chattopadhyay (Arizona State University)
	Multiscale framework simulates inelastic behavior of CNT-epoxy polymers at the molecular level due to bond dissociation and integrates atomistic data with continuum damage mechanics at microscale.
	3122-3 ENABLING FASTER STRUCTURAL DESIGN: EFFICIENT MULTISCALE SIMULATION OF LARGE COMPOSITE STRUCTURES Luigi Gigliotti (Imperial College London), Silvestre Pinho (Imperial College London) Novel Multiscale PBCs, exploiting symmetries in solid-to-shell homogenization of periodic structures, are presented. These reduce modelling (85%) and analysis (89%) CPU times very significantly.
10:50	'Young scientist award' - The Danish Plastics Federation – Composite Division The Danish Plastics Federation – Composite Division is every year awarding a talented young scientist that has impressed with a project related to composite. This year's winner is the 29 year old Ismet Baran, assistant professor at the University of Twente, NL. He finished his PhD study from DTU Mechanical Engineering in 2014 with the thesis 'Modelling the pultrusion process of off shore wind turbines blades'.

### **Wednesday 22 July**

	Center Stage
11:20	3222 Tsai Award 2
	3222-1 AN INVESTIGATION ON HYBRID INTERFACE USING ON-LINE MONITORING EXPERIMENT AND FINITE ELEMENT Analyses
	Hieu Truong (Texas A&M University), Marcias Martinez (Delft University of Technology), Ozden Ochoa (Texas A&M University), Dimitris Lagoudas (Texas A&M University)
	A study on room and elevated temperature mode-I fracture toughness of a hybrid interface using double cantilever beam tests, distributed strain sensing with fiber optics and finite element analysis
	3222-2 IS IT POSSIBLE TO ELIMINATE MICRO-SCALE STRESS CONCENTRATIONS IN COMPOSITES BY NANO ENGINE- ERING WITH CNTS? Valentin Romanov (KU Leuven), Stepan Lomov (KU Leuven), Ignaas Verpoest (KU Leuven), Larissa Gorbatikh (KU Leuven)
	A spatial distribution of CNTs in fiber-reinforced composites at the micro-scale is investigated to suppress stress concentra- tions without affecting stresses in the rest of the matrix.
	3222-3 EFFECT OF FUNCTIONALIZATION OF GRAPHENE ON THERMAL CONDUCTIVITIES OF GRAPHENE/EPOXY COMPO-
	SITES Xi Shen (The Hong Kong University of Science and Technology), Zhenyu Wang (The Hong Kong University of Science and Technology), Ying Wu (The Hong Kong University of Science and Technology), Xiuyi Lin (The Hong Kong University of Science and Technology), Xu Liu (The Hong Kong University of Science and Technology), Xinying Sun (The Hong Kong University of Science and Technology), Jang-Kyo Kim (The Hong Kong University of Science and Technology)
	The effect of functionalization on thermal conductivities of graphene embedded in epoxy and its composites is studied using molecular dynamics simulations.
	3222-4 MECHANICAL PROPERTIES AND MODELING OF DISCONTINUOUS CARBON FIBER REINFORCED THERMOPLA- STICS Yi Wan (the University of Tokyo), Toshiro Ohori (the University of Tokyo), Jun Takahashi (the University of Tokyo)
	Suitability of Mori-Tanaka model on two CFRTPs were certified. Results show dissimilarities in different materials, the reason was considered to be the residual deformation of fiber structures.
14:00	3322 Workshop on Failure of composites: current status and future directions 1
	Organised by:
	Dr A S Kaddour (QinetiQ*, UK) Prof M J Hinton (HVM Catapult**, UK)
	Prof P Smith (The University of Surrey, UK) Prof S Li (Nottingham University, UK)
	Failure of composites is perhaps the biggest single topic towards which the composites community worldwide has been engaged in extensive research initiatives and activities. Arguably, the most notable top level activity is that carried out under the World-Wide Failure Exercises (WWFE), spanning more than 20 years. But, have we reached the endgame, yet? A composite structure could be a single fibre embedded in a matrix, a unit cell, 3D composite, a coupon with hole, a panel with ribs, a vessel, a wing, a blade, a fuselage, an aircraft, a spacecraft etc The workshop will debate how much more work is needed in order to close (or narrow) any gap between academics/theoreticians and industrial designers/end users for designing a composite structure. The workshop will address missing links in validated design capabilities employed for reliably predicting failure evolution and ultimate strength, all the way up to the structural scale. In order to address the above, this work shop will provide a keynote addressing where we are on failure of composites. This is followed by a series of short presentations, given by invited speakers giving their views on future directions in their own areas they are actively leading. Finally, an open discussion and concluding remarks will be made.
14:00	3322-1 FAILURE OF COMPOSITE: STATUS AND FUTURE DIRECTION Mike J. Hinton (High Value Manufacturing Catapult), Sam Kaddour (QinetiQ)

### **>>>** Wednesday 22 July

	Center Stage
14:40	Industry needs: Today and over the coming 10 years
	Problems with interaction between manufacturing and failure Prof A Poursartip (UBC, Canada)
	Limitations of commercial software Ms S Miot (ssanalysis, UK)
	Industry needs for tools Dr M Jevons (Ferchau, Germany)
	Needs for design tools Dr M Stojkovic (NCC,UK)
15:20	COFFEE BREAK
15:40	3422 Workshop on Failure of composites: current status and future directions 2
	Which Science works and which does not
	Unresolved issues with prediction of damage/delamination Prof M Wisnom (University of Bristol, UK)
	Current status and future research in micro mechanics Prof S Li (University of Nottingham, UK)
	Future directions in 3D composites Prof S Lomov (K.U. Leuven, Belgium)
16:20	Testing and Validation
	Future research structural analysis of composites Prof A Mouritz (RMIT, Australia)
	Future research in structural testing Prof F Paris (Seville university, Spain)
16:35	Final remarks - Key actions arising
16:50	INDUSTRY SESSION - JEC GROUP
16:50	Overview and dynamism of the worldwide composites market Daniel Ageda (Secretary-General - JEC Group)

### Posters and mini-orals programme

The poster presentations at the ICCM20 are fully integrated in the scientific programme and consists of both a poster and a mini-oral presentation.

### Mini-oral presentation schedule

	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
:30	Mini Oral Session I	Mini Oral Session I	Mini Oral Session I	Mini Oral Session I	Mini Oral Session I
	P101-1 STATISTICAL AND NUMERICAL ANLYSIS OF WEAR TOOL GEOMETRY IN DRILLING CFRP Notberto Feito (Universidad Carlos III de Madrid), Ana Sánchez Muñoz (Universidad Carlos III de Madrid), Maria Lopez Puente (Universidad Carlos III de Madrid), Maria Henar Miguelez Garrido (Universidad Carlos III de Madrid) An experimental and statistical analysis has been carried out in woven CFRPs drilling to study the influence of wear in delamination. A numerical model was also devel- oped to predict surface damage.	P102-1 RECYCLING THE FIBER REINFORCED POLYMER COMPOSITES: OPTIMUM DECOMPOSITION CONDITIONS AND FIBER FAILURE MECHANISM Jian Shi (Akita prefectural university), Limin Bao (Shinshu University) A recycling system was developed for the treatment of FRP. In this research, FRP was efficiently depolymerized and reinforced fiber was separated from resin by super- heated stream.	P103-1 INTERFACE FEATURES OF THE C/C         COMPOSITE DURING ITS FORMING PROCESS WITH         A COAL-TAR-PITCH AS THE PRECURSOR OF THE         CARBON MATRIX         Li Tang-Qi (Aerospace Reasearch Institute of Materials         & Processing Technology), Feng Zhi-Hai (Aerospace         Reasearch Institute of Materials & Processing Technology), Jiao Xing-Jan (Aerospace Reasearch Institute of Materials & Processing Technology), Zhang Zhong-Wei (Aerospace Reasearch Institute of Materials & Processing Technology), Feng Xiang (Aerospace Reasearch Institute of Materials & Processing Technology)         I have uploaded my full paper. We will attend the conference. For the strict time set by our institute, we have no enough time to joint other activities.	P104-1 HEAT TREATMENT RESPONSES OF PARTICULATE TIC REINFORCED TOOL STEEL COMPOSITES S. H. Kim (GIFT-POSTECH), D. W. Suh (GIFT-POSTECH) Heat treatment responses of a particulate TiC reinforced tool steel matrix composite, which is fabricated by pres- sure infiltration casting, have been investigated.	P105-1 MODIFICATION OF EPOXY RESIN AND ITS INFLUENCE ON TENSILE PROPERTIES OF VISCOSE FABRIC COMPOSITES Rathish Rajan (Technology Centre Ketek Ltd), Mirva Rahkonen (Technology Centre Ketek Ltd), Mikael Skrifvars (University of Boras), Egidija Rainosalo (Technology Centre Ketek Ltd) Modification of the epoxy resin with silane coupling agent and assessing the influence of resin modification on the properties of viscose fabric reinforced composite
	P101-2 THE EFFECT OF POST-WELDING COOLING           RATE ON THE STRENGTH OF TCW JOINTS           Zhi Bin Tan (University of Sydney), Liyong Tong (University of Sydney), Luke Djukic (Cooperative Research Centre for Advanced Composite Structures), Rowan Paton (Cooperative Research Centre for Advanced Composite Structures)           Structures)           TCW technology allows two carbon-epoxy components, manufactured with thermoplastic surfaces to be welded together. This study focuses on the effect of the cooling rate on the strength of the joint.	P102-2 KINETIC STUDY OF THE HYDROLYSIS OF AN EPOXY RESIN IN HIGH TEMPERATURE AND HIGH PRESSURE WATER <u>Gidéon Simenou</u> (Institut de recherche technologique Jules Verne), Eric Le Gal La Salle (l'Institut Catholique des Arts et Métiers de Nantes), Jean Luc Bailleul (Ecole Polytechnique de l'Université de Nantes), Jérôme Bellettre (Ecole Polytechnique de l'Université de Nantes) This paper presents the findings of an investigation into the kinetic of the hydrolysis of carbon fiber epoxy com- posites, using high temperature and high pressure water.	P103-2 EFFECT OF FIBER–POLYMER SOLUBILITY ON INTERFACIAL MECHANICAL PROPERTIES OF CARBON FIBER- REINFORCED BMI COMPOSITES Shi fenghui (AVIC composite Co.Itd), <u>Li Jia</u> (AVIC compos- ite Co.Itd), Zhang baoyan (AVIC composite Co.Itd) The interfacial shear strength (IFSS) of carbon fibers/BMI composites were investigated by micro-droplet test and the correlation of the fiber-matrix solubility parameter with interfacial mechanical p	P104-2 EFFECTS OF SHORT ALUMINA FIBER REINFORCEMENT ON MACHINABILITY OF ALUMINUM ALLOY Kazunori Asano (Kinki University) Short alumina fiber-reinforced aluminum alloy compos- ites were fabricated by squeeze casting, and the effects of the fiber reinforcement on the turning machinability of the alloy were investigated.	P105-2 OPTIMIZING THE MANUFACTURE OF BIO- BASED COMPOSITES AND LOW TEMPERATURE CURE POWDER COATING Kamika De Silva (University of Auckland), Mark Taylor (University of Auckland), Debes Bhattacharyya (Universi of Auckland), Sanjeev Rao (University of Auckland), Daw Smith (Scion ), Clemence Dranebois (Scion ) Variability in the surface conductivity, moisture level, porosity & heat distortion at high temp. employed to cure powders coatings on (MDF) boards have led to por surface finishes.
	P101-3 EVALUATION OF SKIN-CORE EFFECTS IN THICK CFRTP LAMINATES BY EMBEDDED OPTICAL FIBER SENSORS AND MECHANICAL TESTS <u>Takuhei Tsukada</u> (The University of Tokyo), Shu Minakuchi (The University of Tokyo), Nobuo Takeda (The University of Tokyo) This study demonstrated that the residual strain/stress distribution in thick CFRTP laminates due to skin-core effects can be evaluated by embedded optical fiber sen- sors and tensile tests.	P102-3 INVESTIGATION OF TEXTILE DEFORMATION IN LIQUID COMPOSITE MOLDING PROCESS Dang Gi Seong (Korea Institute of Materials Science) Several types of fiber preform deformation in liquid composite molding were observed and the related forces are measured in order to investigate the mechanism of the deformations	P103-3 EFFECT OF REINFORCEMENT FIBER CROSS SECTION GEOMETRY ON INTERFACIAL DEBONDING BEHAVIOR OF COMPOSITES <u>Tatsuya Yamasaki</u> (Kyushu University), Nobuhide Uda (Kyushu University), Kousei Ono (Kyushu University), Hiroto Nagai (Kyushu University), Yuichi Hirakawa (Kyushu University), Tadashi Nagayasu (Kyushu University) We found that interfacial debonding process of compos- ite with irregularly-shaped reinforcement is unique. This unique debonding behavior may affect the increase of interfacial properties.	P104-3 THE CARBON FOAM WITH SKELETON STRUCTURE IN COMPOSITE MATERIALS Jerzy Myalski (Silesian University of Technology), <u>Bartosz</u> Hosmyk (Silesian University of Technology) The manufacturing process and tribological investi- gations of composites reinforced by different types of foams (GC, Al2O3 and Al2O3+GC) are presented.	P105-3 TENSILE CHARACTERISTICS OF JUTE ROPE PLAIN FABRIC REINFORCED POLYLACTIC ACID COMPOSITES Jieng-Chiang Chen (Vanung University), Chang-Mou Wu (National Taiwan University of Science and Technology), Jia-Sheng Li (Vanung University) Manufacturing and tensile properties of jute plain fabric reinforced polylactic acid composites were investigated in current study. The composites have good tensile strength and energy absorption.
	P101-4 ASSESSMENT OF RESIDUAL STRESSES IN THICK-WALLED GFRP SLIDING BEARING AFTER WINDING AND CURING Alexander Bezmelnitsyn (South Ural State University), Sergei Sapozhnikov (South Ural State University) The structure of the woven GFRP ring was modelled by using impregnated unidirectional threads and repeated unit cell. Mechanical and thermal properties (micro-, macro- and meso-scale) were calculated	P102-4 DIELECTRIC CURE MONITORING OF A FAST CURING RESIN SYSTEM <i>Effon A Martin</i> (University of Nottingham), Anastasia <i>F Koutsomitopoulou (University of Bristol), Ivana K</i> <i>Partridge (University of Bristol), Alex A Skordos (Cranfield University)</i> Study of a new three part epoxy system for use in short cycle time RTM processes. Following the establishment of a cure kinetics model, the potential of dielectric cure monitoring mould was explored.	P103-4 STUDY OF THE INTERPHASE IN EPOXY/BASALT FIBRE COMPOSITES BY DYNAMIC MECHANICAL ANALYSIS Joana Ibarretxe (LEARTIKER), Ricardo Hernandez (LEARTIKER), Alex Arrillaga (LEARTIKER), Faustino Mujika (University of the Basque Country) The viscoelastic properties of modified unidirectional epoxy basalt fibre composites were investigated. The sensitivity and applicability of cooperativity to the inter- phase analysis was proved.	P104-4 THE EFFECTS OF MASTER SINTERING CURVE ON THE MICROSTRUCTURAL EVOLUTION AND MAGNETIC PROPERTIES OF NICUZN FERRITES Chenxin Duyang (Harbin Institute of Technology), Shumin Xiao (Harbin Institute of Technology), Janhua Zhu (Shenzhen Zhenhuafu Electronics Co.), Peng Zhou (Harbin Institute of Technology), Hai Wang (Shenzhen Zhenhuafu Electronics Co.) This work reports our recent work on the fabrication of NiCuZn ferrites, with the particular interests on how the pre-sintering affect the microstructural evolution and magnetic properties.	P105-4 AN ANALYTICAL MODEL FOR PREDICTING THI TENSION MODULUS AND POISSON'S RATIO OF SATIN WEAVE COMPOSITES Tianya Bian (Beijing University of Aeronautics and Astronautics), Zhidong Guan (Beijing University of Aeronautics), Junwu Mu (Beijing University of Aeronautics), Junwu Mu (Beijing University of Aeronautics and Astronautics), Gen Han (Beijing University of Aeronautics and Astronautics) The article established an analytical model to make an accurate prediction for the tension modulus and Poisson's ratio based on energy method and improving rule of mixtures formulations.

	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	
9:30	Mini Oral Session I	Mini Oral Session I	Mini Oral Session I	Mini Oral Session I	Mini Oral Session I	
	P101-5 ACCEPTANCE TESTING OF TUNGSTEN-CFRP LAMINATE INTERFACES FOR SATELLITE ENCLOSURES <u>Mikko Kanerva</u> (Aalto University), Jarno Jokinen (Aalto University), Paulo Antunes (University of Aveiro), Markus Wallin (Aalto University), Timo Brander (Aalto University), Olli Saarela (Aalto University) This is a study about experimental 3-point bend testing of W-CFRP laminate specimens and FE simulations of the interfacial failure propagation during these tests.	P102-5 A PRELIMINARY EVALUATION OF THE HIGH INJECTION PRESSURE RESIN TRANSFER MOULDING PROCESS Masoud Bodaghi (Engineering Design and Advanced Manufacturing-MIT Portugal Programme-Faculty of Engineering-University of Porto-Porto), Nuno Correia (Instituto de Engenharia Mecânica e Gestão Industrial- Campus da FEUP) Void size distribution in composites produced by high injection resin transfer moulding was addressed.For no gap the HIPRTM delivers the composite part with the lowest frequency of void size of c.4 %.	P103-5 FRIABILITY, THERMAL STABILITY, AND EFFECT OF HYGROTHERMAL AGING ON THE MECHANICAL PROPERTIES OF LIGNIN- AND WOOD-REINFORCED PHENOLIC FOAMS Juan Carlos Dominguez (Complutense University of Madrid), Maria Virginia Alonso (Complutense University of Madrid), Mercedes Oliet (Complutense University of Madrid), Belen del Saz-Orozco (Complutense University of Madrid), Efrancisco Rodriguez (Complutense University of Madrid) Study of the influence of lignin nanoparticle and wood flour reinforcements on the final properties of a phenolic foam and the effect of hygrothermal aging on their com- pressive mechanical properties	P104-5 IMPROVEMENT OF PARTICLE-REINFORCED COMPOSITES BY METAL FORMING AIDED BY CYCLIC SHEAR STRESS Jerzy Myalski (Silesian University of Technology), Franciszek Grosman (Silesian University of Technology), Bartosz Hekner (Silesian University of Technology), Marek Tkocz (Silesian Universit of Technology) The paper presents a method for altering the microstruc- ture of cast composites reinforced with particles, which consists in compression aided by shear stress caused by transverse motion of a punch.	P105-5 NON-CONVENTIONAL GLASS FIBER NCF COMPOSITES WITH THERMOSET AND THERMOPLASTIC MATRICES Thierry Lorriot (Institute of Mechanics and Engineering (12/M), Jalal El Yagoubi (Institute of Mechanics and Engineering (12/M)), Julie Fourel (Chomarat Textiles Industries), Franck Tison (Plateforme CANOE) We propose in this paper a preliminary experimental study on the mechanical behavior of glass NCF composites with shallow angled plies. We considered a thermos set matrix and a thermoplastic one.	
	P101-6 ANALYSIS AND EVALUATION OF MECHANICAL PROPERTIES USING AUTOCLAVE MOLDING METHOD Toshikazu Uchida (Kyoto Institute of Technology), Junpei Ochiai (UCHIDA Co.), Defang ZHAO (Donghua University ), Yuqiu Yang (Donghua University ), Tadashi Uozumi (Gifu University), Hiroyuki Hamada (Kyoto Institute of Technology), Koji Kuroda (Kyoto Institute of Technology), Atsushi Endo (Kyoto Institute of Technology), Akihiko Goto (Osaka Sangyo University) This paper discusses how differences in the hand lay- up work process and workers' skill level influence the mechanical performance of molded products by process analysis and dynamic characteristics.	P102-6 CARBON FIBER/PHTHALONITIRLE RESIN COMPOSITES WITH HIGH TEMPERATURE RESISTANT AND EXCELLENT RTM PROCESSABILITY Bao-Gang Sun (Aerospace Research Institute of Materials & Processing Technology), Han-Qiao Shi (Aerospace Research Institute of Materials & Processing Technology), Zhi-Yong Yang (Aerospace Research Institute of Materials & Processing Technology), Qian Liu (Aerospace Research Institute of Materials & Processing Technology), Yi Zhang (Aerospace Research Institute of Materials & Processing Technology) Carbon fiber/phthalonitrile resin composites were prepared by RTM process. Their RTM processability, high-temperature resistant, mechanical properties and micromorphology were studied.	P103-6 RIGID AROMATIC HETEROCYCLIC POLYMER FOAMS FOR HIGH TEMPERATURE APPLICATIONS Ming Liu (Nanyang Technological University), Living Zhang (Nanyang Technological University), Xiao Hu (Nanyang Technological University) The work present the development and characterization of rigid closed-cell foam based on an aromatic heterocy- clic thermoset resins for high temperature applications.	P104-6 TECHNOLOGICAL ASPECTS OF OBTAINING ALMMC - THE MODIFICATION OF ALSI MATRIX ALLOY <u>Maciej Dyzia</u> (Silesian University of Technology), Anna J. Dolata (Silesian University of Technology) In the technological process based on the stir-casting appropriate preparation of matrix alloy is decisive importance for the permanent connection between the ceramic particles and the liquid matrix	P105-6 APPLICATION OF HIGH IMPREGNATION CHARACTERIZATION OF A CYCLIC BUTYLENE TEREPHTHALATE OLIGOMER RESIN FOR ELECTRICALLY AND THERMALLY CONDUCTIVE COMPOSITES SIMULTANEOUSLY REINFORCED WITH CONTINUOUS FIBER AND NANOCARBON FILLERS Seong Yun Kim (Korea Institute of Sicence and Technology (KIST)), Ye Ji Noh (Korea Institute of Sicenc and Technology (KIST)) Applications of high impregnation characterization of the polymerizable, low-viscosity CBT oligomer resin to continuous carbon fiber fabric and carbon nanotube m composites are investigated	
	P101-7 DETERMINATION OF ISOTROPY OF THE C/PPS         SAMPLES MANUFACTURED FROM PELLETS         Zdenek Padovec (Czech Technical University in Prague- Faculty of Mechanical Engineering), Hynek Chlup (Czech Technical University in Prague-Faculty of Mechanical Engineering), Radek Sedlacek (Czech Technical University in Prague-Faculty of Mechanical Engineering), Michal Kral (Czech Technical University in Prague-Faculty of Mechanical Engineering), Milan Ruzicka (Czech Technical University in Prague-Faculty of Mechanical Engineering), Pavel Ruzicka (Czech Technical University in Prague-Faculty of Mechanical Engineering)         Presented work deals with isotropy determination of flat plate manufactured from randomly oriented C/PPS pellets with image processing methods, analytical and numerical calculation and experiment.	P102-7 PROPERTIES OF ULTRA-CRYOGENIC EPOXY RESIN MATRIX COMPOSITES BY RTM PROCESS Han-Diao Shi (Aerospace Research Institute of Materials & Processing Technology), Bao-Gang Sun (Aerospace Research Institute of Materials & Processing Technology), Dian Liu (Aerospace Research Institute of Materials & Processing Technology), Zhi-Yong Yang (Aerospace Research Institute of Materials & Processing Technology), Yi Zhang (Aerospace Research Institute of Materials & Processing Technology)         Epoxy composites with with excellent cryogenic me- chanical properties and RTM processability were devel- oped. The effects of temperature and cryogenic-cycles on mechanical properties were revealed.	P103-7 MECHANICAL PROPERTIES OF POLYURETHANE         CELLULAR FOAM FROM PALM CANOPY POWDER         Anin Memon (Rajamangala University of technology         thunyabury), Sirichai Torsakul (Rajamangala University         of technology thunyabury), Varunee Premanond (King         Mongkut's University of Technology Thonburi), Anucha         Watanapa (King Mongkut's University of Technology Thonburi), Annoiy Ruengwaree (Rajamangala University of Technology Thunyaburi)         Polyurethane cellular foam mixed palm canopy powder         were fabricated with sized 350 mm x 350 mm x 100 mm (W x L x H), and were used as heat insulator. Palm canopy powder of three various sizes: 100 mes	P104-7 THE INFLUENCE OF MODIFIER ELEMENTS ON THE MICROSTRUCTURE OF ALSI ALLOY DESTINED FOR MATRIX OF COMPOSITES WITH SIC AND C PARTICLES <u>Anna Janina Dolata</u> (Silesian University of Technology), Maciej Dyzia (Silesian University of Technology) In presented work the influence of modifier elements such as Ti, B, Sr and Mg on microstructure of AISi7Mg alloy designed as matrix of composites reinforced by SiC and Cg particles were presented.	P105-7 PAPERMAKING PILOT TRIALS WITH A NEW SILICA COATED PCC FILLER Ana Lourenço (University of Coimbra), <u>Rogério Sirnões</u> (University of Beira Interior), Ana P. Costa (University o Beira Interior), José Gamelas (University of Coimbra), Paulo Ferreira (University of Coimbra) The present work enabled to confirm, at pilot scale, the results obtained at laboratorial scale regarding the potential of silica-coated PCC filler to be used in papermaking.	
	P101-8 »MULTI-MATERIAL-HEAD« ONE TOOL FOR 3 TECHNOLOGIES: LASER-ASSISTED THERMOPLAST- TAPE PLACEMENT, THERMOSET-PREPREG- PLACEMENT AND DRY-FIBER-PLACEMENT Michael Emonts (Fraunhofer Institute for Production Technology IPT) The all-in-one »Multi Material Head« is a flexible fib- er-placement system and allows to process thermoplas- tic tape, thermoset prepreg and spread dry-fiber rovings covered with a binder within one tool	P102-8 NUMERICAL SIMULATION OF TRI-BODY COMPOSITES BOAT BY VARTM INTEGRAL PROCESS Xiao Tang (Harbin Engineering University), Chai Jun (Harbin Engineering University), Lili Tong (Harbin Engineering University) With the development of science and technology, variety of composite manufacturing processes emerged as the times required. The vacuum assisted resin transfer mold- ing (VARTM) process is now used exten	P103-8 A BIOBASED AND MOISTURE-STABLE HONEYCOMB STRUCTURE OF HIGH SHEAR STIFFNESS AND LOW DENSITY Lars Berglund (KTH Royal Inst of Technology), <u>Qiliang Fu</u> (KTH Royal Inst of Technology) In the current study, we have used sodium chlorite and sodium hydroxide as extraction solutions, to remove lignin and hemicelluloses from the Balsa (Ochroma Lagopus) wood tissues.		P105-8 INFLUENCE OF GLASS FILLERS ON PROPERTIES OF SHORT CARBON FIBER REINFORCH THERMOPLASTIC COMPOSITES Izabella Rashkovan (UVICOM Co.Ltd), Ol'ga Kulachinskaya (Polyplastic Co.), Mark Kazakov (UVICC Co.Ltd) Improving of physical-mechanical properties of 15% short carbon fiber reinforced polyamide-6 as a result hybridization with glass fillers have been studied.	

### //Posters and mini-orals programme

	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	
9:30	Mini Oral Session I	Mini Oral Session I	Mini Oral Session I	Mini Oral Session I	Mini Oral Session I	
	P101-9 ONLINE PROCESS MONITORING AND CONTROL BY DIELECTRIC AND PRESSURE SENSORS FOR A COMPOSITE MAIN SPAR FOR WIND TURBINE BLADES <u>Arme Breede</u> (Faserinstitut Bremen e. V.), Maryam Kahali Moghaddam (Institut für Mikrosensorenaktoren und -systeme), Christian Braumer (Faserinstitut Bremen e. V.), Walter Lang (Institut für Mikrosensorenaktoren und -systeme), Axel S. Herrmann (Universität Bremen) This study presents a monitoring method to determine viscosity and permeability for a composite main spar infusion process. Sensor data is fed into a 2D flow simu- lation to derive real process values.	VARTM-MANUFACTURED CARBON FIBRE REINFORCED COMPOSITE MATERIALS Yasunari Kuratani (Kyoto Institute of Technology), Kentaro Hase (KADO Corporation), Takahiro Hosomi (KADO Corporation), Tomoe Kawazu (KADO Corporation), Tadashi Uozumi (Gifu University), Akihiko Goto (Osaka Sangyo University) VaRTM requires a preform to be manufactured before molding however, the majority works are manufactured by hand. So we focus on the accuracy of these preforms lies in the ability of the performers and	P103-9 PROCESSING, MICROSTRUCTURE AND PROPERTIES OF CARBON NANOTUBES REINFORCED MG MATRIX COMPOSITES Xiaojun Wang (Harbin Institute of Technology), Xiaoshi Hu (Harbin Institute of Technology), Kun Wu (Harbin Institute of Technology), Yanqiu Wang (Harbin Engineering University), Xutang Zhang (Harbin Institute of Technology)	P104-9 EFFECTIVE THERMAL CONDUCTIVITY OF ALUMINUM MATRIX COMPOSITES WITH CONSIDERING INTERFACIAL THERMAL RESISTANCE Kenjiro Sugio (Institute of Engineering-Hiroshima Univ.), Rio Yamada (Institute of Engineering-Hiroshima Univ.), Gen Sasaki (Institute of Engineering-Hiroshima Univ.) We developed new simulation code which can calculate the effective thermal conductivity of composites with considering the interfacial thermal resistance.	TEMPERATURE <u>Kazuto Tanaka</u> (Doshisha University), Genta Maeda (Doshisha University), Yusuke Morita (Doshisha University), Tsutao Katayama (Doshisha University) Carbon nanotubes were grafted on the surface of carbon fibers. The influence of high temperature on the inter- facial properties of CF/PA6 was revealed by single fiber pull-out tests.	
	P101-10 INFLUENCE OF PREHEATING CONDITIONS ON THE DEGRADATION OF CARBON FIBER REINFORCED POLYPROPYLENE Hao Piao (The University of Tokyo), Wataru Nagatsuka (The University of Tokyo), Hooseok Lee (The University of Tokyo), Isamu Ohsawa (The University of Tokyo), Jun Takahashi (The University of Tokyo) This study investigate the Influence of heat aging on mechanical properties of MAPP. Regardless of both addi- tional amount of maleic acid and heating time, the MAPP becomes brittler by heat exposure.	P102-10 EFFECT OF SURFACE COATING ON THE CHARACTERIZATION OF THE PROCESS DYNAMICAL BEHAVIOUR DURING MOLD FILLING IN LIQUID RESIN INFUSION Victor García (University CEU Cardenal Herrera), <u>Enrique</u> <u>Cortes</u> (Aerox Advanced Polymers), Luis Domenech (University CEU Cardenal Herrera), Fernando Sanchez (University CEU Cardenal Herrera), Francisco Chinesta (Ecole Central de Nantes) A mixed numerical/experimental technique based on ar- tificial vision is used for estimating the induced effect of the surface coating curing in the laminate impregnation during filling.	P103-10 STRONG AND DUCTILE NANOLAMINATED COMPOSITES FABRICATED BY FLAKE POWDER METALLURGY Zihigang Li (Shanghai Jiao Tong University), Genlian Fan (Shanghai Jiao Tong University), Zhanqiu Tan (Shanghai Jiao Tong University), Zhen Qin (Shanghai Jiao Tong University), Di Zhang (Shanghai Jiao Tong University) A bio-inspired architecture design and flake powder metallurgy technique route was explored to coordinate the strength-ductility dilemma for CNT/Al composites	P104-10 MECHANICAL HYSTERESIS BEHAVIOR OF FIBER-REINFORCED CERAMIC-MATRIX COMPOSITES AT ROOM AND ELEVATED TEMPERATURES Longbia Li (Nanjing University of Aeronautics and Astronautics)	P105-10 MECHANICAL PROPERTIES OF CNT/CARBON FIBER/EPOXY HIERARCHICAL COMPOSITES PREPARED USING ELECTROPHORETICAL DEPOSITION Shinn-Shyong Tzeng (Tatung University), Ding-Hwa Cherng (Tatung University) CNT/carbon fiber fabric/epoxy three-phase hierarchical composites were fabricated using electrophoretic depo- sition and the mechanical properties of the three-phase composites were investigated.	
	P101-11 PREPARATION AND CHARACTERIZATION OF THE PVDF/LDPE THERMOPLASTIC COMPOSITE Seung Goo Lee (Chungnam National University), <u>Jong</u> <u>Sung Won</u> (Chungnam National University) In this study, polyvinylidene fluoride(PVDF) fiber rein- forced low density polyethylene(LDPE) composites were manufactured by a hot pressing method using "conju- gate spun fibers".	P102-11 THROUGH THICKNESS COMPACTION RESPONSE OF 3D WOVEN REINFORCEMENTS <u>Behan Umer</u> (Khalifa University), Hussam Alhussein (Khalifa University), Sanjeev Rao (Khalifa University), Wesley Cantwell (Khalifa University) This paper presents compaction characterization of 3D fabrics for LCM process. The data presented paves the ground for robust LCM processes in both simulation and real life.	P103-11 ENHANCED LOAD TRANSFER IN CARBON NANOTUBES-REINFORCED ALUMINUM Jong Gil Park (Institute for Basic Science), Dong Hoon Keum (Sungkyunkwan Univ.), Young Hee Lee (Institute for Basic Science)         We report the fabrication method of CNTs-reinforced Al by castable process. The yield strength of Al-CNT com- posite is improved by 60%. The strengthening can be explained from load transfer mechanism.	P104-11 SHEAR AND BENDING PROPERTIES OF CERAMIC FIBER REINFORCED SILICA AEROGEL MATRIX COMPOSITES Shuangqi Lv (Beihang University), <u>Duoqi Shi</u> (Beihang University), Xiaoguang Yang (Beihang University), Jian Feng (National University of Defense Technology), Yantao Sun (Beihang University) Shear and bending properties of fiber reinforced aerogel composites were investigated experimentally to obtain the anisotropic mechanical behaviors and different failure modes.	P105-11 EFFECT OF NANO ZNO ON THE PROPERTIES OF PP/ZNO COMPOSITE YARNS Samiha Gawish (National Reserach center), Amira Ramadan (National Reserach center) SUMMARY:The objective of this study is the modification of PP with nano ZnO at a loading of 1,2 and 3% and determination of the influence of the additive on the thermal and mechanical properties	
	P101-12 ATMOSPHERIC PRESSURE PLASMA SURFACE TREATMENT OF THERMOPLASTIC COMPOSITES FOR BONDED JOINTS Clara Palleiro Palmou (AIMEN Technology Centre), Sergey Stepanov (Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM), Elena Rodriguez-Senin (AIMEN Technology Centre), Ralph Wilken (Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM), Jörg Ihde (Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM), Polypropylene matrix composites were treated by atmospheric pressure plasma, in order to improve their adhesive properties. The influence of the most significant operational parameters were studied	P102-12 IN-PLANE AND THROUGH-THICKNESS PERMEABILITY CHARACTERIZATION OF 3D WOVEN REINFORCEMENTS <u>Hussam Alhussein</u> (Khalifa University), Rehan Umer (Khalifa University), Sanjeev Rao (Khalifa University), Wesley Cantwell (Khalifa University) Permeability of three different 3D woven carbon fiber reinforcements were studied. For all reinforcements, unsaturated radial in-plane, and saturated through thick- ness were obtained at different Vfs	P103-12 DEFINITION AND MANUFACTURING OF CARBON FIBER REINFORCED ALUMINUM FOR EMBEDDED ELECTRONIC PACKAGINGS Christophe Perron (Univ. Bordeaux), Corinne ARVIEU (Univ. Bordeaux), Eric LACOSTE (Univ. Bordeaux) Pitch based carbon fibres reinforced aluminium is inves- tigated for heat sink performance. Numerical simulations were led to evaluate its viability and processing routes were reviewed.	P104-12 CATALYTIC PROPERTY OF ZIRCONIUM DIBORIDE-SILICON CARBIDE CERAMIC COMPOSITES <u>Qingxuan Zeng</u> (Harbin Institute of Technology), Hua Jin (Harbin Institute of Technology), Songhe Meng (Harbin Institute of Technology), Jiahong Niu (Harbin Institute of Technology), Fajun Yi (Harbin Institute of Technology)	P105-12 PREPARATION AND UV-AGEING RESISTANCE PROPERTIES OF POLY(P-PHENYLENE BENZOBISOXAZOLE)/NANO-TIO2 NANOCOMPOSITE FIBERS Byung Gil Min (Kumoh National Institute of Technology), Gingwei Wang (Kumoh National Institute of Technology), Kwan Han Yoon (Kumoh National Institute of Technology), Sang Cheol Lee (Kumoh National Institute of Technology) Nanocomposite fibers of poly(p-phenylene benzobisoxa- zole) and nano-titania were prepared through dry-jet wet spinning for improving UV-ageing resistance.	

-	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	
1	Mini Oral Session I	Mini Oral Session I	Mini Oral Session I	Mini Oral Session I	Mini Oral Session I	
	101-13 INTRINSIC JOINING OF INCOMPATIBLE IBER-REINFORCED PLASTICS BY PHOTONICS lichael Emonts (AZL of RWTH Aachen University), Kai ischer (AZL of RWTH Aachen University), Stefan Schmitt VZL of RWTH Aachen University), Richard Schares (AZL f RWTH Aachen University) he process chain to combine thermoset and thermo- lastic FRP has been proven by the use of a pulsed laser ith continuous carbon fiber-reinforced epoxies and a nort glass fiber-reinforced PA6.	P102-13 RESIDUAL STRESS MEASUREMENT OF CFRP BY X-RAY DIFFRACTION Taisei Doi (Advanced Course Student of Kobe City College of Technology), Masayuki Nishida (Kobe City College of Technology), Junichi Ozaki (Kobe City College of Technology) We try the next step to measure the residual stress in carbon fiber by x-ray stress measurement. The residual stress of CFRP have the possibility to measure by the x-ray stress measurement.	Doi (Advanced Course Student of Kobe City College hnology), Masayuki Nishida (Kobe City College ohogy)       TIB2 AND MG2SI PARTICLES       OXIDATION PROTECTION SYSTEM         Shusen.Wu (Huazhong University of Science and logy)       Shusen.Wu (Huazhong University of Science and Technology), Oia Ga (Huazhong University of Science and Technology), Shulin LÜ (Huazhong University of Science and Technology), Shulin LÜ (Huazhong University of Science and Technology), Shulin LÜ (Huazhong University of Science and Technology)       OXIDATION PROTECTION SYSTEM         In fiber by x-ray stress measurement. The residual of CFRP have the possibility to measure by the stress measurement.       Shusen.Wu (Huazhong University of Science and Technology), Shulin LÜ (Huazhong University of Science and Technology)       A low-cost SiC-borosilicate glass coating was prepa University of Science and Technology)         In-situ (TiB2+Mg2Si)/Al composites with higher particle volume fraction, about 15%, were fabricated success- fully. Mechanical properties of the composites are improved.       In-situ (Find State)       Now-cost SiC-borosilicate glass coating was prepa on C/C composites. The coating showed self-sealing performance and excellent anti-oxidation behavior in temperature from 900 to 1500 .		P105-13 GRAPHITE NANOSHEET 3-D NETWORKS FC POLYMER COMPOSITES CAPABLE OF ENHANCED HE TRANSPORT Sang-Soo Lee (Korea Institute of Science and Technology), Sung Gook Jin (Korea Institute of Science and Technology) Construction of carbon-based three-dimensional net- works is an effective strategy for practical applications including thermal management materials, and we hav developed a novel method for that matter	
	101-14 EVOLUTION BEHAVIOR OF TIB WHISKER         URING LASER WELDING IN-SITU SYNTHESIZED TIB/         DOMPOSITES         Iao Jianwei (State Key Laboratory of Metal Matrix omposites-Shanghai Jiaotong University), Chen Liangui tate Key Laboratory of Metal Matrix Composites-Shanghai JiaoTong University), Wang Liqiang (State ey Laboratory of Metal Matrix Composites-Shanghai JiaoTong University), Wang Liqiang (State ao Tong University), Lu Weijie (State Key Laboratory of Metal Matrix Composites-Shanghai Jiaotong University), Lu Weijie (State Key Laboratory of Idetal Matrix Composites-Shanghai Jiaotong University)       P102-14 EXAMINATION OF THE CHEMICAL MECHANISMS DURING THERMAL TREATMENT OF CARBON FIBER PAN PRECURSORS         Nino Haase (University of Augsburg), Robert Horny (University of Metal Matrix Composites-Shanghai Jiaotong University), Lu Weijie (State Key Laboratory of Idetal Matrix Composites-Shanghai Jiaotong University)       Nino Haase (University of Augsburg), Robert Horny (University of Augsburg), Stegfried Horn (University of Augsburg)         Pauland University), Lu Weijie (State Key Laboratory of Idetal Matrix Composites-Shanghai Jiaotong University)       PAN-homopolymers (partially deuterated) and corr sponding oligomers were synthesized and their the behaviours were examined to further understand t stabilization mechanisms during CF-production.		P103-14 MAGNESIUM ALLOY ELEKTRON21         REINFORCED WITH ALN: PROCESSING,         MICROSTRUCTURE AND COMPRESSION CREEP         RESPONSE         Lydia Katsarou (Helmholtz-Zentrum Geesthacht),         Maher Mounib (Université de Rouen), Williams Lefebvre (Université de Rouen), Hajo Dieringa (Helmholtz-Zentrum Geesthacht)         Magnesium alloy Elektron21 reinforced with nano-AIN was examined by metallography, electron microscopy, hardness, compression creep and mechanical compression strength methods within EC-project ExoMet	P104-14 EVALUATION OF OXIDATION BEHAVIOR OF UHTC COMPOSITE MATERIALS <u>Mamoru Yano</u> (Tokyo Univercity of Science), Yuki Kubota (Tokyo Univercity of Science), Hiroki Tanaka (Tokyo Univercity of Science), Yasuo Kogo (Tokyo Univercity of Science), Ken Goto (Institute of Space and Astronautical Science) Oxidation behavior of C/ZrB2-SiC-ZrC under dynamic heating condition at 1800°C was investigated. The com- posite showed better recession and oxidation resistance with the optimized composition.	P105-14 INVESTIGATING INTERFACIAL THERMAL CONDUCTANCE OF GRAPHENE/EPOXY NANOCOMOPOSITES Jia-Lin Tsai (National Chiao Tung University), Tai-Yuan Wang (National Chiao Tung University) (National Chiao Tung University) The functionalization of graphene on interfacial therm conductance (ITC) of graphene/epoxy nanocomposites was investigated using non-equilibrium molecular dy- namics (NEMD) simulation.	
their engineering applications. P101-15 FORM-ADAPTIVE GRIPPING SYSTEM FOR LIGHT-WEIGHT PRODUCTIONS Christian Brecher (Fraunhofer Institute for Production Technology IPT), Michael Emonts (Fraunhofer Institute for Production Technology IPT), <u>Christian Kukla</u> (Fraunhofer Institute for Production Technology IPT), Richard Schare (Fraunhofer Institute for Production Technology IPT) Form-adaptive and area-selective electrostatic grip- ping technology. Automated handling and draping of	P101-15 FORM-ADAPTIVE GRIPPING SYSTEM FOR LIGHT-WEIGHT PRODUCTIONS Christian Brecher (Fraunhofer Institute for Production Technology IPT), Michael Emonts (Fraunhofer Institute for Production Technology IPT), <u>Christian Kukla</u> (Fraunhofer Institute for Production Technology IPT), Richard Schares (Fraunhofer Institute for Production Technology IPT) Form-adaptive and area-selective electrostatic grip- ping technology. Automated handling and draping of non-rigid, air-permeable, sensitive technical textiles (e.g.	P102-15 HIGH-TEMPERATURE CREEP BEHAVIOR OF ALUMINA/YAG/ZIRCONIA COMPOSITES Fredy A. HUAMAN-MAMANII (Universidad de Sevilla), <u>Manuel JIMENEZ-MELENDO</u> (Universidad de Sevilla) Study of the fabrication, microstructure and creep properties of a three-phase alumina-yttrium aluminum garnet-zirconia composite with the ternary eutectic composition.	P103-15 MICROSTRUCTURE AND PROPERTIES OF TIBCN-TC4 COMPOSITES PREPARED BY LASER MELTING Jiandong Hu (Jilin University) TIBCN powder , possessing NaCI-type fcc structure , synthesized by boronizing of Ti , was firstly used as addi- tives to make TIBCN-TI-6AI-4V/TC4 base composites on TIC4by laser cladding. The TIBCN pow	P104-15 EXPERIMENTAL STUDY ON ULTRASONIC ASSISTED GRINDING OF C/SIC COMPOSITES Yucan Fu (Nanjing university of Aeronautics and Astronautics) Ultrasonic assisted grinding and conventional grinding tests of C/SiC composites were conducted. The ma- chining quality, grinding force, grinding force ration and specific grinding energy were studied	P105-15 BROADBAND DIELECTRIC SPECTRA AND MICROWAVE ABSORBING / SHIELDING EFFICIENCY DIELECTRIC-CONDUCTOR NANOCOMPOSITES <i>Viktor Bovtun</i> (Institute of Physics-Academy of Science of the Czech Republic), Alexandra Borisova (NTUU "Kiev Polytechnic Institute"), Martin Kempa (Institute of Physics-Academy of Sciences of the Czech Republic), Aleksander Machulyansky (NTUU "Kiev Polytechnic Institute"), Dmitry Nuzhnyy (Institute of Physics-Acade of Sciences of the Czech Republic), Maxim Savinov (Institute of Physics-Academy of Sciences of the Czec Republic), Jan Petzelt (Institute of Physics-Academy o Sciences of the Czech Republic), Yuriy Yakymenko (NT "Kiev Polytechnic Institute") Microwave shielding and absorption efficiency of som polymer-based dielectric-conductor nanocomposites i simulated on the base of their experimentally studied broadband dielectric spectra.	
	P101-16 ASSESSEMENT OF DIFFERENT TECHNIQUES FOR ADDING THERMOPLASTIC MATRIXMATERIAL IN THE REINFORCEMENT STRUCTURES Joris Degrieck (Ghent University), Ruben Geerinck (Ghent university), Ives De Baere (Ghent university), Geert De Clercq (Ghent University), Jan Ivens (KU Leuven)	P102-16 FUNCTIONAL UV COATING COMPOSITION FOR STEEL COATING <u>Hye-Jn Yao</u> (POSCO) Modified urushiols were successfully synthesized and their properties of films were investigated. modified urushiol films showed better inhibitory results on the growth of bacteria than pristine film.	P103-16 DISCUSSION OF THE EVOLUTION OF MICRO CRACKS BY CHARACTERIZATION AND MODELING OF METAL MATRIX COMPOSITES REINFORCED BY METALLIC GLASS PARTICLES Kay André Weidenmann (Karlsruhe Institute of Technology), Klaudia Lichtenberg (Karlsruhe Institute of Technology), Katrin Schulz (Karlsruhe Institute of Technology) Innovative metallic glass particle reinforced MMCs pro- duced by gas pressure infiltration were numerically and experimentally investigated regarding dislocationbased deformation and crack evolution.	P104-16 GAMA RADIATION EFFECT ON THERMOGRAVIMETRIC PROPERTIES AND INFRARED SPECTROSCOPY OF SISAL FIBERS / POLYURETHANE DERIVED FROM CASTOR OIL COMPOSITES WITHOUT COUPLING AGENTS Marina Vasco (Technological Federal University of Paranâ), Juliana Cortez (Technological Federal University of Paranâ), Paulo Bittencourt (Technological Federal University of Paranâ), Salvador Claro Neto (University of São Paulo), Elaine Azevedo (Technological Federal University of Paranâ) Thermogravimetric and infrared spectroscopy were used to analyze composites of dispersed and woven sisal fib- ers and polyurethane derived from castor oil before and after gamma irradiation.	P105-16 ELECTRICAL AND MECHANICAL PROPERT OF CARBON AEROGELS / PHENOLIC RESIN FOR NANOCOMPOSITES Wei Jen Chen (National Tsing Hua University), Yi Luen Li (National Tsing Hua University), Chin-lung Chiang (Hung Kuang University), Ming Chuen Yip (National Ts Hua University), CHEN-CHI M. Ma (National Tsing Hua University), Ming Yuan Shen (China University of Scier and Technology) In this study carbon aerogels and phenolic resin were used to prepare nano polymer resin. Polyethylene oxid (PEO) was used as the modifying agent for resin, to in prove it mechanical properties.	

### //Posters and mini-orals programme

	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	
):30	Mini Oral Session I	Mini Oral Session I	Mini Oral Session I	Mini Oral Session I	Mini Oral Session I	
	P101-17 INVESTIGATION ON THE MECHANICAL ROBUSTNESS OF CFRP MOLDS Philipp Kammethofer (Institute for Carbon Composites), Swen Zaremba (Institute for Carbon Composites), Klaus Drechsler (Institute for Carbon Composites) Wihtin this investigation the failure of composite edges due to a static load has been observed. Therefore a test has been developed that determines a quasi-static strength of edges.	P102-17 SELF PROPAGATING HIGH TEMPERATURE SYNTHESIS OF TIB2-AL203 AND CRB2- AL203 PREPARATION OF TIB2-AL203 AND CRB2- AL203 COMPOSITES WITH A BROAD RANGE OF PHASE COMPOSITION WAS CONDUCTED BY SELF- PROPAGATING HIGH-TEMPERATURE SYNTHESIS (SHS). Danara Raimkhanova (Institute of Combustion Problems), Roza Abdulkarimova (Institute of Combustion Problems), Roza Abdulkarimova (Institute of Combustion Problems), In this study, the SHS processes were conducted to prepare TIB2- Al203 and CrB2-Al203 composites. Composition and structure of synthesis products in the system B203-Cr203 and A1 were investigated.	P103-17 A COMPOSITE BASED ON 7475 ALLOY REINFORCED WITH PARTICLES OF AL3TI <u>Wojciech Szyma ski</u> (Institute of Non-Ferrous Metals) Beneficial effect of the semi-solid composite extrusion was most evidently manifested in the increased hard- ness and yield strength of this material when processed by extrusion.	P104-17 THERMAL DEGRADATION PROPERTIES OF RHDPE/EVA/EGGSHELL POWDER COMPOSITES: EFFECTS OF FILLER LOADING AND PVC-MA COUPLING AGENT Nur Farahana Ramli (Universiti Malaysia Perlis (UniMAP)), Supri A. Ghani (Universiti Malaysia Perlis (UniMAP)), Teh Pei Leng (Universiti Malaysia Perlis (UniMAP)) This paper focuses on the effect of PVC-MA as a cou- pling agent on the thermal properties of the rHDPE/EVA/ ESP composites using thermogravimetric (TGA) and differential scanning analysis (DSC).	P105-17 METAL NANOWIRES SELF-ASSEMBLY BY DIELECTROPHORETIC Chinq-Chang Lin (National Chiao Tung University), Wen Hsien Sun (industrial technology Research Institute), Ya-Lin Lin (National Chiao Tung University), Fu-Hsiang I (National Chiao Tung University) In this research, we use dielectrophoresis to make a spaced alignment of metal nanowires which will in- crease the reflection of substrate and result in negative effect on optical properties.	
	P101-18 CONTINUOUS PROCESSING AND QUALITY INSPECTION OF WOVEN PREPREGS Jens Schmidt (Fraunhofer ISC-HTL)	P102-18 A STUDY ON PROPERTIES OF BISMALEIMIDE         RESIN MODIFIED BY BENZOXAZINE FOR RTM         PROCESS         Gang Liu (AVIC Composites Center), Jianwen Bao (AVIC Composites Center)         Bismaleimide resin for resin transfer molding process         was modified by the benzoxazine (BOZ) with low curing shrinkage and its properties were investigated.	P103-18 HIGH THERMAL CONDUCTIVITY OF DIAMOND PARTICLES DISPERSED ZR-ALLOYED CU MATRIX COMPOSITES PRODUCED BY GAS PRESSURE INFILTRATION Hailong Zhang (University of Science and Technology Beijing) Diamond particles dispersed Zr-alloyed Cu matrix composites were produced by a gas pressure infiltration method. A maximum thermal conductivity of 930 W/mK was obtained at 0.5 wt.% Zr addition.	P104-18 EFFECT OF CHEMICAL MODIFICATION FOR KENAF FIBER ON MECHANICAL PROPERTIES OF FURAN BASED NERP Jun Nakai (Tokyo Institute of Technology), Masatoshi Kubouchi (Tokyo Institute of Technology), Hiroha Tanaka (Tokyo Institute of Technology) An approach to increase the mechanical properties of plant-derived resin and NFRP were achieved to reduce environmental load and petroleum consumption, through chemical analysis.	P105-18 THERMAL AND MECHANICAL CHARACTERIZATION OF RESIN TRANSFER MOLDED TRI-COMPONENT POLYESTER / GLASS FIBER / MODIFIED CLAYS COMPOSITES. Daiane Romanzini (UFRGS), Vanessa Piroli (UCS), Adem J. Zattera (UCS), Sandro C. Amico (UFRGS) Evaluation of the effect of cation exchange and silane modified montmorillonite (MMT) nanoclays, on disper- sion, mechanical, thermal properties and flammability of polyester/glass fiber composites.	
	P101-19 SYSTEMATIC COMPARISON BETWEEN CARDING AND PAPER-MAKING METHOD FOR PRODUCING DISCONTINUOUS RECYCLED CARBON FIBER REINFORCED THERMOPLASTICS Haowen Wei (The University of Tokyo), Hooseok Lee (The University of Tokyo), Wataru Nagatsuka (The University of Tokyo), Isamu Ohsawa (The University of Tokyo), Kazumasa Kawabe (Industrial Technology Center of Fukui Prefecture), Tetsuhiko Murakami (Industrial Technology Center of Fukui Prefecture), Ken Sumitomo (Tokyo), Jun Takahashi (The University of Tokyo) Two kinds of manufacturing method for discontinuous recycled carbon fibers reinforced thermoplastics will be discussed and compared by the mechanical properties	P102-19 MEASUREMENT AND ANALYTICAL OF TOW/ MATRIX INTERFACIAL MECHANICAL PROPERTIES IN CARBON/CARBON COMPOSITE <u>Chenghai Xu</u> (Harbin Institute of Technology), Desheng Xu (Harbin Institute of Technology), Ying Fu (Harbin Institute of Technology), Songhe Meng (Harbin Institute of Technology)	P103-19 IN-SITU SYNTHESIZED MAGNESIUM MATRIX COMPOSITES Tongxiang Fan (Shanghai Jiaotong University-State Key Lab of Metal Matrix Composites), Di Zhang (Shanghai Jiaotong University-State Key Lab of Metal Matrix Composites) In this work, TiC/AZ91D composites simultaneously in situ synthesized will be introduced, the compressive mechanical properties and the damping properties of this composite will be further discussed.	in Trois-Rivières) The present work is focused on investigating the effects of hygrothermal aging on the quasi-static and fatigue behavior of a polyethylene composite reinforced with	P105-19 QUALITATIVE CHARACTERIZATION OF NANOCLAY PARTICLE EMISSIONS FROM PP NANOCOMPOSITES AFTER THERMAL DEGRADATION Nazanin Alipour (Royal Institute of Technology), Emma Strömberg (Royal Institute of Technology(KTHI), Jonas Enebro (SP) The degradation and release of nanoclays from PP nanocomposite was simulated in a prototype exposure chamber under controlled conditions to evaluate and characterise the released particles.	
	P101-20 TESTING OF THE MATERIAL CHARACTERISTICS OF RECYCLED GLASS FIBRE REINFORCED POLYMER FOR THE USE IN BEARING STRUCTURES Tihomir Stefic (University of J.J. Strossmayer of Osijek- Faculty of Civil Engineering Osijek), Aleksandar Juric (University of J.J. Strossmayer of Osijek-Faculty of Civil Engineering Osijek), Pavao Marovic (University of Split- Faculty of Civil Engineering-Architecture and Geodesy) Testing of some basic characteristics of recycled and original glass fibre reinforced polymer was conduted and appropriate diagrams are proposed in order to describe the tested materials.	P102-20 EFFECT OF FIBER DOSAGE ON FIBER REINFORCED CONCRETE BOND-SLIP PERFORMANCE Yafang Zhang (Guangzhou University), <u>Hao Liu</u> (Guangzhou University), Yi Yang (Guangzhou University), Qinghua Wu (Guangzhou University) The bond-slip performance of interface between steel fiber and concrete has been stuided in details by adopt- ing both experimental and numerical methods.	P103-20 A EXPERIMENTAL STUDY OF SURFACE MODIFICATION OF TA2 USING MICRO-BEAM PLASMA ARC Rongjuan Yang (School of Aerospace Engineering), Dongyun Ge (School of Aerospace Engineering), Zongde Liu (Key Laboratory of Condition Monitoring and Control for Power Plant Equipment of Ministry of Education) The surface remelting was performed on commercial pure titanium TA2 using micro-beam plasma arc under 3 working conditions.the sample remelted 1 time with cooling water exhibits excellent performance	40%wt of short birch fibers. P104-20 PREPARATION AND CHARACTERIZATION OF GREEN COMPOSITE USING BIOMIMETIC MODIFIED LIGNIN Sunghoon Kim (Graduate school student), Jongshin Park (Seoul National University) In this study, two types of alkyl-chain modification agents.As a result, the physical properties of the result- ing blends were limited by alkyl chain of modified lignin.	P105-20 FABRICATION OF ES-NANOFIBER IMPRINTING PLASTIC MOLD AND MICRO- STRUCTURED PARTS BY NANOPOWDER PRINTING Kazuaki Nishiyabu (Kinki University) Electrospinning nanofiber imprinting was developed to produce the plastic mold with microstructures and was applied for contact printing using paste consisting of nanopowder and followed by sintering.	

	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	
:00	Mini Oral Session II	Mini Oral Session II	Mini Oral Session II	Mini Oral Session II	Mini Oral Session II	
	P201-1 MECHANICAL PROPERTIES AND CURING BEHAVIOUR OF GRAPHITE/OXIDE EPOXY NANOCOMPOSITES <u>R. Mikael Larsen</u> (Aalborg University) Graphite oxide is added to epoxy using the functional groups to form stronger bonds to the epoxy network and thus improving the mechanical properties.	P202-1 HIGH STRAIN RATE AND HYGROTHERMAL EFFECTS ON MECHANICAL PROPERTIES OF LAMINATED COMPOSITES Ytting Wu (Tsinghua University), Dongyun Ge (Tsinghua University), Chen Li (Tsinghua University) The impact mechanical performances of T300 carbon fiber reinforced epoxy resin matrix composite laminates under hygrothermal circumstance and high strain rate are investigated using SHPB.	P203-1 JOINT AND ASSEMBLING OF HUGE COMPOSITE TOP-HAT STIFFENED HULLS Jiteng Zhang (Harbin Engineering University), Limin Zhou (The HongKong Polytechnic University) In the paper, a bolted joint scheme was studied to be used in foam inserted top-hat stiffened composite hull. and a 4m×2m×1.5m model was manufactured with the scheme proposed.	P204-1 AN APPROACH FOR MULTI-OBJECTIVE OPTIMIZATION OF HYBRID MATERIAL STRUCTURES FOR MOBILITY APPLICATIONS Vahid Ghaffarimeilei (Technische Universität Braunschweig), Sebastian kleemann (Technische Universität Braunschweig), Thomas Vietor (Technische Universität Braunschweig) Layup optimization for a composite part -in a structure made by metal and composite- subject to 3 axial loads using Genetic Algorithm. Two approaches for reducing the number of analyses are described.	P205-1 EFFECTIVE VOLUME OF CURVED BEAM UD- CFRP SPECIMEN FOR OUT-OF-PLANE STRENGTH BY 4-POINT BENDING Elichi Hara (JAXA), Tomohiro Yokozeki (The university of Tokyo), Yutaka Iwahori (JAXA) In order to evaluate size effects of out-of-plane strength of CFRP curved beam, two equations for calculating effective volume were derived. Weibull statistics were applied to evaluate size effects.	
	P201-2 DYNAMIC MECHANICAL ANALYSIS OF         CELLULOSE NANOFIBER/POLYESTER RESIN         COMPOSITES         Alessandra Lavoratti (UNIVERSIDADE DE CAXIAS DO         SUL), Lisete Cristine Scienza (Universidade Federal do         Rio Grande do Sul), <u>Ademir José Zattera</u> (UNIVERSIDADE         DE CAXIAS DO SUL)         This study presents a recently developed method for         processing cellulose residues by grinding them into         cellulose nanofibers (CNFs) to be used in composite         materials.	P202-2 APPLICABILITY OF A TAPPING METHOD TO NON-DESTRUCTIVE INSPECTION OF CARBON FIBER REINFORCED THERMOPLASTICS Xiugi Lyu (The University of Tokyo), Jun Takahashi (The University of Tokyo), Isamu Ohsawa (The University of Tokyo) Tapping method including both global method and local method was introduced to detect defects such as voids caused by inadequate molding or inappropriate use or inappropriate use of CFRTP parts.	P203-2 MODIFIED FICK'S LAW AND TSAI METHOD APPLIED TO THE ANALYSIS OF ADHESIVE BONDED COMPOSITE REPAIR Yin Yu (Shanghai Jiao Tong University), Kun-Hua Chen (Shanghai Jiao Tong University), Kun-Hua Han (Shanghai Jiao Tong University), Hai Wang (Shanghai Jiao Tong University)         The coupled hygro-thermo-stress analysis method on adhesively bonded repaired composite under hygrother- mal and mechanical loads environment was investigated and verified by the test.	P204-2 ANALYSIS OF STRAIN UNIFORMITIES IN ASYMMETRIC BI-STABLE COMPOSITE LAMINATES Diankun Pan (Harbin Institute of Technology), Fuhong Dai (Harbin Institute of Technology) It is found that the distributions of strains in asymmetric bistable composite laminates are uniform and the varia- tions of strains during snap-though are also even.	P205-2 INFRARED SIGNATURES OF BONDED INTERFACES FOR THE REPAIR OF PRIMARY STRUCTURES IN COMPOSITE MATERIAL Barus Matthias (Université Paul Sabatier), Francis Collombet (Université Paul Sabatier), Hélène Welemane (Ecole Nationale d'Ingénieurs de Tarbes), Laurent Crouzeix (Université Paul Sabatier), Arthur Cantarel (Université Paul Sabatier), Vres-Henri Grunevald (Composites Expertise & Solutions), Valérie Nassiet (Eco Nationale d'Ingénieurs de Tarbes), Marie-Laetitia Pastor (université Paul Sabatier) This work aims at evaluating bonded repaired compos- ite structures by means of Infrared Thermography. It presents the characterisation of a heat flow by inverse identification.	
	P201-3 FUNCTIONALIZED NANOCARBON BASED         POLYMER COMPOSITES AND ITS FEASIBLE         APPLICATION AT LEO SPACE ENVIRONMENT         Seung-Bo Jin (Korea Aerospace Research Institute),         Jae-Young No (Korea Advanced Institute of Science and Technology), Chun-Gon Kim (Korea Advanced Institute of Science and Technology)         Recent advances in the development of nanocarbons (including carbon nanotube, graphene and their assembly) have gained much interest in the aerospace field.	ITS FEASIBLE ENVIRONMENT       OF POLYMER-BONDED EXPLOSIVES USING COUPLED PLASTIC DAMAGE MODEL       PEEK/CARBON FIBER RECYCLABLE COMPOSITES BY SURFACE REDUCTION OR EPOXYDATION       BUTT JOINTED THERMOPLASTIC COMPOSITE BEDING         e Research Institute, Institute of Science and orea Advanced Institute of Science and orea Advanced Institute, hene and their assembly)       OF POLYMER-BONDED EXPLOSIVES USING COUPLED PLASTIC DAMAGE MODEL       PEEK/CARBON FIBER RECYCLABLE COMPOSITES BY SURFACE REDUCTION OR EPOXYDATION       BUTT JOINTED THERMOPLASTIC COMPOSITE BEDING         e Research Institute, Institute of Science and orea Advanced Institute of Science and orea Advanced Institute of Science and orea Advanced Institute of Engineering), Academy of Engineering), pement of nanocarbons (in- hene and their assembly)       Chen QLina Academy of Engineering), A damaged plasticity model for the specific composite material PBX was used to describe the deformation       PEEK/CARBON FIBER RECYCLABLE COMPOSITES BY SURFACE REDUCTION OR EPOXYDATION       BUTT JOINTED THERMOPLASTIC COMPOSITE BEDING	Ismet Baran (University of Twente-Faculty of Engineering Technology), Laurent Warnet (University of Twente- Faculty of Engineering Technology), Remko Akkerman (University of Twente-Faculty of Engineering Technology) Crack initiation and propagation mechanisms for the fill- er and the delamination at the skin-filler interface were captured experimentally and numerically for an AS4/ PEKK hybrid joint under bending.	P205-3 NON-DESTRUCTIVE TESTING OF DEFECTS IN THICK COMPOSITES BY MEANS OF PULSE AND LOCK IN THERMORRAPHY TECHNIQUES Alper Aktas (National Physical Laboratory), Michael Gower (National Physical Laboratory), Richard Shaw (National Physical Laboratory), Rob Simpson (National Physical Laboratory), Louise Wright (National Physical Laboratory), Sam Gnaniah (National Physical Laboratory) Lindsay Chapman (National Physical Laboratory), Gorder Pilkington (National Physical Laboratory) This study focuses on non-destructive inspection of defects within thick GFRP and CFRP composites by means of pulse and lock-in thermography techniques to evaluate the detection limits.		
	P201-4 STUDY ON PREPARATION AND FLAME RETARDANT PROPERTIES OF EPOXY/GRAPHENE OXIDE NANOSHEETS COMPOSITES Jia-Ming Yang (Hungkuang University), <u>Chin-Lung Chiang</u> (Hungkuang University) The flame retardant containing silicon and phosphorus was grafted onto the surface of graphene oxide nano- sheets via a condensation reaction and it can improve the flame retardancy of epoxy resin.	P202-4 DETECTION OF SMALL-SIZED DAMAGE IN A UNIFORM BEAM USING VIBRATORY POWER ESTIMATED FROM THE MEASURED VELOCITIES BY A LASER SCANNING VIBROMETER Jae Kwan Kim (Seoul National University), Young Cheol Huh (Korea Institute of Machinery and Materials), Tae Young Chung (Korea Institute of Machinery & Materials) A small size damage in a beam is identified with the damage index derived from the vibratory power. The vibratory power is estimated from the velocity data measured with laser scanning vibrometer.	P203-4 EVALUATION OF SURFACE TREATMENT           METHODS FOR PAG FRP BONDING WITH ADHESIVES           Toru Ohnishi (Tokyo Institute of Technology), Kazumasa           Shimamoto (Tokyo Institute of Technology), Masato           Katano (Tokyo Institute of Technology), Hiroshi Okamoto           (Tokyo Institute of Technology), Hiroshi Okamoto           Toru Ohnishi (Tokyo Institute of Technology), Hiroshi Okamoto           (Tokyo Institute of Technology), Vi Sekiguti (Tokyo           Institute of Technology), Chiaki Sato (Tokyo Institute of Technology)           To find suitable surface treatment for PA6 FRP, strengths           of adhesively bonded joints had experimentally been           evaluated. Enough strength for structural bonding was           obtained by some treatment methods.	P204-4 AN APPROXIMATE ANALYTIC SOLUTION FOR DISTORTION OF THIN-WALLED ORTHOTROPIC BEAMS WITH SYMMETRIC CROSS-SECTIONS SECTIONS SUBJECTED TO TORSION Bože Plazibat (University of Split-The University Department of Professional Studies), Frane Vlak (University of Split-FESB)         The section distortion of thin-walled beams made of iso- tropic and orthotropic materials with approximately equal modulus of elasticity in both directions under torsion is considered.	P205-4 A BENCHMARK FOR VIBRATION-BASED STRUCTURAL DAMAGE ASSESSMENT OF COMPOSITE USING WAVELET ANALYSIS Andrzej Katunin (Silesian University of Technology) The benchmark consists of 143 simulation and exper- imental studies on damage assessment in composite structures using wavelet analysis of modal shapes of vibration.	

### //Posters and mini-orals programme

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3:00	Mini Oral Session II	Mini Oral Session II	Mini Oral Session II	Mini Oral Session II	Mini Oral Session II
	P201-5 GRAPHENE/NICKEL COMPOSITE NANOWIRES UNDER UNIAXIAL COMPRESSION: A MOLECULAR DYNAMICS SIMULATION STUDY Zhenyu Yang (Beihang University), Jian Sun (Beihang University), Zixing Lu (Beihang University), Guipin Lin (Beihang University) The compressive behaviours of the nanolayered graphene/nickel composites nanowires (NWs) are studied with considering effects of layer spacing and temperature.	P202-5 MICROSTRUCTURAL AND EXPERIMENTAL ANALYSIS OF STRAIN RATE EFFECT FOR SHORT GLASS FIBER REINFORCED POLYPROPYLENE Nadia Achour Renault (Ensam), Joseph Fitoussi (Ensam), Jean François Vittori (Renault), Fodil Meraghni (Ensam)       P203-5 DESIGN AND OPTIMIZATION OF GRADIENT CLILULAR STRUCTURES Li Ma (Harbin Institute of Technology)       P204-5 EFFECT OF THE REINFORCING SIC, CG AND GRP PARTICLES ON THE STRUCTURE AND PROPERTIES OF COMPOSITE PISTONS BASED ON ALSITMG2SR0.03 ALLOY         Jean François Vittori (Renault), Fodil Meraghni (Ensam)       Combine with FE method and a genetic algorithm, a numerical methodology for design of gradient auxetic cellular structures was proposed and the geometrical and physical parameters were designed.       Sonia Boczkal (Institute of Non-Ferrous Metals in Gliwice), Marzena Lech-Grega (Institute of Non-Ferrous Metals in Gliwice), Marek Nowak (Institute of Non-Ferrous Metals in Gliwice), Anna Dolata (Silesian University of Technology)         The study gives characteristics of the structure and properties of the composite pistons based on AlSi7Mg2Sr0.03 alloy with different proportional conten of SiC, Cg and GRp particles.		P205-5 INTEGRATION OF SENSOR ELEMENTS IN FIBRE-REINFORCED THERMOPLASTICS USING REMOTE LASER PROCESSING Teresa Möbius (Technische Universität Dresden), Frank Adam (Technische Universität Dresden), Andreas Fürst (Fraunhofer IWS Dresden), Annett Klotzbach (Fraunhofer IWS Dresden), Jan Hauptmann (Fraunhofer IWS Dresden) Eckhard Beyer (Fraunhofer IWS Dresden) The integration of sensor elements in fibre-reinforced thermoplastic textiles using remote laser processing wa analysed with special focus on grade of modification of the textile layers.	
	P201-6 GRAPHENE- BASED COMPOSITE MATERIALS FOR AUTOMOTIVE Ahmed Elmarakbi (University of Sunderland), Brunetto Martorana (Centro Ricerche Flat S.C.p.A) This work advances innovative lightweight GRAPHENE based materials and their related modelling, designing, manufacturing, and joining capabilities suitable for large scale automotive productions.	P202-6 DAMAGE BEHAVIOR IN PAPER-BASED FRICTION MATERIALS SUBJECTED TO COMPRESSIVE LOADING UNDER ELEVATED TEMPERATURE <u>Tomoyuki Fujii</u> (Shizuoka University), Keiichiro Tohgo (Shizuoka University), Naoya Urata (Shizuoka University), Shunya Kozaki (Shizuoka University), Tomohiro Hasegawa (F.C. CoLtd), Shintaro Yagi (F.C.C. CoLtd), Yoichi Ito (F.C. CoLtd) This paper deals with investigation on microscopic dam- age behavior in paper-based friction materials subjected to compressive loading at elevated temperature.	P203-6 EXPERIMENTAL AND NUMERICAL STUDY ON THE EFFECT OF STIFFENER STIFFNESS ON COMPRESSIVE STABILITY OF STIFFENED COMPOSITE PANEL Yuequan Wang (Nanjing University of Aeronautics and Astronautics), Shuhua Zhu (Nanjing University of Aeronautics and Astronautics), Mingbo Tong (Nanjing University of Aeronautics and Astronautics), Xing HU (Nanjing University of Aeronautics and Astronautics), Xiaowei Jiang (Nanjing University of Aeronautics and Astronautics)	P204-6 COMPOSITE POWER PYLONS FOR HIGH VOLTAGE TRANSMISSION LINES         Mehrtash Manouchehr (Technical University of Denmark (DTU)), Christian Berggreen (Technical University of Denamrk (DTU))         Different stages of a project aimed at the development of a new composite power pylon for high voltage trans- mission lines is described. Finite element model and experimental test plans have been shown	P205-6 COMPOSITE MICROPOWDERS FOR ADDITIVE TECHNOLOGIES. Pavel Lykoy (Federal State State-Financed Educational Institution of High Professional Education "South Ural State University" (National Research University) FSSFEI HPE "SUSU" (NRU) ), Sergei Vaulin (Federal State State- Financed Educational Institution of High Professional Education "South Ural State University" (National Research University) FSSFEI HPE "SUSU" (NRU) ), Sergei Sapozhnikov (Federal State State-Financed Educational Institution of High Professional Education "South Ural State University" (National Research University) FSSFEI HPE "SUSU" (NRU) ), Igor Shulev (Federal State State- Financed Educational Institution of High Professional Education "South Ural State University" (National Research University) FSSFEI HPE "SUSU" (NRU) ), Dmitrii Zherebtsov (Federal State State-Financed Educational Institution of High Professional Education "South Ural State University" (National Research University) FSSFEI HPE "SUSU" (NRU) ), Ruslan Abdrahimov (Federal State State-Financed Educational Institution of High Professional Education "South Ural State University" (National Research University) FSSFEI HPE "SUSU" (NRU) ), Ruslan Abdrahimov (Federal State State-Financed Educational Institution of High Professional Education "South Ural State University" (National Research University) FSSFEI HPE "SUSU" (NRU) ), The technology of obtaining composite micropowders, allowing the production of a wide range of composite powders suitable for use in additive technologies, is proposed.
	P201-7 THERMAL EVALUATION AND PREPARATION OF MORTAR CONTAINING N-HEXADECANE/XGNP SSPCM FOR ENERGY EFFICIENT BUILDINGS Sumin Kim (Soongsil University), Su-Gwang Jeong (Soongsil University), Seong Jin Chang (Soongsil University), Sughwan Kim (Soongsil University) We prpared the SSPCM which has high heat stotage property and it applied to a mortar. As a result, we con- firmed that heat stroage mortar has time lag effect and energy saving.	P202-7 INVESTIGATION OF THE DELAMINATION BEHAVIOR ON CARBON FIBER TAPE REINFORCED THERMOPLASTICS Mikio Akamatsu (The University of Tokyo), Toshiro Ohori (The University of Tokyo), Takahiro Hayashi (The University of Tokyo), Jun Takahashi (The University of Tokyo) This study deals with L-shaped specimen made of CTT material. The fracture behavior and flexural rigidity of CTT in curved structure were verified, compared with UD material.	<ul> <li>P203-7 THE PREPARATION AND STUDY OF FLAME RETARDANT FOR EXPANDABLE POLYSTYRENE Yazhen Wang (Qiqihar University), Yongsheng Zhang (Qiqihar university), Guoli Chen (Qiqihar University), Haiyang Chang (Qiqihar University), Liwu Zu (Qiqihar University)</li> <li>A composite flame retardant for expandable polystyrene was reported, in which phenol formaldehyde resin (PF) was used as coating agent, graphite oxide(GO)was used as flame retardant.</li> </ul>	P204-7 COMPARISON BETWEEN SIMULATED CENTRAL SUPPORT TESTS AND TWO-SPAN PANEL TESTS FOR SANDWICH PANELS <u>Harald Nelke</u> (TU Darmstadt), Jörg Lange (TU Darmstadt) Simulated central support and two-span tests agree fairly well for the first failure mode. But EN 14509 does not predict the resistance (shear, core compression, wrinkling) at mid support correctly.	P205-7 STRUCTURES AND PHYSICAL PROPERTIES OF POLYETHYLENE/BORON NITRIDE COMPOSITES BY REACTIVE EXTRUSION Soon Man Hong (Korea Institute of Science and Technology (KIST)), Bum Ki Baek (Korea Institute of Science and Technology (KIST)), Seunggun Yu (Korea Institute of Science and Technology (KIST)), Yun Ho La (Korea Institute of Science and Technology (KIST)), Jun Pyo Hong (Korea Institute of Science and Technology (KIST)), Chong Min Koo (Korea Institute of Science and Technology (KIST)) High-density polyethylene (HDPE) composites with chemically modified boron nitride (mBN) fillers, functior alized with an organosilane, were manufactured by twit

	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
:00	Mini Oral Session II	Mini Oral Session II	Mini Oral Session II	Mini Oral Session II	Mini Oral Session II
	P201-8 GRAPHENE OXIDE FUNCTIONALIZATION WITH POLYSILOXANES FOR ADVANCED COMPATIBILITY IN EPOXY NANOCOMPOSITES Celina Maria Damian (University Politehnica of Bucharest), Maria Adina Vulcan (University Politehnica of Bucharest), Gheorghe Hubca (University Politehnica of Bucharest), Razvan Petre (Scientific Research Center for CBRN Defense and Ecology), Horia Iovu (University Politehnica of Bucharest) The incorporation of GO functionalized with glycidyloxy type silane in epoxy matrix increased the properties of the final composites by creating a compatible interface between the matrix and the GO.	P202-8 FRACTURE BEHAVIOR OF CROSS-PLY FIBRE REINFORCED COMPOSITE LAMINATES WITH CRACKS UNDER BIAXIAL LOADING CONDITIONS <i>Nauven Hai Dang (Nanyang Technological University),</i> <i>Sridhar Idapalapati (Nanyang Technological University),</i> <i>Narasimalu Srikanth (Nanyang Technological University)</i> This study is to investigate the effects of the biaxial stress states on failure behaviors of composite laminates with cracks under static conditions.	P203-8 IMPACT DAMAGE AND PERFORATION OF THIN MONOLITHIC ALUMINIUM ALLOY PLATES: INSIGHTS FOR IMPACT RESISTANT POLYMER-METAL BILAYER LAMINATES Kedar Pandya (University of Cambridge), Graham McShane (University of Cambridge), William Stronge (University of Cambridge) Numerical and experimental studies on the impact re- sponse of thin aluminium alloy plates in terms of ballistic limit velocity, energy absorption capability and sensitivity to projectile nose shape.	P204-8 SHEAR-DOMINATED BENDING BEHAVIOR OF CARBON/EPOXY COMPOSITE LATTICE ISOBEAM STRUCTURES David W_Jensen (Brigham Young University), Kirsten Hinds (Brigham Young University) Three 0.6 m long rectangular carbon/epoxy composite lattice (IsoBeam™) structures manufactured (0.8 kg) and tested in 3-point shear-dominated bending demon- strated considerable ductility and potential.	P205-8 PHOTOPOLYMERIZABLE HYBRID COMPOSITIONS BASED ON (THERMO) PHOTOSENSITIVE MONOMER UNITS USED AS ORGANIC MATRIX FOR SILVER AND ZNO NANOPARTICLES Emil Constantin Buruiana (Petru Poni Institute of Macromolecular Chemistry), Tinca Buruiana (Petru Poni Institute of Macromolecular Chemistry), Viorica Podasca (Petru Poni Institute of Macromolecular Chemistry) Photopolymerized polymer composites incorporating Ag and ZnO nanoparticles into urethane acrylic monomers and hybrid monomers were synthesized and character- ized as dye photocatalyst.
	P201-9 EMBEDDED TRILAYER GRAPHENE FLAKES UNDER INEFFICIENT TENSILE AND COMPRESSIVE LOADINGS Georgia Tsoukleri (Foundation of Research and Technology Hellas-Institute of Chemical Engineering and High Temperature Processes), John Parthenios (Foundation of Research and Technology Hellas- Institute of Chemical Engineering and High Temperature Processes), Costas Galiotis (Foundation of Research and Technology Hellas-Institute of Chemical Engineering and High Temperature Processes), Konstantinos Papagelis (University of Patras) The mechanical response of ABA 3LG flakes loaded in tension and compression embedded on polymer beams is monitored by simultaneous Raman measurements through the strain sensitivity of G or 2D peaks.	P202-9 FATIGUE MECHANICAL BEHAVIOR OF MWCNT REINFORCED GFRP COMPOSITES UNDER THE PRESENCE OF ARTIFICIAL DEFECTS liona LAZARIDOU (UNIVERSITY OF THE AEGEAN), <u>Nikolaos</u> <i>ALEXOPOULOS</i> (UNIVERSITY OF THE AEGEAN), <u>Evangelos</u> FAVVAS (DEMOCRITUS Research Center), Markos PETOUSIS (Crete Institute of Technology), Achilles VAIRIS (TEI CRETE) The present work investigates on the effect of artificial surface defects of glass fiber reinforced polymers (GFRP) under constant amplitude fatigue loadings and for vari- ous nano-reinforced matrices.	P203-9 MODELING DRY FABRICS UNDER IMPACT WITH A 3D DISCRETE ELEMENT METHOD (DEM) Jeremie Girardot (Institute of Mechanics and Mechanical Engineering (I2M)), Frederic Dau (Institute of Mechanics and Mechanical Engineering (I2M)) n impact simulation scenario is performed to validate the implementation satisfying the criterion of energy conservation. Numerical results with DEM are compared to finite elements ones.	P204-9 EFFECT OF THERMAL CYCLING ON THE MECHANICAL PROPERTIES OF CFRP FOR PRECISE SPACE STRUCTURE Satoshi Kobayashi (Tokyo Metropolitan University), Ken Goto (Japan Aerospace Exploration Agency), Minoru Iwata (Kyushu Institute of Technology) Thermal cycle tests were conducted on carbon fiber re- inforced poly-cyanate ester and epoxy resin. Transverse cracks in 90° layers and delamination occurred. Bending modulus, however did not decrease.	P205-9 POLYMERIC IONIC LIQUIDS AS SEPARATORS FOR ALL-SOLID STATE THIN-FILM ELECTROCHROMIC DEVICES AND LI BATTERIES Alexander Shaplov (A.N. Nesmeyanov Institute of Organoelement Compounds Russian Academy of Sciences (INEOS RAS)), Denis Ponkratov (A.N. Nesmeyanov Institute of Organoelement Compounds Russian Academy of Sciences (INEOS RAS)), Pierre- Henri Aubert (Universite' de Cergy-Pontoise), Elena Lozinskaya (A.N. Nesmeyanov Institute of Organoelement Compounds Russian Academy of Sciences (INEOS RAS)), Cédric Plesse (Universite' de Cergy-Pontoise), Petr Vlasov (Saint-Petersburg State University), Michel Armand (University de Picardie Jules Verne), Frédéric Vidal (University de Picardie Jules Verne), Frédéric Vidal (Universite' de Cergy-Pontoise), Pier Vlasov (Saint-Petersburg State University), Michel Armand (University de Picardie Jules Verne), Frédéric Vidal (Universite' de Cergy-Pontoise), Yakov Vygodskii (A.N. Nesmeyanov Institute of Organoelement Compounds Russian Academy of Sciences (INEOS RAS)) The all-polymer electrochromic devices were made from polymeric ionic liquids and PEDOT. The advantages are: simplicity, fast switching(3÷5 s), high coloration efficien- cy (430 cm2/C), work in vacuum.
	P201-10 INFLUENCE OF DISPERSION METHOD TO DISPERSIBILITY AND MECHANICAL PROPERTIES OF ULTRA-THIN CARBON FIBER TAPE REINFORCED THERMOPLASTICS Hirofumi Suganuma (The University of Tokyo), Shinichiro Yamashita (The University of Tokyo), Xin Zhang (The University of Tokyo), Kouji Hashimoto (The University of Tokyo), Isamu Ohsawa (The University of Tokyo), Jun Takahashi (The University of Tokyo) The applicable range of the methodology was experi- mentally verified to be practical and the cause of the dif- ference between theory and experiment was elucidated.	P202-10 MECHANICAL PROPERTIES OF CARBON NANOTUBE FIBER MATERIALS UNDER MONOTONIC AND CYCLIC TENSILE LOADING <u>Qing-Sheng Yang</u> (Beijing University of Technology), Zhong-Jun Yang (Beijing University of Technology)	P203-10 AN EXPERIMENTAL STUDY OF LOW VELOCITY IMPACT OF CARBON, GLASS AND MIXED FIBER COMPOSITE PLATES Ahmed Alomari (King Fahd University of Petroleum & Minerals), Abul Fazal M. Arif (King Fahd University of Petroleum & Minerals), M. Haris Malik (King Fahd University of Petroleum & Minerals), Faleh Alsulaiman (King Fahd University of Petroleum & Minerals), Shafique Khan (King Fahd University of Petroleum & Minerals) In this work, impact response of composite laminates was experimentally studied to determine the energy ab- sorption. Three types of composites were used: carbon, glass and mixed fiber composite plates.	P204-10 PARAMETER STUDY OF THERMAL PROTECTION FUNCTION INTEGRATED SANDWICH STRUCTURES FOR AEROSPACE APPLICATION Songhe Meng (Harbin institute of technology), Qiang Yang (Harbin institute of technology), Wehua Xie (Harbin institute of technology), Shanyi Du (Harbin institute of technology), Yongxia Li (Harbin institute of technology)	P205-10 HIGH-STRENGTH, HIGH-DISSIPATION CARBON NANOTUBE NANO-COMPOSITES: THEORY AND EXPERIMENTS Walter Lacarbonara (Sapienza University of Rome), Giulia Lanzara (University of Rome Tre), <u>Michela Talà</u> (Sapienza University of Rome), Giovanni Formica (University of Rome Tre) Carbon nanotube nanocomposites with tunable interfa- cial CNT-matrix properties are explored experimentally for optimal strength and dissipation performance.

### //Posters and mini-orals programme

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13:00	Mini Oral Session II	Mini Oral Session II	Mini Oral Session II	Mini Oral Session II	Mini Oral Session II
	P201-11 FLOWABILITY OF DISCONTINUOUS CARBON FIBER REINFORCED THERMOPLASTICS Shuli Tang (The University of Tokyo), Takahiro Hayashi (The University of Tokyo), Hanchul Lee (The University of Tokyo), Wataru Nagatsuka (The University of Tokyo), Isamu Ohsawa (The University of Tokyo), Jun Takahashi (The University of Tokyo) The investigation of effect of tape length and molding conditions on flowability of UT-CTT with rib structure and observation of fiber orientation to characterize the flow behavior.	IBER REINFORCED THERMOPLASTICS         AND RHEOLOGICAL BEHAVIOUR OF CUP-           Ituil Tang (The University of Tokyo), Takahiro Hayashi         STACKED CARBON NANOTUBE MODIFIED EPOXY           The University of Tokyo), Hanchul Lee (The University         STACKED CARBON NANOTUBE MODIFIED EPOXY           NANOCOMPOSITES WITH RE-AGGLOMERATION         NANOCOMPOSITES WITH RE-AGGLOMERATION           namu Ohsawa (The University of Tokyo),         Natachiro Hayashi           the University of Tokyo)         Natachiro Hayashi           the University of Tokyo)         Natachiro Hayashi           the University of Tokyo)         Natachiro Hayashi           the investigation of effect of tape length and molding         Onditions on flowability of UT-CTT with rib structure           no doservation of fiber orientation to characterize the         Re-agglomeration network of CSNT/RTMG nanocom-		P204-11 CHARACTERIZATION AND EVALUATION OF HIGH-STRENGTH LIGHTWEIGHT ABLATOR USING POROUS CARBON MATERIAL Elsuke Koja (Tokyo University of Science), Yuki Kubota (Tokyo University of Science), Takuya Aoki (Japan Aerospace Exploration Agency-Chofu Aerospace Center), Toshio Ogasawara (Japan Aerospace Exploration Agency-Chofu Aerospace Center), Yuichi Ishida (Japan Aerospace Exploration Agency-Chofu Aerospace Center) We manufactured new lightweight ablator using a po- rous carbon material. This indicated high compressive strength compared with traditional ablators and good thermal insulation performance.	P205-11 EFFECT OF UV/VISIBLE LASER IRRADIATION ON SOME HYBRID FORMULATIONS CONTAINING PHOTOREACTIVE URETHANE (DI)METHACRYLATES AND GRAPHENE Anton Airinei (Petru Poni Institute of Macromolecular Chemistry), Tinca Buruiana (Petru Poni Institute of Macromolecular Chemistry), George Epurescu (2National Institute for Lasers-Plasma and Radiation Physics), Florentina Jitaru (Petru Poni Institute of Macromolecular Chemistry), Emil Constantin Buruiana (Petru Poni Institute of Macromolecular Chemistry), Ioana Ion (3National Institute for Research and Development in Electrical Engineering) Hybrid nanocomposites based on novel urethane mono- mers and graphene were prepared through UV photopo- lymerization/direct laser writing by femtosecond laser pulses, and characterized.
	P201-12 MECHANICAL BEHAVIOR OF THE BRITTLE MATRIX LAYERED COMPOSITE REINFORSED BY SHORT FIBERS Andrejs Krasnikovs (Institute of Mechanics-Riga Technical University), Olga Kononova (Institute of Mechanics-Riga Technical University), Arturs Machanovskis (Institute of Mechanics-Riga Technical University), Vitalijs Lusis (Institute of Mechanics-Riga Technical University), Arturs Lukashenoks (Institute of Mechanics-Riga Technical University) Fracture of the brittle matrix composite material (CM) with short fibers is under investigation. Situation when fibers are uniformly distributed is compared with fibers arrange in layers.	P202-12 NONLINEAR STRESS RELAXATION OF NANOSILICA-FILLED SILICONE RUBBER FOAM COMPOSITES <u>Wenjun Hu</u> (China Academy of Engineering Physics), Xicheng Huang (China Academy of Engineering Physics)	P203-12 CONTACT FORCE MEASUREMENT AND DELAMINATING RESPONSES OF COMPOSITE LAMINATE SUBJECTED TO SMALL-MASS-TUP IMPACT Yan chen (Shanghai Jiao Tong University), Baojun Ning (Shanghai Jiao Tong University), <i>Enteng Yu</i> (Shanghai Jiao Tong University), Bo Zhang (Shenyang institute of aircraft engine), Hongbo Liu (Shenyang institute of air- craft engine), Hai Wang (Shanghai Jiao Tong University) The contact force measurement based on the impactor response is numerically studied for the laminate subject- ed to small mass impact, and the response of laminate on the delamination are analysed.	P204-12 APPLICATION OF COMPOSITE MATERIAL IN THE AIRCRAFT STRUCTURE TO IMPROVE CRASHWORTHINESS <i>Yiru Ren</i> (Hunan University) This paper summarizes the crashworthiness design method for composite transport aircraft, and design concept of the frame, bottom structure and strut are discussed.	P205-12 BIOINSPIRED FUNCTIONAL MATERIALS TEMPLATED FROM NATURE MATERIALS Zhang Di (shanghai jiao tong university), Jiajun Gu (shanghai jiao tong university), Wang zhang (shanghai jiao tong university), Huilan Su (shanghai jiao tong university), Qinglei liu (shanghai jiao tong university), Shenming zhu (shanghai jiao tong university)
	P201-13 MICROMECHANICAL ANALYSIS OF NONLINEAR RESPONSE OF FIBROUS COMPOSITES Yanchaa Wang (Tongji University), Zhengming Huang (Tongji University) An elasto-plastic bridging model is established to evalu- ate nonlinear behavior of composites. Using the equiva- lent fiber method, effects of an interphase on composites is studied numerically.	P202-13 EFFECT OF WATER/CEMENT RATIO AND CURING TIME ON COMPRESSIVE STRENGTH OF MWCNT-CEMENT MORTAR Danghoon Kang (Korea Railroad Research Institute), Gang Seok Seo (Kyung Hee University), Wonseok Chung (Kyung Hee University) This study conducted experiments for improving the compressive strength of cement mortar by adding MWCNTs w.r.t. MWCNT concentration, W/C ratio, curing age, and MWCNT concentration adjustment methods.	P203-13 ANTI-BLAST DESIGN OF CELLULAR SACRIFICIAL CLADDING BASED ON A NONLINEAR PLASTIC SHOCK MODEL Yuanyuan Ding (University of Science and Technology of China), Shilong Wang (University of Science and Technology of China), Zhijun Zheng (University of Science and Technology of China), Liming Yang (Ningbo University), Jilin Yu (University of Science and Technology of China) Dimensional analysis and a nonlinear plastic shock model based on the rigid–plastic hardening idealization was employed to guide the anti-blast design of cellular sacrificial cladding.	P204-13 ADSORPTION OF CO2 ON AMINE-GRAFTED ACTIVATED CARBON FIBER FABRICS Yu-Chun Chiang (Yuan Ze University), Chien-Yuan Hung (Yuan Ze University) The ACFs modified with MEA and TPEDA were character- ized and their CO2 adsorption isotherms were measured. Results suggested that the aminated ACFs were the applicable adsorbents for CO2 adsorption.	P205-13 STYLUS SUPPORT STRUCTURE AND FUNCTION OF RADULAR TEETH IN CRYPTOCHITON STELLERI Steven Herrera (University of California Riverside), Lessa Grunenfelder (University), Qianqian Wang (University of California Riverside), Christopher Salinas (University of California Riverside), Sucholas Yaraghi (University of California Riverside), Jeffrey Geiger (University of California Riverside), Suchard Wuhrer (University of California Riverside), Richard Wuhrer (University of Western Sydney), Pablo Zavattieri (Purdue University), David Kisailus (University of California Riverside) The chiton feeding apparatus demonstrates a high level of control at multiple length scales to produce extremely lightweight designs for structural materials.

	Stage 1	Stage 2	Stage 3		Stage 5
3:00	Mini Oral Session II	Mini Oral Session II	Mini Oral Session II	Mini Oral Session II	Mini Oral Session II
	P201-14 UNDERSTANDING THE EFFECT OF IN-PLANE FIBER WAVINESS ON DAMAGE BEHAVIOR OF CURED WOVEN COPOSITES Masoud Haghi Kashani (University of British Columbia), Abbas. S. Milani (University of British Columbia) This article presents an experimental investigation into the mechanical behavior of a cured woven lamina under uniaxial tensile loading in warp and weft directions to assess in-plane waviness effect.	P202-14 LIGHTWEIGHTING OPPORTUNITY USING FRP STEEL HYBRID Elspeth Keating (University of Warwick), Darren Hughes (University of Warwick), Janka Cafolla (Tata Steel Research and Development), Richard Dashwood (University of Warwick), Iain McGregor (Tata Steel Research and Development) Using both simulation and mechanical testing, PAG GF60 and DP600 hybrids are shown to offer a 30% increase in specific stiffness with respect to steel only.		P204-14 ACTUATION AND ENERGY HARVESTING	P205-14 EFFECTIVE ELECTRICAL CONDUCTIVITY OF CNT-EPOXY NANOCOMPOSITE Vladimir Kulakov (Institute of Polymer Mechanics- University of Latvia), Andrey Aniskevich (Institute of Polymer Mechanics-University of Latvia), Triinu Poltimae (Tallinu University of Technology) The effective electrical conductivity of an epoxy resin filled with the well-dispersed and randomly oriented carbon nanotubes (CNTs) was calculated by applying th micromechanical approach.
	P201-15 INFLUENCE ON THE MECHANICAL BEHAVIOR OF CARBON FIBER FABRIC REINFORCED PPS LAMINATES UNDER DIFFERENT TEMPERATURE Wang Shiyu (Harbin Institute of Technology), Zhang Jiazhen (Harbin Institute of Technology), Zhou Zhengong (Harbin Institute of Technology), Wang Yue (Harbin Institute of Technology) With the temperature increasing up to Tg(120°C) of fiber fabrics reinforced PPS laminates degrades significantly the quality of the adhesion at the fiber/matrix interface. P201-16 LIGHTNING PROTECTION TESTING OF WET	P202-15 EXPERIMENTAL ANALYSIS ON THE BEARING CAPACITY OF SANDWICH PANEL JOINTS Christina Kunkel (TU Darmstadt), Jörg Lange (TU Darmstadt)         According to industry standards sandwich panels are not permissible for the full stabilization or bracing of steel structures. Possible joint reinforcement solutions are assessed experimentally.         P202-16 FLEXIBLE SPACER FABRICS FOR	P203-15 THERMAL AGING REDUCTION IN POLYMER MATRIX COMPOSITES Joe Hoffman (University of Denver), Maciej Kumosa (University Of Denver)         This paper presents an approach to reduce the impact of thermal aging of hybrid glass/carbon fiber epoxy matrix composite rods utilized in novel high voltage transmis- sion lines.         P203-16 EVALUATION BY AGING CYCLES OF TENSILE	P204-15 EXPERIMENTAL SUB-COMPONENT INVESTIGATION OF WIND TURBINE BLADE RETROFIT REINFORCEMENTS Maurizio Sala (DTU - Technical University of Denmark), Christian Berggreen (DTU - Technical University of Denmark) Experimental sub-component investigation of wind turbine blade reinforcement which aims to reduce the problems caused by longitudinal cracks detected at the blade trailing edge P204-16 INFLUENCE OF THE CUSP COMPLIANCE AND	P205-15 MATERIAL CHARACTERIZATION AND VIBRO-ACOUSTIC ANALYSIS OF A PREIMPREGNATED CARBON FIBER REINFORCED EPOXY DRUM SHELL Manuel Ibañaz (Rasch Drums), Alberto Gimenez (University CEU Cardenal Herrera), Fernando Sanchez (University CEU Cardenal Herrera) The vibro-acoustic behavior of composite materials are analyzed depending on their material characterization i a set of test conducted in different drum shell prototype P205-16 ELECTROSPUN CORE-SHELL COMPOSITE
	METALIZED POLYMER COMPOSITES <u>Rajesh P. S. M.</u> (Ecole Polytechnique de Montreal), Martin Gagne (Ecole Polytechnique de Montreal), Xavier Cauchy (Ecole Polytechnique de Montreal), Jolanta E. Klemberg-Sapieha (Ecole Polytechnique de Montreal), Frederic Sirois (Ecole Polytechnique de Montreal), Frederic Sirois (Ecole Polytechnique de Montreal), A qualitative analysis of the lightning protection ability of wet-metalized composites, studied via low energy strikes and resistive heating tests is presented.	REINFORCEMENT OF RIGH PADINGS FON REINFORCEMENT OF RIGH POLYURETHANE FOAMS IN SANDWICH STRUCTURES Kay Schäfer (Technische Universität Chemnitz), Jürgen Iröltzsch (Technische Universität Chemnitz), Frank Helbig (Technische Universität Chemnitz), Dariusz Niedziela (Fraunhofer Institute for Industrial Mathematics), Lothar Kroll (Technische Universität Chemnitz) Spacer fabrics as reinforcement structure for rigid PUR foams achieve significant increases to the mechanical properties. Corresponding process simulation is devel- oped for component designing.	STRENGTHS AND DURABILITY CHARACTERISTICS OF MATERIALS REINFORCED BY CARBON, GLASS AND BASALT FIBERS <u>Piero De Fazio</u> (ENEA), Giuseppe Arleo (ENEA), Maria Bruna Alba (ENEA), Franco Bernardo (ENEA)	LAYERING METHOD ON THE CUSP DEFLECTION IN DENTAL BULK-FILL COMPOSITE RESTORATION. <u>Yu-Jin Kim</u> (Seoul national university), Ryan Jin-Young Kim (Seoul national university), In-Bog Lee (Seoul na- tional university) The aim of this study was to investigate the effects of the layering method and cusp compliance on cusp deflection in bulk-fill and conventional composite restorations, and to examine the relationship	FIBER FILMS WITH SELF-HEALING PROPERTY FiBER FILMS WITH SELF-HEALING PROPERTY Fenghua Zhang (Harbin Institute of Technology), Zhichur Zhang (Harbin Institute of Technology), Yanju Liu (Harbin Institute of Technology), Jinsong Leng (Harbin Institute of Technology) Coaxial electrospinning that is a branch of nanotech- nology has attracted great attention. Due to the easy operation process, it is able to form special structure an multifunctional fibers. The rapid

### //Posters and mini-orals programme

	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	
13:00	Mini Oral Session II	Mini Oral Session II	Mini Oral Session II	Mini Oral Session II	Mini Oral Session II	
	P201-17 FAILURE BEHAVIOR OF LAMINATED COMPOSITE PLATES UNDER ANTICLASTIC BENDING Yakup Okan Alpay (Bogazici University), Fazil O. Sonmez (Bogazici University), Nuri Ersoy (Bogazici University) Failure behaviour of composite plates under anticlastic bending is studied using a unique test fixture. This is a special case of biaxial out-of-plane loading that applies mainly twisting moment.	P202-17 CRUSHING ANALYSIS AND CRASHWORTHINESS OPTIMIZATION DESIGN OF REINFORCED REGULAR HEXAGON HONEYCOMB SANDWICH PANEL He Qiang (Nanjin University of science and technology) This paper introduces single-rib reinforced regular hexagon HSP (R1-HSP) and double-rib reinforced regular hexagon HSP (R2-HSP). The mechanical characteristics of these three structures are first inve	P203-17 A STUDY ON THE OPTIMAL DESIGN OF COMPOSITE ROTOR BLADE CROSS-SECTION USING MICRO GENETIC ALGORITHM You-Jin Won (Korea Aerospace Research Institute), Soo- Yong Lee (Korea Aerospace University) In this study, optimal design of composite rotor blade cross-section was carried out to draw design variables for layout design of blade cross-section minimizing blade mass in early stage of design.	P204-17 INNOVATIVE HYDROXYAPATITES, COLLAGEN AND CHITOSAN SCAFFOLDS FOR ENHANCED ADHESION, GROWTH AND BIOACTIVITY OF HUMAN OSTEOBLASTS IN VITRO Gheorghe Tomoaia (luliu Hatieganu University of Medicine and Pharmacy), Andrada Tomoaia-Cotisel (University of Utah. School of Medicine), Aurora Mocanu (Babes-Bolyai University of Cluj-Napoca), <u>Maria Tomoaia- Cotisel</u> (Babes-Bolyai University of Cluj-Napoca)	P205-17 DEVELOPMENT OF SHAPE MORPHING KIRIGAMI HONEYCOMBS AND ACTUATION METHODS Robin Neville (University of Bristol), Fabrizio Scarpa (University of Bristol) This work presents techniques for the design and manu- facture of morphing honeycombs using Kirigami (origami + cutting). A method is presented to predict the shape morphing behaviour of the honeycombs.	
	P201-18 THE EFFECT OF PERPENDICULARITY ERROR ON STRESS CONCENTRATION FOR CARBON FIBER REINFORCED PLASTIC Xueshu Liu (Dalian University of Technology), Hang Gao (Dalian University of Technology) The perpendicularity error of bolt-hole affects stress distribution around the bolt-hole and when it increases up to 4 degree stresses in the region surrounding the bolt-hole may increase 20 times.	P202-18 EMPIRICAL APPROACH OF ITERATIVE INSERT SHAPE OPTIMIZATION IN THIN SKINNED FRP- SANDWICH PANEL JOINTS Johannes Wolff (Insitute of Composite Structures and Adaptive Systems), Fritz Felix Trimpe (Insitute of Composite Structures and Adaptive Systems) Analytical results, using an euqation provided by ECSS, predicting the first failure load level of sandwich insert connections using the core load path are compared to test data.	P203-18 LATTICE TRUSS CORE SANDWICH STRUCTURES WITH AL LATTICE TRUSS CORE AND CFRP COMPOSITE FACESHEETS UNDER IMPACT LOADS Bing Wang (Harbin Institute of Technology), shaowei zhu (Harbin Institute of Technology), Guoqi zhang (Beijing Satellite Manufacturing Factory) The mechanical response of pyramidal truss core sand- wich structures consisting of carbon fiber reinforced polymer (CFRP) facesheets and aluminum alloy lattice truss cores	P204-18 EFFECTS OF DIFFERENT TESTING         CONDITIONS ON TENSILE PROPERTIES OF CARBON         FIBER MULTIFILAMENT         Junlin Chen (Beihang University), Yan Zhao (Beihang         University), Ye Li (Beihang University), Zhe Yang (Beihang         University), Jianwei Hao (Aviation Industry Corporation of China)         Effects of different sample preparation and testing conditions on tensile properties of carbon fiber yarn have been investigated based on some parameters.	P205-18 SUBWAVELENGTH WAVE PROPAGATION CONTROL BY USING ACTIVE ELASTIC METAMATERIALS Guoliang Huang (University of Missouri), Yangyang Chen (University of Missouri) Elastic metamaterials have been extensively investigated due to their unique abilities on controlling propagation of subwavelength elastic waves. One of the most interest- ing properties is the generati	
	P201-19 EFFECTS OF PHASE SHIFT ON THE RESPONSE OF LAMINATED WOVEN COMPOSITES <u>Sam Huang</u> (Suny at Stony Brook) This research focuses on responses of 64 woven lami- nated composites whose phase shift in microstructure is different under uniaxial compression and biaxial compression.	P202-19 INDENTATION MODELS AND FAILURE MODE MAP FOR CIRCULAR COMPOSITE SANDWICH PLATES Sridhar Idapalapati (Nanyang Technological University), Rajaneesh Anantharaju (Nanyang Technological University) The failure response of clamped circular sandwich plates under localised central loading is investigated. The com- peting failure modes, failure mode map was created as function of geometry, properties.	P203-19 A STUDY OF THE THERMAL BUCKLING BEHAVIOR OF A COMPOSITE PLATE USING THE DIGITAL IMAGE CORRELATION TECHNIQUE AND FINITE ELEMENT ANALYSIS <u>Nam Seo Goo</u> (Konkuk University)	P204-19 GRP BOGIE CHARACTERISTICS EVALUATED BY EXPERIMENTAL METHODS         Jan Chvojan (VZU Plzen), Jaroslav Vaclavik (VZU Plzen), Miloslav Kepka (University of West Bohemia), Rayner Mayer (Sciotech Projects)         Testing methods have been developed and described in the paper for the bogie dynamics characteristics inves- tigation in a laboratory conditional including drop test, sweep test and track profile test.	P205-19 A STUDY ON THE DURABILITY OF GECKO- LIKE PDMS MICRO-STRUCTURES BY METAL COATINGS Gyu-He Kim (Andong National University), Tae-Chang Ahr. (Andong National University), Hui Yun Hwang (Andong National University) In this study, we suggested a metal coating method to improve durability of Gecko-like dry adhesives, and proved that metal coating can improve more than 30% by experimental works.	
	P201-20 ANALYTICAL, EXPERIMENTAL AND NUMERICAL APPROACH OF STORAGE AND LOSS MODULI OF FIBRE REINFORCED EPOXY COMPOSITES Efstathios Theotokoglou (National Technical university) of Athens), Ioannis Giannopoulos (Cranfield University), Emilios Sideridis (National Technical university of Athens) In the study presented in this article the Dynamic Mechanical Analysis of micro-mechanically modelled unidirectional fibre reinforced composites was investi- gated numerically by Finite Element Method.	P202-20 EXPERIMENTAL-THEORETICAL ANALYSIS OF MECHANICAL PROPERTIES OF PERFORATED COMPOSITE SANDWICH PANELS FOR AIRCRAFT ENGINE NACELLE Aleksandr Anoshkin (Perm National Research Polytechnic University), Valerii Zuiko (Perm National Research Polytechnic University), Anna Tchugaynova (Perm National Research Polytechnic University), Evgeniya Shustova (Perm National Research Polytechnic University) The work is dedicated to analysis of mechanical prop- erties of composite sandwich panels. The influence of perforation on mechanical properties of fiberglass panels was studied.	P203-20 COMPOSITE BEAM WITH CELL STRUCTURE FOR HIGH STIFFNESS SHORT BEAM APPLICATIONS Zdeněk Pošvář (Czech Technical University in Prague), Milan Růžička (Czech Technical University in Prague)			



### Scientific programme

#### Monday 20 July

	day 20 July Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
8:30	Opening Ceremony						· · · ·	· · ·	· · ·	
	Plenary: Integration of manuf	acturing and failure analyses	for sustainable design of com	posites Ramesh Talreja, Texas	A&M University, USA					
9:45	Coffee in the Exhibition									
10:15	1101 Processing - Manufacturing Technology 1	1102 Nano Composites 1	1103 Multifunctional Composites - Sensing and Actuation 1	1104 Fatigue 1	1105 Structural Analysis and Optimization 1	1106 Processing - Preforming Technologies	1107 Process Modelling 1	1108 Biocomposites 1	1109 Interfaces and Interphases 1	1110 Ceramic Matrix Composites
10:15	ENERGY DIRECTORS: INFLUENCE OF THE THICKNESS OF THE ENERGY DIRECTOR ON THE WELDING PROCESS Genevieve Palardy (Delft University of Technology), Irene Fernandez Villegas (Delft University of Technology) This paper presents a detailed experimental examination of	University), Yuji Asahina (Kobe University), Chizuru Hongo (Kobe University) All-it.PP nanocomposite, com- posed of it.PP matrix and it.PP	1103-1 MICROMECHANICAL MODELING OF SMART MAGNETOCELECTRIC COMPOSITE PLATES Alexander Kalamkarov (Dalhousie University), Demetra Hadjiloizi (Cyprus University of Technology), Chariklia Metti (Cyprus University of Technology), Pedro Pacheco (CEFET/ RJ), Marcelo Savi (COPPE- Universidade Federal do Rio de Janeiro), Tasos Georgiades (Cyprus University of Technology)	1104-1 A MICROMECHANICAL APPROACH TO STUDY THE DAMAGE EVOLUTION OF EPOXY BASED COMPOSITE MATERIALS UNDER FATIGUE LOADING Daniel Krause (German Aerospace Center (DLR)) Using the hysteresis energy as a failure criterion, the transverse crack initiation and growth is modelled on a micro-scale. Test data for neat resin is obtained to calibrate the model.	1105-1 BUCKLING ANALYSIS, DESIGN AND OPTIMISATION OF VARIABLE STIFFNESS SANDWICH PANELS Broderick Coburn (University of Bristol), Paul Weaver (University of Bristol) A Ritz approach semi-ana- lytical model is developed for the buckling analysis of fibre-steered sandwich pan- els. Results from parametric and optimisation studies are presented and discussed.	1106-1 THERMAL AND CURE KINETICS MODELING OF THERMOSET LAMINATES DURING AND AFTER THE COMBINED AUTOMATED TAPE LAYING AND AUTOCLAVE PROCESS Maria Skandali (Delft University of Technology), Kaspar Jansen (Delft University of Technology), Sotiris Koussios (Delft University of Technology), Sotiris Koussios (Delft University of Technology), Jos Sinke (Delft University of Technology) A two-dimensional heat trans- fer model in a Lagrangian framework for Automated Tape Laying was developed. Stepwise laying down of the tapes, and more than the usual heat are applied on	1107-1 SIMULATION OF THE THERMO-STAMPING PROCESS <u>Kévin Le Meur</u> (INSA Lyon) The forming step of the thermo-stamping process is simulated. The material's behaviour is characterised experimentally for input data. Simulation results are com- pared to manufactured parts.	KEYNOTE 1108-1 FATIGUE BEHAVIOUR OF WOVEN FLAX/EPOXY COMPOSITES Larry Lessard (McGill University), Soroush Asgarinia (McGill University), Chanvit Viriyasuthe (McGill University), Steven Phillips (McGill University), Martine Dubé (Ecole de Technologie Supéieure), Joris Baets (KU Leuven), Aart van Vuure (KU Leuven), Ignaas Verpoest (KU Leuven) Natural fibre flax composites and hybrid composites made from flax and glass fibres are studied. Understanding their fatigue performance is critical in order increase their	1109-1 QUANTIFICATION OF THE CRACK AREAS OF STABLE AND UNSTABLE CRACK PROPAGATION DURING SINGLE-FIBER PUSH-OUT TESTS PERFORMED ON CERAMIC MATRIX COMPOSITE SAMPLES Wolfgang M. Mueller (University of Augsburg), Judith Moosburger-Will (University of Augsburg), Michael Greisel (University of Augsburg), Siegfried Horn (University of Augsburg) An approach for quantification of the relevant crack area at single-fiber pushout tests is presented resulting in a more reliable determination of interfacial properties of fib-	1110-1 MECHANICAL RESPONSE OF TYPICAL 2D C/SIC BEAMS UNDER DIFFERENT LOADING CASI Chengpeng Yang (northwes err polytechnical university) Bo wang (northwestern polytechnical university) The mechanical responses of two kinds of 2D C/SiC composite beams, I-section and U-sections under differ loading cases are investi- gated experimentally and numerically.
0:35	OF WELDING SPEED AND DISTANCE BETWEEN COIL AND ROLLER DURING INDUCTION WELDING OF METAL AND GLASS FIBER REINFORCED POLYAMIDE 6 Martina Hümbert (Institut für Verbundwerkstoffe), Peter Mitschang (Institut für Verbundwerkstoffe) This study investigates the interdependency of welding speed and distance between coil and roller during continu- ous induction welding of glass fiber reinforced polyamide 6 and steel /aluminum.	1102-2 INTERLAMINAR TOUGHENING OF RESIN TRANSFER MOULDED GLASS FIBRE EPOXY LAMINATES BY POLYCAPROLACTONE ELECTROSPUN NANOFIBRES Sam van der Heijden (Ghent University), Lode Daelemans (Ghent University), Bert De Schoenmaker (Ghent University), Ives De Baere (Ghent University), Hubert Rahier (vrije universiteit brussel), Wim Van Paepegem (Ghent University), Karen De Clerck (Ghent University) Almost 100% improvement in mode l interlaminar fracture toughness could be achieved by electrospinning the PCL anaofibres on both sides of the glass fibre mats prior to impregnation.	1103-2 INTERFACIAL EVALUATION OF CARBON REINFORCED NANO- COMPOSITES USING ELECTRICAL RESISTANCE MEASUREMENT WITH WETTING TESTS Dong-Jun Kwon (Gyeongsang National University), Zuo-Jia Vang (Gyeongsang National University), Jin-Yeong Choi University), Jin-Yeong Choi University), Jan-Yeong Choi University), Jan-Yeong Choi University), Lawrence DeVries (The University of Utah), Joung-Man Park (Gyeongsang National University) Ultimately, it was demonstrat- ed that mechanical proper- ties might potentially be pre- dicted by electrical resistance measurement using empirical formulas and correlations	1104-2 FATIGUE OF OUT- OF-PLANE FIBRE WAVINESS DEFECTS: EXPERIMENTAL AND NUMERICAL STUDY Supratik Mukhopadhyay (University of Bristol), Stephen Hallett (University of Bristol) In this work, failure of lami- nates containing embedded fibre waviness or 'wrinkle' defect is investigated in ten- sion-tension fatigue loading using both an experimental and numerical approach.	1105-2 ULTIMATE STRENGTH PREDICTIONS OF IMPERFECT COMPOSITE PLATES <i>Qiao Jie Yang (University of Oslo), Brian Hayman (University of Oslo)</i> A simplified, semi-analytical method to predict the buck- ling response and ultimate strength of FRP laminates is used in a parametric study of square and rectangular plates under in-plane compression.	thermoset tapes. 1106-2 FIRST STUDY ON USING HEAVY TOW FIBERS FOR TEXTILE PREFORM PROCESSES IN THE AEROSPACE INDUSTRY Daniel Gizik (Airbus Group Innovations), Christian Weimer (Airbus Group Innovations), Peter Middendorf (University of Stuttgart) A first investigation on the use of heavy tow carbon fibers for the aerospace industry is presented. Three commercial fibers were selected, spread to two areal weights and me- chanical tests were done.	1107-2 MODELING OF HEAT TRANSFER AND UNSATURATED FLOW IN WOVEN FABRICS DURING DIRECT INJECTION- PULTRUSION PROCESS OF THERMOPLASTIC COMPOSITES Arthur Babeau (Ecole Centrale de Nantes), Sébastien Comas- Cardona (Ecole Centrale de Nantes), Christophe Binetruy (Ecole Centrale de Nantes), Gilles Orange (Solvay) In this work, a modeling of the thermoplastic pultrusion process is presented. A heat transfer model and a flow model are coupled. Data were measured on a pultrusion line to validate the models.	current use.	er-reinforced composites 1109-2 NEW CONTINUOUS FIBER REINFORCED THERMOPLASTIC COMPOSITES: AN ANALYSIS OF INTERFACIAL ADHESION FROM THE MICRO SCALE TO THE MACRO SCALE Johanna Beguinel (INSA Lyon), Frédéric Lortie (INSA Lyon), Jean-François Gérard (INSA Lyon), Jérôme Maupetit (CHOMARAT Textiles Industries), Pierre Gerard (ARKEMA) Acrylic matrix/fiber interfaces were investigated by con- sidering microcomposites. The study questions the relationships between wetta- bility, work of adhesion, and practical adhesion at various scales.	MATERIALS

Meeting room 5	Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8
Opening Ceremony						1				
Plenary: Integration of man	ufacturing and failure analy	ses for sustainable design o	f composites Ramesh Talreja	, Texas A&M University, USA						
Coffee in the Exhibition										
1111 Textile-Based	1112 Graphene, Graphene-		1114 Fracture	1115 Fracture and	1116 Fracture and	1117 Constitutive	1118 Joints - Design,	1119 In-situ Micro-	1120 Applications -	1121 Multifunctional
Composites and Fibre	Based Composites 1	Behaviour	and Damage -	Damage - Laminate	Damage - Delamination 1	Models 1	Manufacturing and	Mechanical Testing	Offshore and Subsea	Composites - Energy
Architecture 1			Micromechanics 1	Scale 1			Testing 1			Storage and Harvesting 1 1121-1 FIBER REINFORCED
KEYNOTE	1112-1 EFFECT OF REINFORCEMENT	1113-1 AN INVERSE ESTIMATION OF HIGH	1114-1 MICROSCOPIC PROGRESSIVE DAMAGE	1115-1 EFFECTS OF SPECIMEN WIDTH ON THE	1116-1 INFLUENCE OF SPAN RATIO ON THE	1117-1 A GENERAL BEHAVIOR LAW IN ORDER	KEYNOTE	1119-1 IN-SITU MONITORING OF	1120-1 NUMERICAL SIMULATION OF STATIC	PIEZOELECTRIC
1111-1 FATIGUE	WEIGHT FRACTION	STRAIN RATE PROPERTIES		TENSILE STRENGTH OF	FOUR-POINT BEND END	TO MODEL THERMOSET	1118-1 NUMERICAL	COMPOSITE FAILURE BY	MECHANICAL BEHAVIOR	COMPOSITES
PERFORMANCE OF	AND DISPERSANTS ON		OF CARBON-FIBER		NOTCHED FLEXURE TEST	AND THERMOPLASTIC	AND EXPERIMENTAL	COMPUTING TOMOGRAPHY	OF COMPOSITE WIND-	Christopher C. Bowland
MICRO-FIBRILLATED	MECHANICAL PROPERTIES	CONSTITUENTS	REINFORCED COMPOSITE	FIBER REINFORCED EPOXY	<u>Biao Li</u> (Northwestern	COMPOSITE MATERIALS	INVESTIGATION OF CFRP	AND ACOUSTIC EMISSION	BLADE - IMPLICATIONS	(University of Florida),
CELLULOSE AND RUBBER	OF GRAPHENE	Stanley Chacko Salem (The	UNDER SHEAR LOADING	COMPOSITE LAMINATES	Polytechnical University),	SUBJECTED TO DYNAMICS	TO PERFORATED STEEL	Sinan Kalafat (University	ON FABRICATION	Mohammad H. Malakooti
NANOPARTICLE HYBRID	NANOCOMPOSITES	University of Nottingham),	<u>Geng Han</u> (Beihang	Wen-Xue Wang (Kyushu	Yazhi Li (Northwestern	LOADS	JOITNS	of Augsburg), Andreea-	TECHNOLOGIES	(University of Florida), Hyun-
EPOXY RESIN REINFORCED CARBON PLAIN WEAVE	<u>Hsien-Kuang Liu</u> (Feng Chia University), Yu-Chen Lin	Arthur Jones (The University of Nottingham), Richard	University), Zhidong Guan (Beihang University), Mi	University), Hang Li (Hunan University), Terutake	Polytechnical University)	Patrick Rozycki (Ecole Centrale de Nantes), Laurent	Evangelos loannis Avgoulas (University of Cambridge),	Manuela Zelenyak (University of Augsburg),	Monssef DRISSI-HABTI (IFSTTAR), <u>Venkadesh</u>	Sik Hwang (University of Florida), Henry A. Sodano
COMPOSITES	(Feng Chia University)	Brooks (The University of	Zhang (Beihang University), will	Matsubara (Kyushu	The inner to outer span	Gornet (Ecole Centrale de	Michael Sutcliffe (University	Markus Sause (University of	RAMAN (IRT Jules VERNE)	(University of Florida)
Valter Carvelli (Politecnico	(	Nottingham), Mark Jonathan	Zhaojie Ji (Beihang	University), Dongmei Luo	ratio of four-point bend End	Nantes)	of Cambridge)	Augsburg)		(
di Milano), Andrea Betti	In this paper, GO and RGO	Lidgett (EPL Composite	University), Shengzhe	(Foshan University), Jia	Notched Flexure has little		- /		Wind turbine blade was sim-	Multifunctional carbon fiber
(Politecnico di Milano), Toru	graphenes are incorporated	Solutions Ltd)	Li (Beijing), Shanyi Du	Xue (Beijing Aeronautical	influence on the determi-	The paper deals with a	Biomimetic inspired co-in-	Carbon/Epoxy specimens	ulated to optimise the layup	composites are fabricated
Fujii (Doshisha University)	into polyvinyl alcohol and	This names is an invess	(Beihang University)	Science & Technology	nation of mode II fracture	unified behaviour law	fused perforated steel to	are loaded in-situ in a	and thickness. The adhesive	utilizing the piezoelectric
This work deals with the	epoxy matrices as rein- forcements to fabricate four	This paper is on inverse estimation of high strain	The experimental method	Research Institute)	toughness. The toughness value from natural crack	dedicated to the numerical simulations of thermoset	CFRP joint configurations that offer a transitional zone	commercial computing tomography device. Acoustic	material used to join the blade edges was included in	property of nanostructured zinc oxide and barium titan-
effects of hybrid epoxy	kinds of nanocomposites	rate properties of composite	and a unit cell of fiber ran-	This study investigates the	should be used.	and thermoplastic compos-	of stiffness in the joint site	Emission is simultaneously	the numerical study.	ate deposited on Kevlar and
resins, enhanced with mi-	the second secon	materials constituents using	dom distribution are used to	size effects of specimen		ite materials under rapid	were numerically and exper-			carbon fiber fabrics.
cro-fibrillated cellulose and	addition.	micro scale finite element	analyze the damage initia-	width on the tensile testing		dynamic loadings.	imentally investigated.	signals are compared to		
carboxylated nitrile-butadi-		model and numerical opti-	tion and evolution process	properties of various aligned				model predictions.		
ene rubber nanoparticles, on		misation.	of carbon fiber-reinforced	short carbon fiber reinforced						
the fatigue of carbon textile composites.			composite under shear loading.	epoxy composite laminate. Significant effects are found.						
composites.			loaung.	Significant enects are iounu.						
	1112-2 ENHANCED	1113-2 INVESTIGATION	1114-2 FAILURE	1115-2 PREDICTING THE	1116-2 INFLUENCE OF	1117-2 MODELLING THE	-	1119-2 DYNAMIC	1120-2 ANALYSIS OF	1121-2 REALISATION OF
	DAMPING PROPERTIES	OF THE DYNAMIC	PROPERTIES OF	FAILURE OF POLYMER	REINFORCEMENT DESIGN	HYSTERESIS COMPOSITE		VISUALIZATION OF FIBER	BENDING AND TENSILE	STRUCTURAL BATTERY
	OF GRAPHENE/NICKEL	BEHAVIOUR OF EPOXY	BISMALEIMIDE	MATRIX COMPOSITES	ON DELAMINATION	BEHAVIOR USING AN		PULL-OUT BY X-RAY PCI	BEHAVIOR OF CFRP	COMPOSITE MATERIALS
	FOAM FILLED EPOXY COMPOSITES	REINFORCED NANOSILICA AND MICROPARTICULATE	THERMOSETTING RESINS FOR HIGH PERFORMANCE	INCORPORATING THE EFFECTS OF PROCESSING	RESISTANCE & MECHANICAL PROPERTIES	ELASTO-PLASTO-DAMAGE MODEL WITH FRACTIONAL		Matthew Hudspeth (Purdue	STRANDED AND SPIRAL CABLES USING A NUMERIC	Leif Asp (Swerea SICOMP), Simon Leijonmarck (Swerea
		RUBBER COMPOSITES	CARBON FIBRE	Brent Volk (Air Force	OF CFRP/CFRP JOINTS	DERIVATIVE		University), <u>Wayne Chen</u> (Purdue University)	MODEL	SINON Leijonnarck (Swerea SICOMP). Tonv Carlson
		THROUGH ANALYTICAL-	REINFORCED COMPOSITES		UNDER STATIC & FATIGUE	Alina Krasnobrizha (Ecole		(i uluu oliivoloity)	Felipe Luz (Federal	(Swerea SICOMP), Göran
	of Sciences), Han Wang	EXPERIMENTAL TRANSFER		Michael Braginsky (Air Force		Centrale de Nantes), Patrick			University of Rio Grande	Lindbergh (KTH)
		FUNCTIONS	Group Innovations), Bruno	Research Laboratory), Ray	<u>Michael Jürgens</u> (Airbus	Rozycki (Ecole Centrale de			do Sul), Laís Silva (Federal	
	Chinese Academy of	Gabriel Mansour (Aristotle	Bresson (UMR CNRS 7615	Coomer (Air Force Research		Nantes), Laurent Gornet			University of Rio Grande do	The paper presents details
	Sciences), Zhe Ying (Institute of Metal Research-Chinese	University of Thessaloniki), Konstantinos Tsongas	- ESPCI ParisTech), Matteo Ciccotti (UMR CNRS 7615 -	Laboratory), Endel larve (Air Force Research Laboratory),	Nogueira (Fraunhofer), Holger Lang (Fraunhofer),	(Ecole Centrale de Nantes), Pascal Cosson (Ecole			Sul), <u>Carlos Cimini</u> (Federal University of Minas Gerais),	on the development of car- bon fibre structural battery
	Academy of Sciences).	(Aristotle University of	ESPCI ParisTech), Jacques	David Mollenhauer (Air	Elke Hombergsmeier (Airbus	Centrale de Nantes)			Sandro Amico (Federal	composite materials, and
	Minghe Fang (Institute of	Thessaloniki), Dimitrios	Cinquin (Airbus Group	Force Research Laboratory),	Group), Klaus Drechsler				University of Rio Grande	their devices, and the ra-
	Metal Research-Chinese	Tzetzis (International	Innovations), Frédéric Lortie	Tara Storage (Air Force	(Technische Universität	The proposed model is			do Sul)	tionale for developing them.
	Academy of Sciences),	Hellenic University)	(UMR CNRS 5223 - INSA de	Research Laboratory)	München)	dedicated to composites				
	Hui-Ming Cheng (Institute	An officient identification	Lyon), Jean-François Gérard	A methodology upod to	Multidimensional mat-III-	material and composed of			In this study, a CFRP Spiral	
	of Metal Research-Chinese Academy of Sciences)	An efficient identification method for modal testing of	(UMR CNRS 5223 - INSA de Lyon)	A methodology used to incorporate the effects (i.e.	Multidimensional metallic reinforcements significantly	an elasto-plastic damage behavior law which is			composite cable was ana- lyzed in order to evaluate	
	nouterity of ottenets)	epoxy reinforced with na-	uo Lyony	residual stresses) due to	increase mode II fracture	strain rate responsive and			their bending and tensile	
	Graphene/Ni-foam filled	nosilica and CTBN rubber is	The effect of several ther-	processing on the resulting	toughness of CFRP joints	fractional derivatives to rep-			behavior as compared to a	
	epoxy composites exhibit	demonstrated in this paper,	moplastics on the failure	strength of organic matrix	and laminates by milli- and	resent hysteretic loops.			similar Stranded composite	
	much higher flexural modu-	through the analytical-ex-	behaviour of a typical bis-	composites is demonstrated.	nanoscaled mechanical in-				cable.	
	lus and larger energy dissi-	perimental transfer function	maleimide resin has been		terlocking and plastic shear					
	pation than neat epoxy due to remarkable Ni reinforce-	method.	investigated with a time resolved method using AFM		deformation.					
	ment and rich interfaces of		imaging.							
	the nanocomposites									

### Scientific programme · Monday 20 July

	Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
10:55	1101-3 INFLUENCE	1102-3 A UNIFIED MODEL	1103-3 DESIGN AND	1104-3 THE EFFECT OF	1105-3 BUCKLING	1106-3 REDUCING	1107-3 NON ISOTHERMAL	1108-2 RELATIONSHIP	1109-3 IMPROVING	1110-3 ELECTRO DISCHARGE
	OF TEMPERATURE ON	FOR THE PREDICTION	CHARACTERIZATION OF	FIBER WAVINESS AS	AND VIBRATION	MANUFACTURING COSTS BY	REACTIVE FLOW MODELLING	BETWEEN FIBER	INTERFACIAL STRESS	MACHINABLE ALUMINA-
		OF YIELD STRENGTH IN	PRESSURE, TEMPERATURE	MANUFACTURING DEFECT	CHARACTERISTICS OF	DIRECT ROVING PLACEMENT	IN PULTRUSION PROCESS	ORIENTATION ANGLE	TRANSFER IN GLASS FIBER	BASED NANOCOMPOSITES
		PARTICULATE-REINFORCED	AND MOISTURE SENSORS	ON THE FATIGUE LIFE OF	THIN-WALLED LAMINATED	<u>Yannis Grohmann</u> (German	LOOKING TOWARD VOIDS	AND STATIC BENDING	POLYMER COMPOSITES	Luis Antonio Diaz Rodriguez
	RESISTANCE WELDED	METAL MATRIX	BASED ON MWCNT-	LAMINATED CFRP	COMPOSITE BEAMS	Aerospace Center (DLR	PREDICTION	CHARACTERISTIC OF	THROUGH GRAPHITE	(Nanomaterials and
	THERMOPLASTIC	NANOCOMPOSITES	COMPOSITES	Susanne Hörrmann (Johannes		e.V.)), Niels Stoffers (German	Pierpaolo Carlone (University	LAMINATED BAMBOO	NANOPLATELETS	Nanotechnology Research
	COMPOSITES JOINTS	Foisal Mirza (Ryerson	Sergei Sapozhnikov (South	Kepler University), Christoph	SECTIONS	Aerospace Center (DLR e.V.)),	of Salerno), Gaetano Palazzo	PLATES	Alessandro Pegoretti	Center CINN-CSIC-UNIOVI-
	Nikos Koutras (TU Delft), Irene		Ural State University), Ruslan	Viechtbauer (Johannes Kepler	Arash Asadi (University of	Alexandra Kühn (German	(University of Salerno)	<u>Kazufumi UDA</u> (Kanagawa	(University of Trento), Diego	PA), Anna Okunkova (State
		(Ryerson University)	Abdrakhimov (South Ural	University), Adi Adumitroaie	Adelaide), Abdul Hamid Sheikh	Aerospace Center (DLR e.V.)),		Institute of Technology)	Pedrazzoli (University of	University of Technology
	Rinze Benedictus (TU Delft)		State University), Alexander	(Johannes Kepler University),	(University of Adelaide), Ole	Thorsten Mahrholz (German	An impregnation model		Trento), Kyriaki Kalaitzidou	STANKIN), Washintong
		A unified model incorporating	D'yakonov (South-Urals State	Martin Schagerl (Johannes	Thybo Thomsen (University of	Aerospace Center (DLR e.V.)),	for pultrusion, based on a	An evaluation of the bending	(Georgia Institute of	Solis (State University of
	Exposure of resistance weld-	five factors (Orowan strength-	University)	Kepler University)	Southampton)	Stefan Schmidt (German	non-homogeneous non-iso-	characteristics of bamboo-fib-	Technology)	Technology STANKIN), Pavel
		ening, load bearing, CTE	The second second second	Denne and initiation and any	An efficient dD been finite	Aerospace Center (DLR	thermal/reactive multiphase	er-laminated plates with fiber	This should farmer an the of	Peretyagin (State University
		mismatch, grain size, and po-	There were developed MWCNT-composite sensors	Damage initiation and pro-	An efficient 1D beam finite element considering coupling	e.V.)), Felix Kruse (German	approach, is reported. Resin	orientation angles at 15°	This study focuses on the ef-	of Technology STANKIN),
		rosity) is developed to predict the yield strength of metal		gression of CFRP specimens with waviness out-of-plane	between different deforma-	Aerospace Center (DLR e.V.))	flow and pressure at die inlet are inferred, aiming to void	intervals in the range from 0° to 90°. The applications to an	fects of graphite nanoplatelets	de Ciencia de Materiales de
	failure mechanisms.	matrix nanocomposites.	with epoxy, PVA, rubber and glass matrices for direct	are experimentally and	tion modes is proposed for	The DRP technology lowers	prediction.	EV were demonstrated.	dispersed in polymer com- posites reinforced with short	Sevilla ICMS-US), Ramón
		mainx nanocomposites.	measurement of external	numerically investigated,	buckling and vibration of thin-	manufacturing costs for	prediction.	Ev were demonstrated.	glass fibers. As matrices, both	Torrecillas (Nanomaterials and
			pressure, temperature and	loaded in axial C-C and T-C	walled laminated composite	dry fiber preforms. This			isotactic polypropylene and an	,
			moisture changing with use of		beams having open/closed	can be achieved by directly			epoxy resin, were used.	Center CINN-CSIC-UNIOVI-
			TAUNIT as nanofiller.	influence.	section.	processing raw fiber mate-				PA), Ramón Torrecillas (State
				initiatite.	0001011	rial combined with an online				University of Technology
						binder application for the fiber				STANKIN)
						fixation.				
						- Maton				EDM ceramic composites con-
										sisting of a base non-conduc-
										tive ceramic component such
										Al2O3, and electro-conductive
										ceramic nanoparticles such
										TIC, TINC, NbNC, TaNC, and
										also SiC whiskers.
11:15	1101-4 NUMERICAL	1102-4 HIGH TEMPERATURE	1103-4 3D PRINTING	1104-4 EFFECT OF STRESS	1105-4 OPTIMIZATION	1106-4 IMPROVEMENT	1107-4 NUMERICAL	1108-3 MECHANICAL	1109-4 LASER SHOCK	1110-4 AN IMPROVED
	SIMULATION BASED	HYBRID COMPOSITES	OF CONDUCTIVE	RATIO ON FATIGUE	OF NON-SYMMETRIC	OF FIBRE PLACEMENT	INVESTIGATION ON THE	PERFORMANCE AND	TEST APPLICATION	SHEAR-LAG MODEL FOR
		FOR THERMAL BARRIER	NANOCOMPOSITES	CHARACTERISTICS IN THE	COMPOSITE PANELS	ACCURACY IN CONTINUOUS	STRESS DISTRIBUTION	FRACTURE CHARACTERISTIC	FOR MECHANICAL	NEEDLE-PUNCHED CARBON/
	OF THE NOVEL	APPLICATIONS	FOR LIQUID SENSOR	OUT-OF-PLANE DIRECTION	USING FAST ANALYSIS	TOW SHEARING PROCESS	FOR HOLLOW COMPOSITE	OF BAMBOO FIBER	CHARACTERISATION OF	CARBON COMPOSITE
	THERMOCLINCHING	Luis C. Herrera-Ramirez	APPLICATION	OF THICK CFRP LAMINATES	TECHNIQUES	Byung Chul Kim (University	STRUCTURES DUE TO	REINFORCED POLYETHYLENE		LAMINATES
	TECHNOLOGY FOR	(IMDEA Materials Institute),	<u>Kambiz Chizari</u> (École	WITH TOUGHENED	<u>Riccardo Vescovini</u>	of Bristol), Evangelos	OVERMOLD-ING	BIOCOMPOSITES PREPARED	Amélie Perrier (Institut Pprime-	<u>Yongzhen Jia</u> (Huazhong
	TEXTILE REINFORCED	Juan C. Fernandez	Polytechnique de Montreal),	INTERLAMINAR	(Politecnico di Milano), Chiara	Zympeloudis (University of	Alexander Liebsch (Institute	BY ROTATIONAL MOLDING	CNRS-ISAE-ENSMA-Université	
	THERMOPLASTICS	(Universidad Politecnica	Anil Raj Ravindran (École	<u>Atsushi Hosoi</u> (Waseda	Bisagni (Politecnico di Milano)	Bristol)	of Lightweight Design and	Supaphorn Thumsorn	de Poitiers UPR 3346), Romain	Technology), Dunming Liao
	Maik Gude (Technische	Madrid), <u>Roberto Guzman</u>	Polytechnique de Montreal),	University), Shigeyoshi			Polymer Technologies),	(Rajamangala University of	Ecault (Institut Pprime-CNRS-	(Huazhong University of
			Daniel Therriault (École	Sakuma (Waseda University),	A semi-analytical approach is	Continuous Tow Shearing	Andreas Freund (Institute	Technology Thanyaburi),	ISAE-ENSMA-Université de	Science and Technology),
		Institute)	Polytechnique de Montreal)	Yuzo Fujita (Toray Industries-	presented for the optimization	(CTS) is a new fibre place-	of Lightweight Design and	Jitlada Boonlertsamut	Poitiers UPR 3346), Fabienne	Hong Cui (Xi'an Aerospace
	Dresden), Andreas Freund	In and a to be seen at a the se	0D anisting of any dusting	Inc.), Ichiro Taketa (Toray	of laminated panels with	ment technology that can	Polymer Technologies),	(Rajamangala University of	Touchard (Institut Pprime-	Composites Research
	(Technische Universität	In order to improve the ther- mal and electrical properties	3D printing of conductive	Industries-Inc.), Hiroyuki Kawada (Waseda University)	nonsymmetric lay-ups with buckling, postbuckling and ei-	steer the tow without causing	Robert Kupfer (Institute of	Technology Thanyaburi),	CNRS-ISAE-ENSMA-Université	Institute), Alin Ji (Xi'an
	Dresden)	of a polymeric matrix, hollow	nanocomposite was used for investigation of the influence	Kawaua (waseua University)	genfrequencies requirements.	the defects. In this work, the method to improve its layup	Lightweight Design and Polymer Technologies), Maik	Thanadol Petchnoi (Rajamangala University of	de Poitiers UPR 3346), Maria Vidal Urriza (Institut Pprime-	Aerospace Composites Research Institute), Xia Bai
	Based on a developed pro-	glass microspheres and	of structural parameters in	The effect of the stress ratio	gennequencies requirements.	accuracy was developed and	Gude (Institute of Lightweight	Technology Thanyaburi),	CNRS-ISAE-ENSMA-Université	(Xi'an Aerospace Composites
	cess simulation concept a	carbon nanotubes-hollow	scaffold configurations for	on fatigue characteristics in		tested.	Design and Polymer	Saowaluk Boonmawieng	de Poitiers UPR 3346), Jacques	
	numerical parameter study	glass microspheres hybrids	their application as liquid	the out-of-plane direction of		lesteu.	Technologies)	(Rajamangala University of	Baillargeat (Institut Pprime-	nesearch institute)
	is carried out to support the	were added.	sensors.	thick CFRP laminates with			(iouniologica)	Technology Thanyaburi),	CNRS-ISAE-ENSMA-Université	Based on the finite difference
	experimental studies of the	Noro addou.		toughened interlaminar layers			In the present work, a sim-	Narongchai O-Charoen	de Poitiers UPR 3346),	method and the shear-lag
	specific deformation phenom-			was evaluated quantitatively.			ulation method to analyze	(Rajamangala University of	Laurence Chocinski-Arnault	theory, this paper analyzed
	ena in the thermoclinching			nao ovaloutoo quantitativoiy.			the deformation behavior	Technology Thanyaburi),	(Institut Pprime-CNRS-ISAE-	the stress concentrations in a
	joining zone						of a hollow profile and the	Hiroyuki Hamada (Kyoto	ENSMA-Université de Poitiers	needle-punched C/C compos-
							supporting core during the	Institute of Technology)	UPR 3346), Michel Boustie	ite laminate.
							injection molding process was	037	(Institut Pprime-CNRS-ISAE-	
							approved.		ENSMA-Université de Poitiers	
								ites were made by rotational	UPR 3346)	
								molding. LLDPE-g-MA was		
								used to improve adhesion in	The aim of this work is to	
									The aim of this work is to study the ability of laser shock	
								the composites. BF enhanced	study the ability of laser shock	
								the composites. BF enhanced tensile modulus, hardness	study the ability of laser shock technique to characterise fibre/	

## Monday 20 July · Scientific programme

Meeting room 5	Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8
	1112-3 EFFECT	1113-3	1114-3	1115-3 IMPACT DAMAGE	1116-3 THE INFLUENCE	1117-3 AN ELASTO-	1118-2 PERFORMANCE	1119-3 IN-SITU	1120-3 THERMOPLASTIC	1121-3 STRENGTH OF
	OF GRAPHENE	CHARACTERISATION OF	MICROMECHANICAL		OF MECHANICAL TEST	PLASTIC MODEL TO	OF VARIOUS DESIGNS OF	EXPERIMENTAL	COMPOSITES FOR	THIN SOLID POLYMER
	NANOPLATELETS	E-GLASS/VINYLESTER	MODELLING OF NON-	TECHNIQUE OF COMPOSITE		PREDICT PERMANENT	HYBRID LOOP-LOADED	CHARACTERIZATION OF	UNDERWATER	ELECTROLYTE COATINGS
PERFORMANCE	FEATURES ON	COMPOSITES SUBJECTED	HOMOGENOUS MATERIALS	LAMINATE FOR	OUTCOME OF THE END	INDENTATION DUE TO	CFRP-TITANIUM STRAPS	INTERFACIAL TOUGHNESS	APPLICATIONS	AND THE COATED CARBON
OF STRETCH-	CURE KINETICS	TO IN-PLANE AND OUT-OF-	BY MESHLESS METHODS	STRUCTURAL DESIGN OF	NOTCH FLEXURE TEST	IMPACT AND QUASI-	Holger Büttemeyer	OF ALUMINUM THIN	Mael Arhant (Ifremer), Peter	FIBRES
	OF BENZOXAZINE	PLANE HIGH STRAIN RATE	Nelson Muthu (IIT Bombay),	SMALL SCALE AIRCRAFT	FOR MODE II FRACTURE	STATIC INDENTATION ON	(Faserinstitut Bremen	FILMS ON POLYIMIDE	Davies (Ifremer), Christian	Simon Leijonmarck
FIBER REINFORCED	COMPOSITES	COMPRESSIVE LOADING:	Brian Falzon (Queen's	Hyunbum Park (Howon	TOUGHNESS.	COMPOSITE LAMINATES	e.V.), Patrick Schiebel	SUBSTRATES	Burtin (Ecole Centrale	(Swerea SICOMP), Andreis
THERMOPLASTIC	<u>Vanessa Garcia</u>	EXPERIMENTAL DATA AND	University Belfast), Surjya	University)	Ives De Baere (Ghent	Zhaojie Ji (Beihang	(Faserinstitut Bremen	Emanuele Cattarinuzzi	de Nantes), Christophe	Pupurs (Luleå University
COMPOSITES	(FIDAMC, Getafe	NUMERICAL SIMULATION	Maiti (IIT Bombay), Wenyi		University), Stefan Jacques	University), Zhidong Guan	e.V.), Axel S. Herrmann	(Politecnico di Milano),	Briançon (CETIM)	of Technology), Leif Asp
Patcharat Wongsriraksa	(Madrid), Spain) María	Jamal Arbaoui (ENSTA	Yan (Monash University)		(Ghent University), Wim	(Beihang University),	(Universität Bremen)	Riccardo Lucchini		(Swerea SICOMP), Göran
(Kanazawa Institute of	R. Gude (FIDAMC, Getafe	Bretagne), Mostapha			Van Paepegem (Ghent	Zengshan Li (Beihang		(Politecnico di Milano),	Carbon fibre reinforced	Lindbergh (KTH), Janis
Technology), Mitsugu Kimizu	(Madrid), Spain), Alejandro	Tarfaoui (ENSTA Bretagne),	The element-free Galerkin		University), Joris Degrieck	University), Wei He (Beihang	Investigation of hybrid	Dario Gastaldi (Politecnico	polyamide thermoplastic	Varna (Luleå University of
(Industrial Research Institute	Ureña (Department of	Aboulghit El Malki (ENSTA	(EFG) method is used to in-		(Ghent University)	University), Geng Han	straps with different flange	di Milano), Pasquale Vena	composites have been	Technology)
	Applied Mathematics,	Bretagne)	vestigate the micromechan-			(Beihang University), Tianya	designs, varying in radius	(Politecnico di Milano),	tested in compression	
(Kanazawa Institute of	Materials Science and		ics of crack propagation in		A mainly numerical evalu-	Bian (Beihang University)	and the quantity of the	Leandro Lorenzelli	before and after seawater	Polymer coated carbon
Technology), Isao Kimpara	Engineering and Electronics	This paper presents the	composite material. Two		ation of some experimental		loops. The influence on the	(Fondazione Bruno Kessler),	aging. Implosion tests were	fibres for use in structural
(Kanazawa Institute of	Technology, Universidad	in-plane and out-of-plane	approaches for representing		parameters, influencing	a finite element model	tensile strength depending	Johan P. M. Hoefnagels	performed and compared to	batteries were investigated
Technology)	Rey), Juan Carlos (Móstoles	compression behavior of	the bi-material interface are		the outcome of the end	based on an anisotropic	on these designs has been	(Technical University of	carbon/epoxy tube results.	with respect to the durability
-	(Madrid), Spain)	an E-glass fiber reinforced	examined.		notch flexure test for the	elasto-plastic theory was	tested.	Eindhoven)		of the polymer after me-
The purpose of this research		vinylester composite,			determination of the Mode II			The adhesion of Alignetic		chanical cycling. No failures
is to study the effect of		which was tested in Split			fracture toughness.	permanent indentations on		The adhesion of Aluminum		in the coatings could be
stretch-broken carbon fiber		Hopkinson Pressure Bar, and				composite laminates under		thin films on Polyimide sub-		found.
on mechanical properties		modeled with Abaqus.				low velocity impact and		strates was measured by		
and formability performance of the composites made						quasi-static indentation.		means of peel tests. In-situ light microscopy of the peel		
with SBCF compared to CCF.								front enabled comprehen-		
with SBCF compared to CCF.								sive interpretation of the		
								peel force trend		
1111-3 COMPARISON OF		1113-4 NUMERICAL	1114-4 STRESS	1115-4 DISCRETE DAMAGE	1116-4 EXPERIMENTAL		1118-3 EXPERIMENTAL	1119-4 STRAIN	1120-4 THERMOPLASTIC	1121-4 MOLECULAR
C-PLY SP (THIN PLY) WITH		SIMULATION OF TRIAXIAL	CONCENTRATION FACTOR	MODELING IN LAMINATED			INVESTIGATION OF	RATE DEPENDENT	COMPOSITE PIPE:	DYNAMICS MODELLING
WOVEN FABRIC AND UD		BRAIDED TEXTILE UNDER		COMPOSITES UNDER	INVESTIGATION ON THE		MECHANICAL FASTENERS	FAILURE OF GLASS/	OPERATIONAL EXPERIENCE	
PERFORMANCES		BALLISTIC IMPACT	UNDER TRANSVERSE LOAD		FRACTURE PROPERTIES		REGARDING THEIR	EPOXY INTERFACES AT	IN DEEPWATER	COMPONENTS
Vicky Singery (CHOMARAT		BASED ON MESO-SCALE	Zheng-Ming Huang (Tongji	Endel larve (University of	OF NANO-MODIFIED		INFLUENCE ON CRACK	NANO-MICROSCALE	AND TECHNOLOGY	Osvalds Verners (TU
Textiles Industries), Thomas		MODELING METHODS	University), Li-Min Xin	Dayton Research Institute),	COMPOSITES		GROWTH IN ADHESIVELY	VIA NANOIMPACT	QUALIFICATION APPROACH	
Roure (CHOMARAT Textiles		Lulu Liu (Nanjing	(Tongji University)	Kevin Hoos (University of	Ali Naem S Alamry (UNSW),		BONDED CRFP-JOINTS	EVERENTO	Bart Steuten (Airborne Oil	State University), Marnix
Industries), Philippe Sanial		1		Denter Descent Institute)				EXPERIMENTS	Durt Oloulon (Andonio On	State University), warnix
(CHOMARAT Textiles		University of Aeronautics		Dayton Research Institute),	B. Gangadhara Prusty		SUBJECTED TO FATIGUE	Vikas Tomar (Purdue	& Gas), Marcus Kremers	Wagemaker (TU Delft),
Industries), Jean-François		and Astronautics), Wei	Closed-form formulae for	David Mollenhauer (Air	(UNSW), S Natarajan (Indian					
			Closed-form formulae for stress concentration factors				SUBJECTED TO FATIGUE	Vikas Tomar (Purdue	& Gas), Marcus Kremers	Wagemaker (TU Delft),
Osselin (Université de Haute		and Astronautics), Wei		David Mollenhauer (Air	(UNSW), S Natarajan (Indian		SUBJECTED TO FATIGUE LOADING <u>Ronny Sachse</u> (Institut of Aircraft Design), Anthony	<u>Vikas Tomar</u> (Purdue University West Lafayette),	& Gas), Marcus Kremers (Airborne Oil & Gas), Henk de Boer (Airborne Oil & Gas), Jens de Kanter (Airborne	Wagemaker (TU Delft), Angelo Simone (TU Delft) A crosslinked solid polymer
Osselin (Université de Haute Alsace), Jean-Yves Drean		and Astronautics), Wei Chen (Nanjing University of Aeronautics and Astronautics), Minghua	stress concentration factors	David Mollenhauer (Air Force Research Laboratory) The Discrete Damage	(UNSW), S Natarajan (Indian Institute of Technology), Sri		SUBJECTED TO FATIGUE LOADING <u>Ronny Sachse</u> (Institut of Aircraft Design), Anthony Pickett (Institut of Aircraft	<u>Vikas Tomar</u> (Purdue University West Lafayette), Devendra Verma (Purdue	& Gas), Marcus Kremers (Airborne Oil & Gas), Henk de Boer (Airborne Oil & Gas),	Wagemaker (TU Delft), Angelo Simone (TU Delft) A crosslinked solid polymer electrolyte reactive mo-
Osselin (Université de Haute		and Astronautics), Wei Chen (Nanjing University of Aeronautics and Astronautics), Minghua He (Tsinghua University),	stress concentration factors of the matrix in a composite subjected to transverse loads are obtained, which	David Mollenhauer (Air Force Research Laboratory) The Discrete Damage Modeling method was	(UNSW), S Natarajan (Indian Institute of Technology), Sri Bandyopadhyay (UNSW) This paper presents an ex-		SUBJECTED TO FATIGUE LOADING Ronny Sachse (Institut of Aircraft Design), Anthony Pickett (Institut of Aircraft Design), Wolfgang	<u>Vikas Tomar</u> (Purdue University West Lafayette), Devendra Verma (Purdue University West Lafayette) The mechanical strength	& Gas), Marcus Kremers (Airborne Oil & Gas), Henk de Boer (Airborne Oil & Gas), Jens de Kanter (Airborne Oil & Gas)	Wagemaker (TU Delft), Angelo Simone (TU Delft) A crosslinked solid polymer electrolyte reactive mo- lecular dynamics study of
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00		Auditorium 15		Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
		1102-5 MORPHOLOGY,	1103-5 ANALYSIS OF		1105-5 ANISOGRID	1106-5 NOVEL 3D PREFORM	1107-5 MODELLING	1108-4 A COMPARATIVE	1109-5 INTERFACIAL	1110-5 NANOSTRUCTURE
OF	MOISTURE CONTENT	THERMAL DEGRADATION	SMART MAGNETOELECTRIC		COMPOSITE LATTICE FLOOR	ARCHITECTURE FOR	PRESSURE DISTRIBUTION	STUDY OF IMPACT	IMPROVEMENT FOR	HYBRID CARBON
0	THE WELD SEAM	AND MECHANICAL	REINFORCED PLATES		BEAM STRUCTURES FOR	IMPROVED PERFORMANCE	DURING COOLING OF	PERFORMANCE AND POST-	CARBON FIBER/ EPOXY	NANOTUBE-CERAMICS
QL	ALITY FOR LASER	PROPERTIES OF	Demetra Hadjiloizi (Cyprus		COMMERCIAL AIRPLANES	OF STRUCTURAL BEAMS	RANDOMLY-ORIENTED	IMPACT STRENGTH OF HIGH	RESIN MONOFILAMENT	HETEROSTRUCTURES
W	ELDED THERMOPLASTIC	BIODEGRADABLE	University of Technology),		Alexander Razin (Central	Nandan Khokar (Biteam	STRAND CARBON/PEEK	VOLUME FRACTION RESIN	COMPOSITE MODIFIED WITH	MICROSTRUCTURE
CC	MPOSITES	POLYESTER BLENDS AND	Alexander Kalamkarov		Research Institute of Special	AB), Stefan Hallström (Div.	COMPOSITES	TRANSFER MOULDED FLAX	GRAPHENE OXIDE	EVOLUTION AND FORMI
Ve	rena Wippo (Laser Zentrum	NANOCOMPOSITES	(Dalhousie University),		Machinery), Valery Vasiliev	of Lightweight Structures),	Benoit Landry (McGill	AND GLASS FIBRE EPOXY	Ye Li (Beihang University), <u>Yan</u>	MECHANISM
		Riaan Luyt (University of the	Chariklia Metti (Cyprus		(Central Research Institute	Fredrik Winberg (Biteam AB)	University), Pascal Hubert	LAMINATES	Zhao (Beihang University),	Changqing Hong (Harbin
		Free State), Julia Mofokeng	University of Technology),		of Special Machinery),		(McGill University)	Henry Ling (University of	Junlin Chen (Beihang	Institute of Technology)
		(University of the Free State)	Pedro Pacheco (CEFET/		Vyacheslav Barynin (Central	The paper presents a new	(	Auckland), Mark Battley	University), Zhe Yang (Beihang	
	ttmann (Laser Zentrum	()	RJ). Marcelo Savi (COPPE-		Research Institute of Special	class of composite beams	A model was developed to	(University of Auckland), Tom		The interest in carbon na
	· ·	Morphology and properlends	Universidade Federal do Rio		Machinery), Andrey Azarov	produced with an Add-on tex-	predict defect formation dur-	Allen (University of Auckland)	University), Jianming Sun	tubes (CNTs) as reinforce
		and nanocomposites of PLA	de Janeiro), Tasos Georgiades		(Central Research Institute of	tile technology demonstrated	ing compression moulding of		(Beihang University)	ments for ceramic and c
		and PCL blends and titania	(Cyprus University of		Special Machinery)	by producing and testing	ROS carbon/PEEK composites.	Experimental comparison of	(Domany Chiverony)	ramic matrix composites
110		containing nanocomposites	Technoloav)		opecial machinery)	I-beams with full interlace-		tensile, compressive and im-		been growing considerat
Th		prepared through melt mixing	(connology)		The paper is concerned with	ment of 0/90° flanges and a	the predicted defects with	pact performance of flax and		However, the dispersion
	ntent on the weld seam	and compression moulding.	A comprehensive micro-		design, analysis, fabrication	±45 web.	those found on moulded	glass fibre laminates. Flax-		and mechanical propertie
	ality of laser welded end-	and compression moulding.	mechanical model for the		and testing of Anisogrid	±45 Web.	panels.	fibre laminates were shown to		for CNTs-ceramics are n
			analysis of smart composite		(Anisotropic Grid) composite		paneis.	have lower specific and abso-		satisfactory as anticipat
	s glass fiber reinforced pol- therimide (GF PEI) welded		and reinforced piezo-magne-		lattice floor beams for the			lute properties than glass.		sausiaciony as anticipate
	GF PEI containing carbon		to-thermo-elastic thin plates		fuselage of a commercial			nute properties that yiass.		
Dia	ck was investigated.		is developed on the basis of		airplane.					
			asymptotic homogenization.							
11	01-6 INFLUENCE OF	1102-6 SOUND ABSORPTION			1105-6 COUPLING EFFECT	1106-6 ACTIVE CONTROL	1107-6 MULTI-SCALE,	1108-5 PROCESSING	1109-6 THERMAL	1110-6 MONOTONIC
		OF ELECTROSPUN			OF COMPOSITE BLADE	OF TEXTILE FORMING	MULTI-PHYSICAL	AND CHARACTERIZATION	CONDUCTIVITY	TENSION. FATIGUE AND
		POLYVINYLIDENE FLUORIDE/			UNDER FLUID STRUCTURE	PROCESSES		OF CARBON NANOTUBE	IMPROVEMENT OF	CREEP BEHAVIOR OF 3
		CARBON NANOTUBE			INTERACTION	Thomas Gereke (Technische	OF THE PRODUCTION	/ POLYLACTIC ACID	COPPER-CARBON FIBER	BRAIDED KD-I-SIC-FIB
-		MEMBRANES			Zhang Long (Northwestern	Universität Dresden-Institute	OF MULTICURVED CFRP	NANOCOMPOSITE FILMS	COMPOSITE BY ADDITION	REINFORCED POLYMER
		<u>Chang-Mou Wu</u> (ational			polytechnical University),	of Textile Machinery and	REINFORCEMENTS			DERIVED SIC-MATRIX
		Taiwan University of Science			Huang Tao (Northwestern	High Performance Material		of Technology), Parvin Karimi	HYDROXIDE	COMPOSITES AT 11000
	serch Center), Wouter J.	and Technology), M. H. Chou			Polytechnical University),	Technology), Farbod Nosrat	& Advanced Composites	(Texas A&M University),	Jean-François Silvain (ICMCB-	
					Jia Purong (Northwestern	Nezami (Daimler AG),	GmbH), Zoltan Simon	Francesca Gencarella (Georgia		AND ISOUGC FOR COAT
	Grouve (ThermoPlastic	(National Taiwan University of								
	mposites Reserch Center),	Science and Technology)			Polytechnical University),	Matthias Hübner (Technische	(Aerospace & Advanced	Institute of Technology),	(ICMCB-CNRS), Yongfeng	Xin Jing (Beihang Univer
	urent L. Warnet (University				Jiao Guiqiong (Northwestern	Universität Dresden-Institute	Composites GmbH), Tim Roser		Lu (UNL)	Duoqi Shi (Beihang
	Twente), Irene Fernandez	Effects of β-phase crystal-			Polytechnical University)	of Textile Machinery and	(Airbus Helicopters), Bernhard			University), Xiaoguang Ya
	legas (Delft University of	linity and piezoelectricity of				High Performance Material	Rittenschober (ALPEX	Ben Wang (Georgia		(Beihang University)
le	chnology)	electrospun CNT/PVDF on the			The blade under fluid field	Technology), Oliver Döbrich	Technologies GmbH), Raphael		hydroxide (Ca(OH)2) to a	
		sound-absorbing were stud-			was simulated by both	(Technische Universität		Rosario Gerhardt (Georgia	copper-carbon fiber (30%)	Monotonic tension, fatigi
	e contamination of the sur-	ied. Novel sound-absorbing			CFD and FSI methods. the	Dresden-Institute of	Sebastian Schmidhuber	Institute of Technology),	composite (Cu-CF(30%)) were	
	e of laminate due to the re-	material especially at low			responses of blade structure	Textile Machinery and	(Krauss Maffei Technologies)	Mohammad Naraghi (Texas	studied. After sintering at 700	failure mechanisms for a
	se media and its effect on	and middle frequency was			and fluid field was compared	High Performance Material		A&M University), Kyriaki	°C, precipitates of calcium ox-	braided SiC/SiC compos
	mechanical performance	developed.			through the finite element	Technology), Chokri Cherif		Kalaitzidou (Georgia Institute	ide (CaO) were included in th	elevated temperatures w
	fusion bonded joints is the				analysis.	(Technische Universität	finite element process simu-	of Technology)		investigated in air.
su	pject of this study.					Dresden-Institute of	lation on an aircraft structural			
						Textile Machinery and		The effect of processing		
						High Performance Material	and spring-in simulation	method on carbon nanotube/		
						Technology)	results are verified on an RTM	polylactic acid films fabricated		
							manufactured part.	via: 1) melt fiber spinning/		
						Simulation approaches for		compression molding or 2)		
						modelling the drape process		electrospinning/compression		
						and a tailored forming pro-		molding was examined.		
						cess of carbon fibre fabrics		3		
						are presented with a complex				
						automotive structural part as				
						example.				

## Monday 20 July · Scientific programme

Meeting room 5	Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8
1111-4 NOVEL		1113-5 NUMERICAL	1114-5 INFLUENCE OF	1115-5 APPLICATION	1116-5 EVALUATION OF	1117-5 MATERIAL	1118-4 BEARING	1119-5	1120-5 CARBON-FIBER	1121-5 BUNDLE
WAVINESS DESIGN FOR		MODELLING OF	VOIDS ON TRANSVERSE	OF A VIRTUAL SHEAR	THE CLIMBING DRUM	MODEL OF LAYERED	STRENGTH AND	MICROMECHANICAL TIME-	COMPOSITE CABLES FOR	REINFORCED POLYMER
THERMOPLASTIC TAPE		POLYURETHANE USED	CRACK ONSET LOCATION	STRESS MODEL AND	PEEL (CDP) TEST FOR	FABRIC COMPOSITES	INTERLAMINAR	LAPSE X-RAY CT STUDY	DEEP-WATER ANCHORAGE	COMPOSITES FOR NOVEL
BRAIDS TO IMPROVE		AS CORE MATERIAL IN	IN CFRP LAMINATES	COMPARISON WITH	THE DETERMINATION OF	WITH DELAMINATION	PROPERTIES OF NOVEL	OF FATIGUE DAMAGE IN	Eduardo Menezes (UFRGS),	STRUCTURAL BATTERIES
MICROMECHANICAL		SACRIFICIAL CLADDING	USING X-RAY COMPUTED	WWFE-III PREDICTIONS	THE MODE I FRACTURE	PREDICTION FOR IMPACT	FIBRE REINFORCED		Lais Silva (UFRGS), Carlos	Yalin Yu (Beihang University
PROPERTY PREDICTION		FOR BLAST MITIGATION	TOMOGRAPHY	TO DESCRIBE THE NON-	TOUGHNESS OF	SIMULATIONS USING	POLYMER HYBRIDS WITH	COMPOSITES	Cimini (UFMG), Sandro	Boming Zhang (Beihang
Daniel Barfuss (TU Dresden),		Hamza Ousji (Royal Military	Shigeki Aratama (Kawasaki	LINEAR BEHAVIOR OF	MONOLITHIC LAMINATED	STANDARD REISSNER-	PERMEABLE METAL	Kristine Munk Jespersen	Amico (UFRGS)	University), Guocheng
Maik Gude (TU Dresden),		Academy), Mohamed	Heavy Industries-Ltd.),	COMPOSITE MATERIALS	COMPOSITE SPECIMENS	MINDLIN SHELL	LAYERS	(Technical University of		Qi (Beihang University),
Christian Garthaus (TU		Abderaouf Louar (Royal	Yusuke Tsumura (Kyoto	Siegfried Galkin (KIT -	Federica Daghia (ENS	FORMULATION	<u>Björn Bosbach</u> (Technische	Denmark), Tristan Lowe	This paper describes	Zhanwen Tang (Beihang
Dresden)		Military Academy), Bachir	University), Ryosuke	Institute of Vehicle System	Cachan), Christophe Cluzel	Sylvain Treutenaere	Universität Hamburg-		the tensile and bending	University)
		Belkassem (Royal Military	Hashizume (Kyoto	Technology), Fabian	(ENS Cachan)	(University of Valenciennes),	Harburg), Wilfried V. Liebig		behaviour of carbon fibre	
Tape braiding technology		Academy), Lincy Pyl (Vrije	University), Masaaki	Johannes Schirmaier (KIT -	(	Fanck Lauro (University	(Technische Universität	of Manchester), Jens	composite cables intended	A novel structural battery
represents a novel, high		Universiteit Brussel), John	Nishikawa (Kyoto	Institute of Vehicle System	The CDP test and the classi-	of Valenciennes), Bruno	Hamburg-Harburg),		to be used on the anchorage	was designed based on
rate preforming process for		Vantomme (Royal Military	University), Masaki Hojo	Technology), Luise Kärger	cal DCB test are compared	Bennani (University of	Bodo Fiedler (Technische		of oil platforms by confront-	the carbon fiber bundle
manufacturing composite		Academy)	(Kyoto University)	(KIT - Institute of Vehicle	for monolithic composites.	Valenciennes), Tsukatada	Universität Hamburg-	Mikkelsen (Technical	ing experimental tests with	composites (CFBC), and
structures. Here new ways				System Technology)	Global and local indicators	Matsumoto (Toyota Motor	Harburg)		numerical results.	the electrochemical and
of prediction for the result-		The present paper focuses	Effects of voids on strengths		enable us to validate the	Europe), Ernesto Mottola				mechanical properties were
ing properties are shown.		on the comparison and reli-	of CFRP laminates were	Modeling nonlinear shear	CDP for the determination	(Toyota Motor Europe)	The hybrid composites with	The study considers fatigue		measured experimentally
5  ····		ability of the results of blast	experimentally investigat-	stress behavior with super-	of the mode I delamination	Lanopo)	permeable metal fabrics	damage evolution in a		and analyzed numerically.
		mitigation predictions with	ed. X-ray CT was used to	imposed transverse tension	toughness.	The present work provides a	are manufactured by using	uni-directional glass fibre		l la
		different material models for		without needing any itera-			Resin-Transfer-Moulding.	composite manufactured		
		PU available in LS-DYNA.	and voids in specimens after	tion at the time integration		of textile composites under	Resulting in high quality	from a non-crimp fabric, by		
			testing for understanding of	points to reach convergence		impact with a viscoelastic	composites with enhanced	means of X-ray Computed		
			mechanics.			damageable model coupled	load bearing capability.	Tomography on cut-outs of		
						to a recompution of the	iouu bouring oupubling:	pre-fatigued samples.		
						realistic strain field.				
1111-5 DUCTILITY FROM		1113-6 HIGH STRAIN	1114-6	1115-6 SUPPRESSION OF			1118-5 INVESTIGATION OF	1119-6 TIME-LAPSE X-RAY	1120-6 DESIGN AND	1121-6 DESIGNER LINEAR
FIBRES AND MATRIX -		RATE TENSILE TESTING	MICROMECHANICAL	INTERLAMINAR CRACK			THE EFFECT OF MWCNT	MICROTOMOGRAPHIC	FATIGUE ANALYSIS OF	FUNCTIONALLY GRADED
LESSONS FROM NATURAL		OF ARAMID YARN - A	DAMAGE SIMULATION	IN UD-CFRP CONTAINING			FILLED EPOXY ADHESIVES		COMPOSITE TURBINE	VISCOELASTIC COMPOSITI
FIBRE COMPOSITES		FEASIBILITY STUDY OF	OF FIBRE REINFORCED	FIBRE DISCONTINUITY			IN ENHANCING THE		BLADES UNDER OCEAN	MATERIALS TAILORED
Stephen Eichhorn (University		OPTICAL MEASUREMENT	COMPOSITE LAMINATES	USING POLYAMIDE MESH			QUALITY OF DISSIMILAR		WAVE AND CURRENT	TO OPTIMIZE ENERGY
of Exeter)		Jørgen Kepler (Aalborg	SUBJECTED TO LOW	Hayato Nakatani (Osaka City			MATERIAL BONDED	COMPOSITES	LOADING	HARVESTING
0. 2.000.)		University), Lennart Hansen	VELOCITY IMPACT BY	University), Tatsuya Imamura			JOINTS	Ying Wang (The University	Hassan Mahfuz (Florida	Harry Hilton (University
This review of the literature		(Aalborg University), Peter	MULTISCALE METHOD	(Osaka City University),			Maria Konstantakopoulou	of Manchester), Costas	Atlantic University), Marco	of Illinois at Urbana-
on ductility in composite fi-		Fritsen (Aalborg University)	Lei Yang (Dalian University	Katsuhiko Osaka (Osaka Citv			(NEWCASTLE UNIVERSITY).	Soutis (The University	Canino (Florida Atlantic	Champaign)
bres, networks and compos-			of Technology), Zhanjun	University)			George Kotsikos	of Manchester), Philip	University), Takuya Suzuki	
ite materials will draw out		High strain rate testing of	Wu (Dalian University of				(NEWCASTLE UNIVERSITY)	Withers (The University of	(IHI Corporation), Fang Zhou	Motion damping by energy
some principles on which		dry aramid yarn through	Technology)	Interlaminar crack onset				Manchester)	(Florida Atlantic University)	harvesting through piezoe-
one might form the basis for		the use of ballistic test		stresses in CFRP laminates			The objective of this study	,	,	lectric devices recharging
a ductile composite.		equipment and high-speed	A multiscale model was	containing fibre discontinui-			is to investigate the effects	The evolution of kink bands	Performing a static and	batteries and having it
		video recording, with sup-	presented to simulate and	ty are improved by interlam-			of the surface modification	has been observed by	fatigue analysis on an	available to do useful work
		plementary accelerometer	reveal the micromechanical	inar toughening using mesh			of the metal substrate ac-	time-lapse X-ray µCT in the	ocean current turbine	rather than simply dissi-
		measurements for force	damage mechanisms of	of polyamide, and they are			companied by modification	compressive zone of carbon	blade through the imple-	pating energy by heat is a
		calculation.	fibre reinforced composite	predicted by an analytical			of the adhesive properties	fibre/epoxy composite under		preferable process.
			laminates subjected to low	model.			on the strength of single		National Renewable Energy	
			velocity impact.				lap joints		Laboratory codes, based on	
									blade element momentum	
									theory.	
unch in the Exhibition										
unch in the Exhibition NDUSTRY SESSION										

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	Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
5:00	1201 Processing - Manufacturing Technology 2	1202 Nano Composites 2	1203 Multifunctional Composites - Sensing and Actuation 2	1204 Fatigue 2	1205 Structural Analysis and Optimization 2	1206 Process Induced Effects 1	1207 Process Modelling 2	1208 Biocomposites 2	1209 Interfaces and Interphases 2	1210 Foams, Cellular and Lattice Materials 1
	COMPOSITES BY BRAIDING PULTRUSION Jens Schäfer (Institut für Textiltechnik der RWTH Aachen University) The Flechttrusion is an innovative process chain to produce fibre reinforced ther- moplastic profiles. The main part is about the Integration of	1202-1 MAGNETICALLY ANISOTROPIC NANO- PILLARS: MICRO- STRUCTURING OF NANOCOMPOSITES USING OSCILLATING MAGNETIC FIELDS Namikof Yamamoto (Penn State University), Harish Manohara (Jet Propulsion Laboratory-California Institute of Technology) We investigated scalable pat- terning of iron-coated carbon nanotube pillars using oscil- lating magnetic fields, in order to achieve highly organized 1D micro-structures.	KEYNOTE 1203-1 A COMPOSITE INTELLIGENT WING WITH STATE-SENSING AND AWARENESS CAPABILITIES Fotis Kopsaftopoulos (Stanford University), Raphael Nardari (Stanford University), Yu- Hung Li (Stanford University), Fu-Kuo Chang (Stanford University) The complete sensor network design, integration, and wind tunnel experimental assessment are presented for a bio-inspired intelligent composite UAV wing with self-sensing and awareness capabilities.	1204-1 MICRO-MECHANICAL MULTIAXIAL FATIGUE MODEL FOR CRACK DENSITY EVOLUTION AND STIFFNESS DEGRADATION Jense Glud (Aalborg University), Janice Dulieu-Barton (University of Southampton), Ole Thybo Thomsen (Aalborg University), Lars Christian Terndrup Overgaard (Aalborg University) The current research effort with regard to the devel- opment of a mechanistic micro-mechanical multiaxial fatigue model for use in wind turbine blade applications is presented.	OPTIMIZATION OF STEERING STIFFENERS FOR GRID- STIFFENED COMPOSITE STRUCTURES	1206-1 OPTICAL DEFORMATION ANALAYSIS OF THE FAILURE BEHAVIOR OF FIBER REINFORCED POLYMERS CAUSED BY LASER PROCESSING Michael Rose (Technische Universität Dresden), Jozsef-Sebastian Pap (Technische Universität Dresden), Jozsef-Sebastian Pap (Technische Universität Dresden), Andrett Klotzbach (Fraunhöfer IWS Dresden), Jan Hauptmann (Fraunhöfer IWS Dresden), Irne Jansen (Technische Universität Dresden), Eckhard Beyer (Technische Universität Dresden), Eckhard Beyer (Technische Universität Dresden) Laser remote cutting of FRP provide fast processing. By an adapted tensile test procedure and a digital image correlation system the mechanical influ- ence of the process on the material was examined.	1207-1 DEVELOPMENT OF INFUSION STRATEGY FOR COMPOSITE RAILROAD MOPPER CAR WITH FLOW SIMULATION AND VALIDATION A. E. Ushakov (ApATeCh), A. A. Safonov (Skotlech), M. Labordus (Lightweight Structures B. V.), E. I. Kornienko (ApATeCh), N. V. Rozin (Tsagi) Development of infusion strategy for composite rail- road hopper car with flow simulation and validation. The hopper car word and body were both impregnated in one shot.	1208-1 RAPID AND EFFECTIVE METHODS FOR THE SCREENING OF FLAX FIBRES FOR COMPOSITE APPLICATIONS Kevin Hendrickx (KU Leuven), Ramona Delphine Romian Sitohang (KU Leuven), Toon Goedemé (KU Leuven), Toon Goedemé (KU Leuven), Aart Willem Van Vuure (KU Leuven), Jan Ivens (KU Leuven) The effect of technical flax fibre fineness, purity and strength on the composite performance was investigated to provide screening methods to assess the composite suit- ability of the fibres.	The aim of this work is to study the effect of moisture absorption and surface treatment of carbon fiber on the interfacial properties of	Technological University), Far Zhang (Nanyang Technologica University), Ming Liu (Nanyan
	THROUGH THE COMBINATION OF PULL- BRAIDING AND BLOW MOLDING Renato Bezerra (Fraunhofer Institute for Chemical Technology ICT), Frederik Wilhelm (Fraunhofer Institute for Chemical Technology ICT), Sebastian Strauß (Fraunhofer Institute for Chemical Technology ICT), Holger Ahlborn (University of Stuttgart)	1202-2 FATIGUE DELAMINATION OF A CARBON FABRIC- REINFORCED EPOXY COMPOSITE WITH CARBON NANOTUBES Martin Kadlec (VZLU - Aerospace Research and Test Establishment), Jakub Šedek (VZLU - Aerospace Research and Test Establishment) This work presents decreased fatigue crack growth rate by approximately 80 % on DCB specimens made from a CFRP with 0.5 % CNTs. The rate also related to the interface of the tows of the plain weave.		1204-2 INFLUENCE OF IMPACT DAMAGE ON THE FATIGUE BEHAVIOUR OF LARGE SCALE COMPOSITES Bodo Fiedler (Technische Universität Hamburg-Harburg), Karl Schulte (Technische Universität Hamburg-Harburg) Karl Schulte (Technische Universität Hamburg-Harburg) The hexapod testing machine is a unique set up. It is possi- ble to perform shear, normal loads and combinations. It en- ables to test composite struc- tures under mulitaxial loading conditions up to 30Hz.	1205-2 MINIMUM COST DESIGN OF A HYBRID LAMINATE WITH UNCERTAIN MATERIAL PROPERTIES SUBJECT TO FREQUENCY CONSTRAINTS Sarp Adali (University of KwaZulu-Natal), Isaac Radebe (Durban University of Technology) Minimum cost design of hybrid cross-ply laminates for a given frequency is obtained by minimizing the thickness of expensive layers. Material properties are taken as uncer- tain using convex analysis.	1206-2 A LOCAL SOLUTION FOR THE STRESS STATE IN A NEW NOTCHED RESIDUAL STRESS SPECIMEN SUBJECTED TO AN ANTI- SYMMETRIC BENDING LOADING CONDITIONS Johnny Jakobsen (Aalborg University), Anders Lyckegaard (-) An Analytical solution for a newly proposed residual specimen is derived. The solu- tion is a superposition of two elastic problems and may be used to explore fatigue char- acteristics of a composite.	1207-2 NUMERICAL SIMULATION OF DYNAMIC WETTING FLOWS INTO FIBROUS MEDIA, FOR MACRO/MICRO-VOID CREATION ISSUES DURING LIQUID COMPOSITE MOLDING PROCESS Yujie Liu (Ecole des Mines de Saint-Etienne), Nicolas Moulin (Ecole des Mines de Saint-Etienne), Julien Bruchon (Ecole des Mines de Saint- Etienne), Pierre-Jacques Liotier (Ecole des Mines de Saint-Etienne), Sylvain Drapier (Ecole des Mines de Saint- Etienne), Sylvain Drapier (Ecole des Mines de Saint-Etienne), Sylvain Drapier (Ecole des Mines de Saint- Etienne) NUMERICAL SIMULATION OF DYNAMIC WETTING FLOWS INTO FIBROUS MEDIA, FOR MACRO/MICRO-VOID CREATION ISSUES DURING LIQUID COMPOSITE MOLDING PROCESS - bifluid-solid con- tact model involving capillary effects	1208-2 PROCESSING OF HIGH PERFORMANCE BIOCOMPOSITES FOR THE USE IN THE EUROPEAN BUILDING INDUSTRY Jovana Dzalto (Institute for Composite Materials), Luisa A. Medina (Institute for Composite Materials), Peter Mitschang (Institute for Composite Materials) By optimizing the manufactur- ing process and using aligned fibers instead of conventional non-wovens, the mechanical as well as physical perfor- mance of bio-composites could be significantly in- creased.	1209-2 PHYSICO- CHEMISTRY OF VINYLESTER/GLASS FIBER INTERFACES USED IN SMC COMPOSITES Thibaut Bénéthuilière (Ingénierie des Matériaux Polymères-INSA Lyon / Plastic Omnium Auto Exterior), Jannick Duchet-Rumeau (Ingénierie des Matériaux Polymères-INSA Lyon), Elise Dubost (Plastic Omnium Auto Exterior), Christophe Peyre (Plastic Omnium Auto Exterior - MCR), Cécile Margand (Plastic Omnium Auto Exterior), Jean-François Gérard (Ingénierie des Matériaux Polymères-INSA Lyon) Evaluation of a styrene-free resin used in SMC composites for the automotive industry, in terms of wetting, impreg- nation, and adhesion. From micro to macroscale.	1210-2 SOFT 3D ACOUSTIC METAMATERIAL WITH NEGATIVE INDEX Olivier Mondain-Monval (University of Bordeaux), Benoit Mascaro (University of Bordeaux), Olivier Poncelet (University of Bordeaux), Christophe Aristégui (University of Bordeaux), (University of Bordeaux), Thomas Brunet (University of Bordeaux), Aurore Merlin (University of Bordeaux), Kéviu Zimny (University of Bordeaux), ), Jacques Leng (University of Bordeaux)

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Meeting room 5	Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8
1211 Textile-Based	1212 Graphene, Graphene-	1213 X-ray Computed	1214 Fracture	1215 Fracture and	1216 Fracture and	1217 Constitutive	1218 Joints - Design,	1219 Applications -	1220 Applications -	1221 Multifunctional
Composites and Fibre	Based Composites 2	Tomography 1	and Damage -	Damage - Laminate	Damage - Delamination 2	Models 2	Manufacturing and	Aerospace 1	Automotive and Rail 1	Composites - Energy
Architecture 2			Micromechanics 2	Scale 2			Testing 2			Storage and Harvesting 2
1211-1 EVALUATION OF THE	1212-1 EFFECTIVE	1213-1 EFFECTIVE	1214-1 EXPERIMENTAL	1215-1 COHESIVE	1216-1 TESTING OF	1217-1 A MESO-	1218-1 EXPERIMENTAL	1219-1 STRUCTURAL	1220-1 EVALUATING	KEYNOTE
GEOMETRICAL INFLUENCE	DISPERSION OF GRAPHENE		CHARACTERIZATION AND	LAWS FOR ANALYZING	Z-PINNED LAMINATES	MECHANICAL	AND NUMERICAL	DESIGN OF AN	MULTI-MATERIAL-	
OF THE STITCHING YARN ON THE STIFFNESS AND	IN THERMOPLASTIC	UNIDIRECTIONAL FLAX/	COHESIVE LAWS FOR	THROUGH-CRACK	WITH MULTIPLE	CONSTITUTIVE MODEL OF	ANALYSIS OF PRELOAD	INSTRUMENTED DOUBLE-	CONCEPTS REGARDING	1221-1 RECENT ADVANCES
STRESS DISTRI-BUTION IN	POLYMERS: CHEMICAL	EPOXY COMPOSITES WITH	DELAMINATION OF OFF-	PROPAGATION IN CROSS	DELAMINATIONS	PARTICLE REINFORCED	IN BOLTED COMPOSITE	SWEPT WIND TUNNEL	TECHNICAL, ECOLOGICAL	IN STRUCTURAL
CONTINUOUS CARBON FIBER	AND PROCESSING	TWISTED YARNS	AXIS GFRP LAMINATES	PLY LAMINATES	Mehdi Yasaee (University	TITANIUM MATRIX	JOINTS WITH	MODEL	AND ECONOMICAL	SUPERCAPACITORS
<b>REIN-FORCED PLAS-</b>	STRATEGIES	Ilya Straumit (KU Leuven),	Esben Lindgaard (Aalborg	Andrew Bergan (NASA	of Bristol), Galal Mohamed	COMPOSITES AT HIGH TEMPERATURES	TEMPERATURE LOADS	Benjamin Lütke (DLR), Maritz Sahmidt (DLR), Jana	PROPERTIES	FOR TRANSPORT APPLICATIONS
TICS MADE BY TAILORED	Horacio Salavagione (ICTP- CSIC), Marta Castelaín	Farida Bensadoun (KU Leuven), Stepan Lomov (KU	University), Brian Bak (Aalborg University)	Langley Research Center), Carlos Dávila (NASA Langley	(University of Bristol), Stephen Hallet (University	Weidong Song (Beijing	<u>F. Hermsdorf</u> (Universität der Bundeswehr München),	Moritz Schmidt (DLR), Jens Neumann (DLR)	<u>Sebastian Kleemann</u> (Technische Universität	Emile Greenhalgh (Imperial
FIBER PLACE-MENT USING	(ICTP-CSIC), Fabrizio Marra	Leuven), Martine Wevers (KU	1	Research Center)	of Bristol)	Institute of Technoloav).	T. Matzies (Universität der	Neumann (DLN)	Braunschweig), Thomas	College London), Natasha
FINITE ELEMENT ANALYSIS Uhlig Kai (Leibniz-Institut für	(Sapienza University of	Leuven)	This work experimentally			Lijun Xiao (Beijing Institute	Bundeswehr München),	The experimental setup	Vietor (Technische	Shirshova (Durham
Polymerforschung Dresden	Rome), Marián Gómez-	2001011	characterizes delamination	Cohesive laws are char-	Application of Z-pinning is a	of Technology)	H. Rapp (Universität der	and the manufacturing are	Universität Braunschweig)	University), Anthony
e.V.), Matteo Tosch (Leibniz-	Fatou (ICTP-CSIC), Gerardo	The paper present results of	in GFRP laminates taking	acterized from tests of	subject of great interest in		Bundeswehr München)	described. The FE model,		Kucernak (Imperial College
Institut für Polymerforschung	Martínez (ICTP-CSIC), Carlos	the modelling of unidirec-	into account the influence of	cross-ply compact tension	the field of through-thick-			the strength analysis and	Due to the high complexity	London), Milo Shaffer
Dresden e.V.), Lars Bittrich	Marco (ICTP-CSIC), Gary	tional flax/epoxy composite	the off-axis angle between	specimens for two material	ness reinforcement (TTR)		Preload loss is determined	the validation by an exper-	of desinging components in	(Imperial College London),
(Leibniz-Institut für Poly-mer-	Ellis (ICTP-CSIC), Maria	samples to predict their	the lamina orientation and	systems. Results are com-	of composite laminates. To		for quasi-isotropic, biaxial	imentel modal analysis are	multi-material-design and	Rita Teixeira (Imperial
forschung Dresden e.V.), Axel Spickenheuer (Leibniz-In-	Sarto (Sapienza University	effective properties taking	the crack growth direction.	pared for specimens with	date, the majority of Z-pin		and UD CFRP-laminates	presented. FSI simulations	conflicting development	College London), Alexander
stitut für Polymerforschung	of Rome)	into account twist and mis-		notches machined by water-	characterisation work has		at room temperature and	are shown.	goals a software tool is de-	Bismarck (University of
Dresden e.V.), Uwe Gohs(Leib-	A carias of stratagios to sh	alignment of the yarns.		jet and by wire slurry saw.	been cond		70°C. Results are compared to 3D-FE-simulations using		veloped in order to support	Vienna), Maxim Kireitseu (Cytec Industrial Materials),
niz-Institut für Polymer-for-	A series of strategies to ob- tain thermoplastic/graphene						viscoelastic and quasi-elas-		the designing engineer.	Richard Shelton (Cytec
schung Dresden e.V.), Gert	nanocomposites with						tic method.			Industrial Materials)
Heinrich (Leibniz-Institut für Polymerforschung Dresden	improved electrical, thermal									
e.V.)	and mechanical properties,									The focus of this paper are
. ,	based chemical function-									structural power materials:
EVALUATION OF THE	alization of graphene are									structural composites which
GEOMETRICAL INFLUENCE	presented.									have the capacity to store
OF THE STITCHING YARN ON THE STIFFNESS AND STRESS										and deliver electrical energy,
DISTRIBUTION IN CONTINUOUS										and presents the current de-
CARBON FIBER REINFORCED										velopments in this field.
PLASTICS MADE BY TAILORED										
FIBER PLACEMENT										-
1211-2 A NUMERICAL	1212-2 THREE-DIMENSIONAL GRAPHENE/POLYMER		1214-2 FATIGUE DAMAGE	1215-2 DAMAGE	1216-2 TESTING	1217-2 AN INVARIANT-	1218-2 NUMERICAL	1219-2 SHOCK	1220-2 FEA USING	
APPROACH MODELING THE BRAIDING PROCESS FOR	COMPOSITES WITH	INDUCED SWELLING PROPERTIES OF NATURAL	IN SHORT GLASS FIBER REINFORCED PA66:	AND FAILURE OF THERMOPLASTIC	OF DELAMINATION BEHAVIOUR UNDER PURE	BASED ANISOTROPIC THERMO-PLASTIC	AND EXPERIMENTAL INVESTIGATION OF LOAD-	PROPAGATION BEHAVIOR OF CFRP LATTICE	DESIGN OPTIMIZATION TECHNIQUE FOR AN	
ARBITRARY MANDREL	EXCEPTIONAL MULTI-	CELLULOSE FIBRES	MICROMECHANICAL	LAMINATES WITH	MODE III LOADING	MATERIAL MODEL FOR	SHARING IN COMPOSITE	STRUCTURES	APPLICATION OF CARBON	
SHAPES TO CALCULATE	FUNCTIONAL PROPERTIES	CHARACTERIZED BY	MODELING AND	STRATIFIED AND	Yangyang Ge (Institut	SHORT FIBER REINFORCED	BONDED-BOLTED JOINTS	Tomohiro Yokozeki	FIBER REINFORCED	
PREFORM PROPERTIES	Zhenyu WANG (The Hong	SYNCHROTRON X-RAY	MULTISCALE	CLUSTERED FIBERS	Clément Ader-IUT Tarbes	THERMOPLASTICS	Kobye Bodjona (McGill	(University of Tokyo),	THERMOPLASTICS TO	
Thorsten Hans (Technical	Kong University of Science and Technology), Xi Shen		IDENTIFICATION	Arief Yudhanto (KAUST	de l'Université Toulouse),	Aamir Dean (Leibniz	University), Gyu-Hyeong Lim	Kento Shimode (University	AUTOMOBILE BODY	
University of Munich),	(The Hong Kong University	Kristofer Gamstedt (Uppsala	APPROACH	(King Abdullah University of	Xiaojing Gong (Institut	Universität Hannover), José	(McGill University), Karthik	of Tokyo), Takahira Aoki	STRUCTURE	
Roland Hinterhoelzl	of Science and Technology),	University), Thomas Joffre	Nicolas Despringre (ARTS),	Science and Technology)),	Clément Ader-IUT Tarbes de	Reinoso (Leibniz Universität	Raju (McGill University),	(University of Tokyo), Keita	Toshiro Ohori (The Univercity	,
(Technical University of	Mohammad Akbari Garakani	(Uppsala University),	Yves Chemisky (Arts &	Gilles Lubineau (KAUST	l'Université Toulouse), Anita	Hannover), Shahab Sahraee	Larry Lessard (McGill	Terashima (Japan Aerospace		
Munich)	(The Hong Kong University of	Per Isaksson (Uppsala	Métiers ParisTech), Fodil	(King Abdullah University of	Hurez (Département de	(Leibniz Universität	University)	Exploration Agency), Toru	(The Univercity of Tokyo),	
The overbraiding process	Science and Technology), Xiuyi Lin (The Hong Kong University		Meraghni (Arts & Métiers	Science and Technology)),	Recherche en Ingénierie des		An officiant clobal finite	Kamita (Japan Aerospace	Jun Takahashi (The	
The overbraiding process is virtually analyzed using	of Science and Technology),	(Uppsala University), Pierre Dumont (Université Grenoble	ParisTech), Joseph Fitoussi (Arts & Métiers ParisTech)	Ditho Pulungan (KAUST (King Abdullah University of	Véhicules pour l'Environ- nement-IUT Le Creusot de	Rolfes (Leibniz Universität Hannover)	An efficient global finite element model of a hybrid	Exploration Agency)	Univercity of Tokyo)	
the finite element method.	Ying Wu (The Hong Kong	Alpes), Sabine Rolland du	Gilles Robert (Solvay)	Science and Technology)),	l'Université de Bourgogne),	1101110101)	bonded-bolted joint is	Shock response behavior of	We investigate weight-light-	
An approach to analyzed	University of Science and	Roscoat (Université Grenoble		Husam Wafai (KAUST (King	Emmanuel De Luycker	This paper is concerned	proposed. An experimental	composite lattice structure	ening possibility of S-crank	
arbitrary mandrel shapes, a	Technology), Xu Liu (The Hong	Alpes), Laurent Orgéas	A micromechanical fatigue	Abdullah University of	(Institut Clément Ader-IUT	with the development of a	validation of this model us-	is experimentally evaluated.	frame structure using	
post processing procedure	Kong University of Science	(Université Grenoble Alpes)	visco-damage model for	Science and Technology)),	Tarbes de l'Université	new coupled thermome-	ing a bespoke instrumented	The shock attenuation char-	CFRTP. Here, we introduce	
and a validation method are	and Technology), Xinying Sun (The Hong Kong University	. ,	short glass fiber reinforced	Warden Schijve (SABIC),	Toulouse)	chanical invariant-based	bolt is also presented.	acteristics of lattice struc-	the study using optimization	
presented.	of Science and Technology),	The hygroexpansion coef-	polyamide-66 is developed	Nikhil Verghese (SABIC		transversely-isotropic elas-		ture are discussed based on	tools in FEM software.	
	Jang-Kyo Kim (The Hong Kong	ficients of the cell wall of a	for specific microstructure.	Technology Center)	Major testing methods for	tic-plastic constitutive mod-		wave analysis.		
	University of Science and		It includes complex damage	Effect of filling also had a	characterizing the pure	el for short fibre reinforced				
	Technology)	is determined by synchro-	mechanisms and matrix	Effect of fiber clustering on	mode III delamination be-	composites.				
	The exceptional multi-func-	tron X-ray micro computed	viscosity.	damage of glass/polypro- pylene (GFPP) is studied	haviors of composites are discussed and a new test					
	tional properties of the 3D	tomography and inverse 3D finite element modeling.		through monotonic and cy-	Edge-Ring-Crack-Torsion					
	graphene/polymer composites	mine dement modeling.		clic tests. Micromechanical	method (ERCT) has been					
	indicate that 3D GF and GA are			framework is also proposed	developed.					
	more effective compared to 1D			to predict damage growth						
	CNTs or 2D graphene sheets									
	as composite reinforcement			in GFPP.						

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Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
5:40 1201-3 HIGH-CYCLE MOLDING OF CONTINUOUS FIBER REINFORCED THERMOPLASTIC COMPOSITES PIPE Asami Nakai (Gifu University) Tadashi Uozumi (Gifu University), Satoshi Nagoh (TOYOBO CoLtd.) The purpose of this study is to construct frame structure of continuous fiber reinforce thermoplastic composites with high impregnated inter- mediate materials and the high cycle molding.	REINFORCED EPOXY RESIN COMPOSITES Shaofeng Lin (National University of Defense Technology), <u>Cai Jiang</u> (National University of Defense Technology), Jianwei	1203-2 STUDY ON THE SENSING FUNCTION OF Z-PINS Bing Zhang (University of Bristol), Giuliano Allegri (Imperial College London), Mehdi Yasaee (University of Bristol), Stephen Hallett (University of Bristol) This paper investigates the self-sensing behaviour of carbon/BMI Z-pin reinforced composite laminates and the multifunctional applications (delamination bridging and sensing) of carbon/BMI Z-pins.	AND ITS DAMAGE	1205-3 ROBUST DESIGN OF EFFICIENT DAMAGE TOLERANT LAMINATES BY ELASTIC ENERGY MINIMISATION Mark Nielsen (University of Bath), Andrew Rhead (University of Bath), Richard Butler (University of Bath) Optimisation for minimum mass whilst accounting for uncertain loading reduces mass by up to 15% compared to current design practice. However, use of non-standard ply angles offers little benefit.	1206-3 REAL AREA OF CONTACT IN CARBON FABRIC FORMING Olga Smerdova (Institut Pprime), <u>Michael Sutcliffe</u> (University of Cambridge), Daniel Mulvihill (University of Cambridge) An experimental method has been developed to examine the microscopic contact con- ditions in composites forming. The technique is applied to a woven fabric and a single tow contacting a glass plate.	University of Madrid & IMDEA Materials Institute), Joaquim Vila (IMDEA Materials Institute), Javier LLorca (Polytechnic University of Madrid & IMDEA Materials Institute) A level set model for fluid flow through a fiber preform using vacuum infusion is presented.	1208-3 DEVELOPMENT OF A FLAX FIBER REINFORCED POLYMER FOR REINFORCED CONCRETE STRUCTURES STRENGTHENING Anne Hallonet (LGCIE Bohr - University Claude Bernard Lyon 1), Emmanuel Ferrier (LGCIE Bohr - University Claude Bernard Lyon 1), Laurent Michel (LGCIE Bohr - University Claude Bernard Lyon 1) This study presents the de- velopment of a new externally bonded flax FRP for reinforced concrete strengthening with mechanical behavior charac- terization in tension and of the adherence with concrete.	according chemistry controls the interaction of the fiber and	1210-3 IN-PLANE COMPRESSIVE RESPONSE OF HONEYCOMBS WITH NON-UNIFORM WALL THICKNESS AND CELL SIZE Youming Chen (The University of Auckland), Raj Das (The University of Auckland), Mark Battley (The University of Auckland) The irregular honeycombs with cell size and wall thick- ness following lognormal distributions were manufac- tured using a 3D printer, and the in-plane compressive response of the honeycombs were tested.
Institute of Leiria), Joao Francisco Silva (ISEP), Joao Pedro Nunes (Minho University), Antonio Torres Marques (University of Porto, Different thermoplastic pre-impregnated materials	interlaminar fracture tough- ness and interlaminar shear strength, and the correspond- ing fracture characteristics	1203-3 MAN-MADE CELLULOSE FIBERS COATED WITH CARBON NANOTUBE NETWORKS AS UNIQUE SMART MATERIALS Haisong Qi (Leibniz Institute of Polymer Research Dresden), Jianwen Liu (Leibniz Institute of Polymer Research Dresden), Yinhu Deng (Leibniz Institute of Polymer Research Dresden), Shang-Lin Gao (Leibniz Institute of Polymer Research Dresden), Edith Mäder (Leibniz Institute of Polymer Research Dresden) Excellent sensing ability, re- producibility and selectivity of cellulose fibers to liquid water and volatile molecules was achieved by CNT coating and has the potential to be used as smart materials.	WOVEN GLASS-FIBRE- REINFORCED COMPOSITE WITH A THERMOPLASTIC MATRIX FOR AUTOMOTIVE APPLICATION Amelie Malpot (PPrime Institute (DPMM)), Fabienne Touchard (PPrime Institute (DPMM)), Sébastien Bergamo (Renault) Tensile-tensile fatigue behaviour of a woven glass-fi- bre-reinforced composite with polyamide 6,6 resin is investigated using acoustic emission and infrared camera	1205-4 EXPERIMENTAL POSTBUCKLING STUDY OF PRE-CONFORMED COMPOSITE PLATES Antonio Blazquez (University of Seville), Jesus Justo (University of Seville), Rafael Roig (University of Seville), Federico Paris (University of Seville) The possibility of avoiding the variability in the postbuckling regime is analyzed. Some panels were manufactured including intentionally specific imperfections.	1206-4 CHARACTERISATION OF VISCOELASTIC MATERIAL PROPERTIES DURING CURING PROCESSES Sibin Saseendran (Swerea SICOMP), <u>Maciej Wysocki</u> (Swerea SICOMP), Janis Varna (Luleå University of Technology) The present contribution is toward systematic character- isation the thermo-viscoelas- ticity of a curing epoxy resin. The results indicate that time, temperature and curing obey a linear relationship.	OF FORMING PROCESS FOR HIGHLY DRAPEABLE FABRICS	1208-4 INVESTIGATION OF PATTERN STYLE OF WOVEN FABRICS PRODUCED FROM HYBRID WRAP SPUN YARNS ON FABRICATED COMPOSITE Behnaz Baghaei (University of Borâs), Mikael Skrifvars (University of Borâs) This paper focuses on the effect of weave structure on the thermal and mechanical behavior as well as moisture absorption of the PLA/hemp woven fabric composites made by compression molding.	1209-4 EVALUATION OF THE INTERFACIAL FRACTURE TOUGHNESS OF A CARBON FIBER REINFORCED THERMOPLASTIC COMPOSITE BY CYCLIC SINGLE-FIBER PUSH-OUT TESTS Michael Greisel (University of Augsburg), Michael Schulz (University of Augsburg), Judith Moosburger-Will (University of Augsburg), Wolfgang M. Mueller (University of Augsburg), Siegfried Horn (University of Augsburg) An expanded approach to quantify the relevant energy dissipated in stable crack propagation during single-fiber push-out testing of a carbon fiber reinforced thermoplastic composite is presented.	1210-4 SOLID STATE POLYLACTIDE-POLY(METHYL METHACRYLATE) PRECURSORS FOR THE IN-LINE PRODUCTION OF FOAM CORE SANDWICH STRUCTURES Yonghoon Yoon (Ecole Polytechnique Fédérale de Lausanne), Christopher Plummer (Ecole Polytechnique Fédérale de Lausanne), Jan-Anders Månson (Ecole Polytechnique Fédérale de Lausanne) Bio friendly foam precursor was prepared and character- ized by PLA/PMMA in order to modify thermal behavior of PLA. A sandwich structure was demonstrated by parti- cleboard faces and CO2 blown foam core.

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Meeting room 5	Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8
1211-3 FIBRE	1212-3 A MICRO-	1213-3 IDENTIFICATION OF		1215-3 TEMPERATURE	1216-3 INFLUENCE OF	1217-3 APPLICATIONS	1218-3 EXPERIMENTAL	1219-3 TESTING AND	1220-3 LIGHTWEIGHTING	1221-2 MULTIFUNCTIONAL
ARCHITECTURE DESIGN	MECHANICAL STUDY OF	TRUE MICROSTRUCTURE	MICROMECHANICAL	DRIVEN FRACTURE	SPECIMEN TWISTING	AND LIMITATIONS OF NON-	INVESTIGATION OF THE	ANALYIS OF ANISOGRID	ROAD FREIGHT SEMI-	COMPOSITE MATERIALS
OF 3D WOVEN COMPOSITE	GRAPHENE REINFORCED	OF COMPOSITES BASED	APPROACH TO	MECHANISMS IN UD/	ON FRACTURE SURFACE	LINEAR VISCOELASTIC	MECHANICAL BEHAVIOR	PREPREG ELEMENT	TRAILERS THROUGH	USING LITHIUM ION
REINFORCEMENT WITH	EPOXY NANOCOMPOSITES	ON VARIOUS FLAX FIBER	INVESTIGATE THE	WOVEN CARBON FIBRE	EVOLUTION IN THE SPLIT-	MODEL FOR SIMULATION	OF BOLTED CERAMIC-	SPECIMEN UNDER	THE APPLICATION OF	FUNCTIONALIZATION
GENETIC ALGORITHMS-	Xin Zhao (University of	ASSEMBLIES BY MEANS	INFLUENCE OF VOIDS	EPOXY COMPOSITES	SHEAR TORSION TEST	OF BEHAVIOUR OF	MATRIX COMPOSITE	UNIAXIAL TENSION AND	COMPOSITES IN TRAILER	Dan Zenkert (KTH - Royal
-A UNIT CELL BASED	Manchester), Robert Young	OF THREE-DIMENSIONAL	ON THE STRUCTURAL	James Meredith (University	Allison Johnston (Syracuse	POLYMER COMPOSITES	JOINTS USING MULTI-	COMPRESSION	DECKING	Institute of Technology).
OPTIMISATION	(University of Manchester)	TOMOGRAPHY	BEHAVIOUR OF FRP UNDER	of Sheffield), Peter Wilson	University), Barry Davidson	Liva Pupure (Luleå	INSTRUMENTATION	Steffen Niemann (German	Joel Galos (University	Eric Jacques (KTH - Royal
FRAMEWORK AND	()	Arttu Miettinen (University	COMPRESSION LOADING	(University of Sheffield),	(Syracuse University)	University of Technology),	Blanche Legin (Université de		of Cambridge), Michael	Institute of Technology),
PERFORMANCE	The efficiency of reinforce-	of Jyväskylä), Roberts	Wilfried Liebig (Technische	Joel Foreman (University		Janis Varna (Luleå University	Technologie de Compiègne),	Wagner (German Aerospace	Sutcliffe (University of	Göran Lindbergh
ASSESSMENT	ment for pristine graphene	Joffe (Luleå University of	Universität Hamburg-	of Sheffield), Mahmoud	The influence of specimen	of Technology), Roberts	Zoheir Aboura (Université de	Centre), Matthias Beerhorst	Cambridge), David Cebon	(KTH - Royal Institute
Xuesen Zeng (University of	with two different lateral	Technology), Liva Pupure	Harburg), Karl Schulte	Mostafavi (University of	twisting during anti-plane	Joffe (Luleå University of	Technologie de Compiègne),	(German Aerospace Centre),	(University of Cambridge)	of Technology), Simon
Nottingham), Andrew Long	size but same thicknesses	(Luleå University of	(Technische Universität	Sheffield)	shear (mode III) loading in	Technology)	Pierre Feissel (Université de	Christian Hühne (German		Leijonmarck (Swerea
(University of Nottingham),	within the bulk epoxy	Technology), Bo Madsen	Hamburg-Harburg),	, i	composite split beam spec-		Technologie de Compiègne),	Aerospace Centre)	The potential application	SICOMP)
lan Ashcroft (University of	nanocomposites has been	(Technical University of	Bodo Fiedler (Technische	Investigation into the effect	imens is studied using the	Different non-linear material	Florent Bouillon (SAFRAN		of different lightweight	
Nottingham), Prasad Potluri	studied by SEM and Raman	Denmark)	Universität Hamburg-	of cure schedule on temper-	split-shear torsion test.	models have been studied.	Herakles)	This paper reports on uniax-	composite materials to	In this paper we show
(University of Manchester)	spectroscopy.		Harburg)	ature driven inter and intra		Methodology for simulating		ial tension and compression	semi-trailer decking is ex-	how one can functionalise
		Microstructure of flax		laminar fracture in cross ply		nonlinear stress-strain	The damage process of	test results of Anisogrid	amined. Existing hardwood	carbon fibres electrochem-
We present a novel ap-		fibre composites is studied	The subject of this presenta-	carbon epoxy composites		response in iso-strain situ-	bolted ceramic matrix	Prepreg knot and rib spec-	decking is heavy and a	ically. This enables several
proach to couple Genetic		with X-ray tomography	tion is the development of a	via digital image correlation		ations of composites based	composite joints tested	imen to give an answer	significant contributor to fuel	multi-functional uses of
Algorithms and unit cell		and image analysis. The	micromechanical approach			on constituent properties is	under tensile loading was	which stiffness and strength	consumption.	carbon fibres, such as sens-
modelling to optimize 3D		stiffness of the composites	to investigate the influence			presented.	investigated by coupling	properties can be expected.		ing, actuation and energy
woven composites - in the		is estimated with microme-	of voids on the structural				experimental methods (ste-			harvesting.
case of constant stiffness		chanical models.	behaviour of FRP under				reo-DIC and AE).			
design for aircraft landing			compression load.							
gear braces.										
1211-4 INFLUENCE	1212-4 EFFECT OF	1213-4 ASSESSMENT	1214-4 INVESTIGATING	1215-4 EXPERIMENTAL	1216-4 MODELLING THE	1217-4 MODELING	1218-4 SIZING OF	1219-4 INVESTIGATION ON		1221-3 FUNCTIONAL
OF TEXTILE DESIGN	HEAT TREATMENT ON	OF ACCURACY OF	INTERLAMINAR FRACTURE		DOUBLE CANTILEVER	THE STRAIN-RATE,	BOLTED JUNCTIONS FOR	THE IMPACT PROPERTIES	BRAIDING AS A METHOD	STRUCTURAL BATTERY
PARAMETERS ON	CONDUCTIVITY OF DOPED	FIBRE ORIENTATION	IN TOUGHENED CFRP'S	PERFORMANCE OF	BEAM TEST WITH BENDING		3D-WOVEN CERAMIC	OF GLASS FIBER/	FOR THE MANUFACTURING	Wilhelm Johannisson
DRAPEABILITY OF WARP-	POLY(ANILINE)/GRAPHENE OXIDE COMPOSITE	MEASUREMENT USING X-RAY COMPUTED	VIA QUANTITATIVE CT	COMPOSITE JOINTS WITH EMBEDDED STEEL PLATE	MOMENTS BY USING BILINEAR DISCONTINUOUS	PRESSURE DEPENDENT	MATRIX COMPOSITES STRUCTURES USING	EPOXY COMPOSITES AT CRYOGENIC CONDITION	OF COMPOSITE PRESSURE	(KTH Royal Institute of
Mirko Christ (Faserinstitut	Shigeji Konagaya (Nagoya	TOMOGRAPHY	ANALYSIS	Shufeng Liu (Beihang	COHESIVE LAWS	RESPONSE OF A HIGHLY	ONERA DAMAGE MODEL	Hei Lam Ma (The Hong Kong	VESSELS Michael Lengersdorf (Institut	Technology), Niklas Ihrner (KTH Royal Institute of
Bremen e.V.), Axel Herrmann	university), Mariko Terada	Dietmar Salaberger	<u>Gregor Borstnar</u> (University of Southampton), Mark Noel	University), Yunyan Xu		CROSSLINKED AEROSPACE	AND COMPARISONS WITH	Polytechnic University), Kin	für Textiltechnik (ITA) of	Technology), Simon
(Faserinstitut Bremen e.V.)	(Nagoya university)	(University of Applied	Mavrogordato (University	(Beihang University),	Paolo S. Valvo (University of Pisa), Bent F. Sørensen	GRADE EPOXY RESIN UP	MULTI-INSTRUMENTED	Tak Lau (The Hong Kong	RWTH Aachen University),	Leijonmarck (KTH Royal
(raserinstitut Dremen e.v.)	(Nagoya university)	Sciences Upper Austria).	of Southampton). Qinada	Xiaoquan Cheng (Beihang	(Technical University of	TO LARGE DEFORMATION	TESTS	Polvtechnic University).	Thomas Gries (Institut für	Institute of Technology),
The Textechno Drapetest	The conductivity of PANI/	Peter Hine (University of	Yang (University of Miami),	University), Jiavi Qi (Beihang	1	Frédéric Lani (Institute of	Etienne Voland (SAFRAN	Jinsong Leng (Harbin	Textiltechnik (ITA) of RWTH	Johan Hagberg (KTH Royal
automatic drapeability	GO thin film composites	Leeds), Michael Jerabek	lan Sinclair (University	University), Gaofeng Dong	Toftegaard (Technical	Mechanics-Materials and	Herakles), Florent Bouillon	Institute of Technology)	Aachen University), Jörg	Institute of Technology),
tester was used on a set	increases with PANI content	(Borealis Polyolefine GmbH),	of Southampton), Mark	(Beihang University)	University of Denmark)	Civil Engineering (IMMC)-	(SAFRAN Herakles),	montate of reenhology)	Multhoff (ISATEC GmbH)	Dan Zenkert (KTH Royal
of NCF that were chosen	and heat-treatment tem-	Johann Kastner (University	Spearing (University of	(Domany on Volony)	children y or bonniarly	University of Louvain),	Thomas Vandellos (SAFRAN	Low velocity impact test		Institute of Technology),
to show the influence of	perature, which is due to	of Applied Sciences Upper	Southampton)	This article focuses on	A theoretical model of the	Xavier Morelle (Institute of	Herakles), Axel Candeau	was performed for Glass	Composite pressure ves-	Göran Lindbergh (KTH Royal
textile design parameters on	DBSA contained as a dopant	Austria)		the tensile strength and	DCB-UBM test is presented,	Mechanics-Materials and	(SAFRAN Herakles), Zoheir	fiber/Epoxy composites.	sels are nowadays mostly	Institute of Technology)
drapeability effects.	in PANI.		CT studies that identify	stiffness of the metallic	based on bilinear discontin-	Civil Engineering (IMMC)-	Aboura (Université de	Results showed that	manufactured by wet-fila-	
		The accuracy of fibre orien-	the chronology of damage	inserts composite structure.	uous cohesive laws. The an-	University of Louvain),	Technologie de Compiègne),	composites at cryogenic	ment winding. This paper	A novel energy-storing
		tation measurement using	events and crack paths	And two forms of inserts	alytical solution is compared		Frédéric Laurin (ONERA),	condition exhibited smaller	evaluates braiding as an	carbon fiber composite
		X-ray CT was determined	within toughened CFRP in-	structure were compared:	to experimental test results	of Condensed Matter and	Blanche Legin (Université de	damage but had relatively	alternative method for the	electrode is produced, and
		for short glass fibre filled	terlayers are used to inform	the blunt and tapered tip	for fracture modes I and II.	Nanosciences (IMCN)-	Technologie de Compiègne)	poor energy absorbability.	manufacturing of composite	investigated with regards to
		polymers. 3D CT analysis	micromechanical A-FEM	steel inserts.		University of Louvain),			pressure vessels.	the mechanical properties of
		gives the same tensor	simulations to highlight the			Thomas Pardoen (Institute	Analysis of 3D woven			the composite and electro-
		values as the 2D sectioning	competing mechanisms			of Mechanics-Materials and	Ceramic Matrix Composite			chemical properties of the
		standard method.				Civil Engineering (IMMC)-	bolted junctions during sin-			electrode.
						University of Louvain)	gle lap shear test using the			
							dialog between simulations			
						The non-linear behavior of	with the damage model			
						the RTM6 aerospace grade	ODM-CMC and multi-intru-			
						epoxy resin is characterized	mented experimental tests			
						and modeled by addressing				
						the effects of strain-rate,				
						the effects of strain-rate, temperature and hydrostatic pressure.				

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	Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
6:40	1301 Processing - Manufacturing Technology 3	1302 Nano Composites 3	1303 Multifunctional Composites - Sensing and Actuation 3	1304 Fatigue 3	1305 Structural Analysis and Optimization 3	1306 Process Induced Effects 2	1307 Process Modelling 3	1308 Biocomposites 3	1309 Interfaces and Interphases 3	1310 Foams, Cellular and Lattice Materials 2
	MICRO-CRACKING Kurt Olofsson (Swerea SICOMP), David Mattsson (Swerea SICOMP), Runar Langstrom (Swerea SICOMP), Fredrik Ohlsson (Oxeon AB) TeXtreme® was introduced in a cryogenic fuel tank. Processability adjustments were introduced to the mate- rial, which lowered the result- ing void content and needed	1302-1 HIERARCHICAL HYBRID COMPOSITES WITH SECONDARY CNT NANOREINFORCEMENT: COMPUTATIONAL MODELLING Leon Mishnaevsky Jr. (Technical University of Denmark), Gaoming Dai (Technical University of Denmark) Effect of secondary CNT (car- bon nanotube) reinforcement on faigue resistance of hybrid and carbon fiber reinforced composites is studied using computational modelling			1305-1 NUMERICAL CHARACTERIZATION OF THE KNOCK-DOWN FACTOR ON UNSTIFFENED CYLINDRICAL SHELLS WITH INITIAL GEOMETRIC IMPERFECTIONS Mariano Arbelo (PFH Private University of Applied Sciences), Kaspars Kalnins (Riga Technical University), Olgerts Dzolins (Riga Technical University), Saulo Castro (PFH Private University) of Applied Sciences), Richard Degenhard (German Aerospace Center) The aim was to validate experimental test results, including imperfection measurements of composite cylinders, with FEM and point out their limitation, advantage and disadvantage against KDF approach.	KEYNOTE 1306-1 BULK AND SURFACE POROSITY IN OUT-OF- AUTOCLAVE PREPREGS James Kay (The University of British Columbia), Jeremy Wells (The University of British Columbia), Anoush Poursartip (The University of British Columbia), Göran Fernlund (The University of British Columbia) In composites manufacturing both bulk and surface porosity are undesirable outcomes that should be minimized or eliminated. Bulk porosity neg- atively impacts mechanical properties whereas surface poros	1307-1 ABOUT THE MODELING OF THE LASER ASSISTED TAPE PLACEMENT PROCESS Cyril Dedieu (GeM-UMR CNRS), Francisco Chinesta (GeM-UMR CNRS), Anaïs Barasinski (GeM-UMR CNRS), Adrien Leygue (GeM-UMR CNRS), Jean-Marc Dupillier (Airbus Defence and Space) The study of the establish- ment of residual stresses in the Automated Tape Placement process of ther- moplastic matrix composites. Two modeling approaches are detailed and compared.	FRAGMENTATION TEST OF NATURAL FIBER COMPOSITES Junji Noda (Yamaguchi University), Tomohiro Sugita (Yamaguchi University), Koichi Goda (Yamaguchi University) To investigate the effect of TPI of natural fiber yarns on multiple fiber breakages and stress recovery behavior using single yarn composites, fragmentation tests and FEA		1310-1 MODELLING OPEN CELL FOAM STRUCTURES BASED ON 3D IMAGE DATA André Liebscher (TU Kaiserslautern), Dennis Merkert (TU Kaiserslautern), Claudia Redenbach (TU Kaiserslautern) We present a 3D image data based modelling approach fo open cell foams that realisti- cally reproduces the foam's microstructure as well as its effective material properties.
	USING PNEUMATIC DEVICES AND APPLICATION TO THERMOPLASTIC PREPREG MANUFACTURING Gyu Hee Lee (Seoul National University), Woo II Lee (Seoul National University) Continuous 12k carbon fiber tow spreading process using air knife was investigated. The tow spread width and spread uniformity for 2 different process parameters were quantitatively evaluated.	1302-2 EFFECTS OF CARBON NANOTUBE CONTENTS ON GLASS TRANSITION TEMPERATURE OF EPOXY MATRIX COMPOSITES Cai Jiang (National University and Defense Technology), Jianwei Zhang (National University of Defense Technology), Shaofeng Lin (National University and Defense Technology), <u>Fubiao</u> Yang (National University and Defense Technology), <u>Dathi</u> Jiang (National University and Defense Technology) Molecular dynamics simu- lation for carbon nanotubes (CNTs) reinforced epoxy matrix composites was conducted to study effects of CNT contents on glass transition temperature of the composites.	1303-2 CONCEPT STUDY FOR THE MATERIAL COMPLIANT IMPLEMENTATION OF THE RFID TECHNOLOGY INTO CARBON FIBRE STRUCTURES Alexander Horoschenkoff (Munich University of Applied Sciences), Nadine Deichelsberger (Munich University of Applied Sciences), Andreas Bierbaumer (Munich University of Applied Sciences), Jürgen Rackles (Munich University of Applied Sciences) Carbon fibres are used to built a radio-frequency identifica- tion (RFID) system, a trans- mitter-receiver system for wireless power transmission and health monitoring in mul- tifunctional composites.	FABRIC REINFORCED POLYPHENYLENSULFIDE IN THE VERY HIGH CYCLE FATIGUE REGIME: TEST PROCEDURE AND MICROSTRUCTURAL ANALYSIS Frank Balle (University of Kaiserslautern), Daniel Backe (University of Kaiserslautern), Dietmar Eifler (University of Kaiserslautern) The fatigue behavior of CF- PPS in the VHCF-regime was studied by a new developed ultrasonic testing facility for cyclic bending at 20 kHz ac- companied by microscopy and online damage monitoring.	1305-2 BUCKLING AND POST-BUCKLING IN CARBON/EPOXY FILAMENT WOUND COMPOSITE TUBES UNDER TRANSVERSE COMPRESSION José Humberto Almeida Jr. (Federal University of Rio Grande do Sul), Volnei Tita (University of São Paulo – São Carlos School of Engineering), Hugo Faria (INEGI - Institute of Mechanical Engineering and Industrial Management), António Marques (Faculty of Engineering of the University of Porto), Sandro Amico (Federal University of Rio Grande do Sul) Non-linear models and progressive failure analysis pointed an increase in max- imum compressive load for high angles. Matrix tensile and matrix compression in- duced by shear dominate the failure mode.		1307-2 COMBINING DRAPING AND INFUSION MODELS INTO A COMPLETE PROCESS MODEL FOR COMPLEX COMPOSITE STRUCTURES <i>Bobert Pierce (Monash</i> University), Brian Falzon (Queen's University), Mark Thompson (Monash University) Experimental validation and demonstration of a Complete Process Model, for LCM processing of complex aircraft structures, which focuses on the relationship between fab- ric draping and resin infusion.	ON THE MECHANICAL BEHAVIOR OF MANICARIA FABRIC/PLA BIOCOMPOSITE LAMINA BY THE TAGUCHI METHOD. Alicia Porras (Universidad de los Andes), Alejandro Maranon (Universidad de los Andes), lan A Ashcroft. (University of Nottingham) The main focus of this study was to analyze the effect of	of Trento-Italy), Alessandro Pegoretti (University of Trento-Italy) In this work, the aim is to use different forms of graphene nanosheets as an interphase in fiber reinforced polymer composite and evaluate its ef- fect on interfacial properties.	1310-2 INSIGHT ON THE DYNAMIC BEHAVIORS OF ALUMINUM FOAM BASED ON THE NEW PLASTIC CONSTITUTION Lingling Hu (Sun Yat-sen University), Liwen Xiong (Sun Yat-sen University), T. X. Yu (The Hong Kong University of Science and Technology) Based on the empirical con- stitution of aluminium foams, the foam's dynamic plateau stress and densified strain can be predicted according to their deformation.

#### Monday 20 July · Scientific programme

Meeting room 5	Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8
1311 Textile-Based	1312 Graphene, Graphene-	1313 X-ray Computed	1314 Fracture	1315 Fracture and	1316 Fracture and	1317 Constitutive	1318 Joints - Design,	1319 Applications -	1320 Applications -	1321 Multifunctional
Composites and Fibre	Based Composites 3	Tomography 2	and Damage -	Damage - Laminate	Damage - Delamination 3	Models 3	Manufacturing and	Aerospace 2	Automotive and Rail 2	Composites - Energy
Architecture 3			Micromechanics 3	Scale 3			Testing 3			Storage and Harvesting 3
1311-1 MODELING AND	1312-1 FAILURE	1313-1 X-RAY CT IMAGE-	1314-1 FAILURE	1315-1 STUDY ON LOAD	1316-1 EFFECT OF	1317-1 NONLINEAR FINITE	1318-1 REDUCED	1319-1 CARBON	1320-1 ANALYSIS OF	1321-1 HIGH STRENGTH
SIMULATION OF THE	MECHANISMS,	BASED MEASUREMENT	LOCUS ANALYSIS OF	DISTRIBUTION OF MULTI-	STACKING SEQUENCE	ELEMENT ANALYSIS OF	BOLT MODEL USING	NANOTUBES FOR	APPLICATION OF HYBRID	MULTIFUNCTIONAL
FORMING OF CONTINUOUS	ELECTRICAL AND THERMAL CONDUCTIVITY	AND MODELING OF MICROSCOPIC DEFECTS IN	FIBRE-REINFORCED COMPOSITES UNDER	BOLT COUNTERSUNK	ON THE FRACTURE	FIBER COMPOSITES WITH DIFFERENT PROPERTIES	MULTI-CONNECTED RIGID SURFACES FOR	PROPERTY ENHANCEMENT OF EPOXY AT CRYOGENIC	MATERIAL ON A SILL	STRUCTURAL BATTERY BASED ON SOLID-STATE
FIBER REINFORCED THERMOPLASTIC		CFRP LAMINATES	COMBINED TRANSVERSE	JOINTS	FATIGUE DELAMINATION	IN TENSION AND	COMPOSITE STRUCTURES	ENVIRONMENTS	Josef Oleksik (TU- Braunschweig)	G-CNT CARBON FIBER
COMPOSITES	COMPOSITE	Akinori Yoshimura (Japan	STRESSES THROUGH	Qian Zhang (Beihang	PROPAGATION BEHAVIOR	COMPRESSION	JOINING	Alan Kin Tak Lau (The Hong	Diaunochwolgy	HYBRID COMPOSITES
Anton Rusanov (INSA	Swetha Chandrasekaran	Aerospace Exploration	COMPUTATIONAL	University), Songwei Wang	OF COMPOSITE	Jie Wang (Tongji University),	Ramzi Askri (Univ. Bordeaux-	Kong Polytechnic University),	This article discusses the	Mi-Young Park (KAIST),
Lyon), Eduardo Guzman-	(Technische Universität	Agency), Shingo li (the	MICROMECHANICS	(Beihang University),	LAMINATES UNDER MODE	Yi Xiao (Tongji University)	I2M-UMR 5295), Christophe	Jinsong Leng (Harbin	possibilities and characters	Jung-Yup Lim (Yonsei
Maldonado (INSA Lyon),	Hamburg-Harburg),	University of Tokyo), Ryohei	<u>Taotao Zhang</u> (Beihang	Xiaoquan Cheng (Beihang	I LOADING		Bois (Univ. Bordeaux-I2M-	Institute of Technology)	of using hybrid material on	University), Jong-Hak Kim
Nahiene Hamila (INSA Lyon),	Wilfred Liebig (Technische	Hosoya (Tokyo University	University), Ying Yan	University), Jiayi Qi (Beihang	Yu Gong (Beihang	This study extended the	UMR 5295), Hervé Wargnier		a sill aiming to increase the	(Yonsei University), Chun-
Philippe Boisse (INSA Lyon)		of Science), Jun Koyanagi	(Beihang University)	University), Gaofeng Dong	University), Libin Zhao	constitutive model to that as	(Univ. Bordeaux-I2M-UMR		stiffness and to decrease	Gon Kim (KAIST)
	Harburg), Matthias	(Tokyo University of	a 2 D modified Upships	(Beihang University)	(Beihang University),	a nonlinear finite element	5295), Julie Lecomte (Univ.	ite structures are always	the weight.	Link alwayship multifunction
	Mecklenburg (Technische Universität Hamburg-	Science), Toshio Ogasawara (Japan Aerospace	criterion for fibre-rein-	The tongile performance of a	Jianyu Zhang (Chongqing University), Stephen Richard	analysis tool by writing a UMAT to address two- or	Bordeaux-I2M-UMR 5295)	subject to cyclic thermal stress in which one surface		High strength multifunction- al structural battery based
	Harburg), Bodo Fiedler	Exploration Agency), Keita	forced composites under	multi-bolt joint of composite	Hallett (University of Bristol)	three-dimensional finite	The development of a	of the structures facing to		on solid-state G-CNT carbo
	(Technische Universität	Terashima (Japan Aerospace		laminate with metal plate is		elements in ABAQUS.	reduced model of bolted	the Sun experiences tem-		fiber hybrid composites was
	Hamburg-Harburg),	Exploration Agency), Toru	proposed through com-	analyzed. The effects of pin			joint using Multi-Connected	perature over 393 K while		successfully fabricated and
	Rainer Adelung (Christian-	Kamita (Japan Aerospace	putational micromechanic	clearance, bolt torsion mo-			Rigid Surfaces and con-	an opposite side		experimented for electrical
	Albrechts-Universität	Exploration Agency), Nobuo	analysis.	ment, height ratio on load			tinuum shell elements for			and structural study.
	zu Kiel), Karl Schulte	Takeda (the University of		distribution are researched.			the prediction of both load			
	(Technische Universität	Tokyo)					distribution and stress field			
	Hamburg-Harburg)	In this paper, the authors					around hole.			
	Aerographite (AG) is a	develop a method to								
	novel hierarchical 3D carbon	measure the microscopic								
	nanomaterial which can be	defects in CFRP laminates								
	filled with epoxy resin, This	from X-ray CT images and								
	results in novel electrical	a method to introduce the								
	and fracture toughness	effect of the defects to the								
	properties of the composite.	finite element method.				1017 0 41	1010 0 1000		1000 0 UCED	
1311-2 NUMERICAL PERMEABILITY	1312-2 DEFORMATION OF GRAPHENE OXIDE: FROM	1313-2 COMPRESSIBILITY OF CHOPPED FIBRE-	1314-2 EXPERIMENTAL AND ANALYTICAL	1315-2 EFFECT OF CONSTRAINT RATIO	1316-2 ENHANCING THE INTERLAMINAR	1317-2 AN ELASTOPLASTIC-DAMAGE	1318-2 HIGH- TEMPERATURE	1319-2 PREVENTION OF UVR DEGRADATION	1320-2 USER- RELATED METHODICAL	1321-2 SYNTHESIS OF CU-DOPED VANADIUM
PREDICTIONS OF WOVEN	MONOLAYER TO BULK	REINFORCED PREPREGS	EVALUATION OF FIBER-	AND COOLING RATE ON	FRACTURE RESISTANCE OF		HYBRID WELDING OF	ON POLYMER-BASED	DEVELOPMENT OF	OXIDE/GRAPHENE
TEXTILES: EXAMINING	NANOCOMPOSITES	DURING COMPRESSION	MATRIX INTERFACE	TRANSVERSE CRACKING	LAMINATED COMPOSITES	BASED ON A LARGE-	THERMOPLASTIC (CF/	COMPOSITES BY NANO-	COST OPTIMISED CFRP	HYBRID MATERIAL FOR
THE CHARACTERISTICS OF	Zheling Li (The University	MOULDING	ADHESION	IN THERMOPLASTIC	BY USING CONTINUOUS	STRAIN HYPERELASTIC	PEEK) TO THERMOSET (CF/	ZNO & HGFS	INTERIOR COMPONENTS	HIGH PERFORMANCE
MULTI-LAYER PREFORMS	of Manchester), Robert	<u>Dimitri Ferré Sentis</u> (Univ.	<u>Jay Mahishi</u> (Honda R	CROSS-PLY LAMINATES	CARBON NANOTUBE FILMS		EPOXY) COMPOSITES	<u>Tsz-Ting Wong</u> (The Hong	FOR DERIVATIVES OF	ELECTROCHEMICAL
	Young (The University	Grenoble Alpes-Lab.	& D Americas), Micheal	Husam Wafai (King Abdullah	Hong Xu (Suzhou Institute	AMORPHOUS GLASSY	Irene Fernandez Villegas	Kong Polytechnic University),		CAPACITOR
of Auckland), <u>Piaras Kelly</u>	of Manchester), lan	3SR-F-38000 Grenoble-	Angelo Osero (Honda R &	University of Science and	of Nano-Tech and Nano-	POLYMERS	(Delft University of	Kin-Tak Lau (The Hong Kong		Xiaoran Zhao (Beihang
(The University of Auckland), Tom Allen (The University of	Kinloch (The University of Manchester)	France), Laurent Orgéas (Univ. Grenoble Alpes-Lab.	D Americas), Eric Walker (Honda R & D Americas),	Technology (KAUST)), Gilles Lubineau (King	Bionics-CAS-China), Xiao Tong (Suzhou Institute	<u>Van Dung Nguyen</u> (University of Liège),	Technology), Pablo Vizcaino Rubio (Delft University of	Polytechnic University), Wai-Yin Tam (The Hong	Aachen University), Liliane Ngahane Nana (RWTH	University), Yan Zhao (Beihang University), Ye
Auckland), Simon Bickerton	manonesier)	3SR-F-38000 Grenoble-	Duane Detwiler (Honda R &	Abdullah University of	of Nano-Tech and Nano-	Xavier Morelle (University	Technology)	Kong Polytechnic University),		Li (Beihang University),
	The deformation behaviour	France), Pierre Dumont	D Americas)	Science and Technology	Bionics-CAS-China),	of Louvain), Frédéric Lani	(connology)	Jinsong Leng (Harbin	Montano (RWTH Aachen	Xiaoyan Zhang (Beijing
	of monolayer and multilayer	(Univ. Grenoble Alpes-Lab.		(KAUST)), Arief Yudhanto	Yongyi Zhang (Suzhou	(University of Louvain),	This paper presents an	Institute of Technology),	University), Anna-Lena	Institute of Aeronautical
An automated tool has been	graphene oxide has been	LGP2-F-38000 Grenoble-	The paper discusses an	(King Abdullah University	Institute of Nano-Tech	Thomas Pardoen (University	procedure to prevent	Julie A. Etches (University	Beger (RWTH Aachen	Materials), Shanyi Du
developed for generation	investigated using Raman	France), Sabine Rolland du	effective and efficient test	of Science and Technology	and Nano-Bionics-CAS-	of Louvain), Christian Bailly	thermal degradation during	of Bristol)	University), Jörg Feldhusen	(Beihang University)
of permeability predictions.	spectroscopy. On this basis,	Roscoat (Univ. Grenoble	procedure to measure force	(KAUST)), Matthieu Mulle	China), Qingwen Li (Suzhou	(University of Louvain),	welding of CF/PEEK to CF/	Effects of anna 7-04	(RWTH Aachen University),	
It has been used to study	their reinforcement to	Alpes-Lab. 3SR-F-38000	needed to pull fiber from	(King Abdullah University	Institute of Nano-Tech and	Ludovic Noels (University	epoxy composites based on	Effects of nano-ZnO/epoxy	Dave Cadwell (BENTLEY	Cu-doped vanadium oxide/
the effects of numerous parameters on permeability	nanocomposites has been discussed.	Grenoble-France), Mustafa Sager (Plastic Omnium Auto	matrix. The experiment involves pulling 24K, 50K	of Science and Technology (KAUST)), Warden Schijve	Nano-Bionics-CAS-China), Tsu-Wei Chou (University	of Liège)	a drastical reduction of the welding time.	rheology and nano-ZnO particle dispersion on	MOTORS LIMITED)	graphene electrode mate- rial has been successfully
and has been verified exper-	นเอยนออธน.	Exterior)	carbon fiber tows bonded	(SABIC), Nikhil Verghese	of Delaware), <u>Weibang Lu</u>	An efficient viscoelas-	worung une.	infiltration condition. UV ab-	Developed design process	synthesized by one-step
imentally.			with the matrix only	(SABIC Technology Center)	(Suzhou Institute of Nano-	tic-viscoplastic-damage		sorbability and mechanical	that tries to give the engi-	hydrothermal technology
		Compressibility, pore kinet-			Tech and Nano-Bionics-	constitutive model based on		properties of a nano-ZnO/	neer a tool to support and	and excellent electrochem-
		ics and kinematics evolution		In this work we study dam-	CAS-China)	a large-strain hyperelastic		epoxy filled HGF composite.	structure his work. It is a	ical properties have been
		of thermoset prepregs dur-		age in cross-ply laminates		formulation for amorphous			very simplified and authen-	obtained.
		ing compression moulding		made of impact-resistant	A novel method for fabri-	polymers in the glassy state			tic try to illustrate such a	
		are investigated using a		Polypropylene Copolymer	cating continuous CNT film				complex thing like a CFRP	
		specially designed compres- sion rheometer and X-ray		reinforced with continuous E-glass fibers (GF/PP).	interleaved carbon fiber composites has been devel-				design.	
		microtomography.			oped. This hybrid laminate					
					composite shows better					

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	Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
	1301-3 MECHANICAL	1302-3 HYBRID CONDUCTIVE		1304-3 MASTER SN CURVE	1305-3 EFFECT OF THE	1306-2 CHARACTERIZATION	1307-3 STOCHASTIC	1308-3 FATIGUE BEHAVIOR	1309-3 WETTING	1310-3 STATIC AND
	PROPERTIES OF CFRP PIPES	POLYMER COMPOSITES:	DAMAGE DETECTION AND	APPROACH- A HYBRID	DESIGN GUIDELINES ON THE	AND NUMERICAL	SIMULATION OF THE CURE	OF UNI-DIRECTIONAL FLAX	BEHAVIOUR OF MOLTEN	DYNAMIC RESPONSE OF
	MADE BY MULTI FILAMENT	THE EFFECT OF MIXED	STRAIN MEASUREMENT IN	MULTISCALE APPROACH TO	DESIGN SPACE	INVESTIGATION OF AN RTM	OF ADVANCED COMPOSITES	FIBRE/EPOXY COMPOSITES	THERMOPLASTICS:	NOVEL ANISOTROPIC
		FILLERS AND POLYMER	LAMINATED COMPOSITE	FATIGUE SIMULATION OF	Thiago Dutra (Instituto	CURE PROCESS WITH CFRP	Alex Skordos (Cranfield	<u>Yosuke Ueki</u> (Hitachi LTD),	EFFECT OF PHYSICAL AND	COMPOSITE FOAM CONCEPT
		BLENDS ON PYRORESISTIVE		SHORT FIBER COMPOSITES	Tecnologico de Aeronautica),	MOLDS AND INDEPENDENT	University, Cranfield, United	Hans Lilholt (Technical		FOR PROTECTIVE HELMETS
	,,, .		INTEGRATED CARBON	Atul Jain (KULeuven), Yasmine	Clovis Ferreira (Embraer),	HEAT PATCHES	Kingdom), Tassos Mesogitis (Cranfield University. Cranfield.	University of Denmark), Bo	ON THE MECHANICAL	Yasmine Mosleh (KU
		<u>Eric Asare</u> (Queen Mary University of London), Jamie	NANOTUBE YARN SENSORS Jandro Abot (The Catholic	Abdin (KULeuven), Stefan Straesser (Siemens Industry	<u>Sergio Almeida</u> (Instituto Tecnologico de Aeronautica)	Jakob Weiland (Institute for Carbon Composites), Mathias	United Kingdom), Andrew	Madsen (Technical University of Denmark)	PROPERTIES OF GLASS FIBRE-THERMOPLASTIC	Leuven), Bart Depreitere (KU Leuven), Jos Vander Sloten
		Evans (LMK Thermosafe Ltd).	University of America).	Software NV). Wim Van	Techologico de Aeronaulica)	Hartmann (Institute for	Lona (Nottinaham University.		COMPOSITE INTERFACES	(KU Leuven), Jan Ivens (KU
		Emiliano Bilotti (Queen Mary	Kevin Wynter (The Catholic	Paepegem (Ghent University),	The boundaries of the feasible	Carbon Composites), Roland	Nottingham, United Kingdom)	Fatique behaviour of a uni-di-	Carlos Fuentes (KU Leuven),	Leuven)
		University of London), Mark	University of America),	Ignaas Verpoest (KULeuven),	region of lamination parame-	Hinterhölzl (Institute for		rectional flax-epoxy compos-	Els Van Santfoort (GroepT-	
	Materials Center), Asami	Newton (LMK Thermosafe Ltd)	Samuel Mortin (The Catholic	Stepan V. Lomov (KULeuven)	ters when design guidelines	Carbon Composites)	A stochastic simulation	ite was investigated. Results	Leuven Engineering College),	In this paper, a new anisotrop-
	Nakai (Gifu University)		University of America), Huy		is discussed. Laminate da-		methodology is developed	indicated that the failure	Haoyu Guo (GroepT-Leuven	ic material concept namely
			Le (The Catholic University	A hybrid multi-scale method	tabases were generated and	A numerical strategy for cure	to investigate the effects of	criteria was determined by	Engineering College), Christine	
	We investigated the Multi-	posites (CPC) with hybrid	of America), Hugo Borges	to predict the local SN curves	filtered according the desired	simulation of an RTM man-	cure kinetics, in plane fibre	not only the fatigue damaging	Dupont-Gillain (Université	as an alternative to next gen-
	Filament-Winding method by applying a tensile load to car-	polymers and fillers are inves- tigated for their pyro-resistive	de Quadros (The Catholic University of America), Victor	of SFRC is proposed; this pro-	design guideline.	ufacturing process utilizing CFRP molds with temperature	misalignment and boundary conditions uncertainty on the	but also the creep strain.	Catholique de Louvain- Louvain-la-Neuve). David	eration helmet liners which can potentially reduce head
		properties. Pyro-resistive	Casarotto (The Catholic	both multiscale-mechanics		controlled heat patches has	cure process of composites.			rotational accelerations.
			University of America)	and tests is validated by		been developed and validated.			Vuure (KU Leuven)	
		dition of hybrid polymer/filler		experiments.						
	to those by SW method.		Piezoresistive characteristic						Surface interactions and inter-	
			of carbon nanotube yarns is						face compatibility between PP,	
			tapped to detect damage and						MAPP, and PVDF with glass	
			measure strain in laminated						substrates were evaluated, at	
			composite materials through						room (20°C) and high temper-	
			resistance measurements without altering their integrity.						ature (200°C).	
			without altering their integrity.							
17:40		1302-4 ULTRADRAWING	1303-4 THE MICROWAVE	1304-4 DELAMINATION	1305-4 A PARAMETERIZED	1306-3 EFFECTS ON	1307-4 MONOLITHIC	1308-4 VISCOSE RAYON	1309-4 EFFECTS OF	
		OF NANODIAMOND REINFORCED POLY (VINYL	ACTUATED SHAPE MEMORY POLYMER FILLED WITH	FATIGUE PROPERTIES OF Z-PINNED CARBON-EPOXY	SURFACE METHOD TO DETERMINE OPTIMAL	FORMING WHEN USING ALIGNED MULTI WALL	STOKES/DARCY FLUID FORMULATION IN	FIBRES: A POTENTIAL ADDITION TO THE	TESTING TEMPERATURE ON INTERFACIAL SHEAR	
		ALCOHOL) NANOCOMPOSITE		LAMINATE USING METAL OR	VARIABLE STIFFNESS LAYUP	CARBON NANOTUBES IN	DEFORMABLE MEDIA	TECHNICAL FIBRES FAMILY?	STRENGTH MEASUREMENTS	
		FIBERS	Zhihong Xu (Nanjing University		DESIGN BY GLOBAL SEARCH	MULTI-STACKED PREPREG	FOR THE SIMULATION OF	Jonathon Chard (University	OF EPOXY RESINS AT	
			of Science and Technology)	Fabio Pegorin (RMIT	Simon Hesse (BMW AG.	Per Hallander (Saab AB), Jens	RESIN-INFUSION BASED	of Surrey). Gavin Creech	DIFFERENT MIXING RATIOS	
		University), Yuya Fujita (Kobe		University), Khomkrit	& Technische Universität	Sjölander (Royal Institute of	PROCESSES	(Scott Bader), David Jesson	Helga Nørgaard Petersen	
	(Colorado State University)	University), Masaru Kotera	The absorbed microwave	Pingkarawat (RMIT University),		Technology), Malin Åkermo	Maxime Blais (Ecole des	(University of Surrey), Paul	(Technical University of	
			energy could be transferred	Stephen Daynes (RMIT	(Technische Universität	(Royal Institute of Technology)	mines de Saint-Etienne),	Smith (University of Surrey)	Denmark), Ross Minty	
			into heat efficiently in the	University), Adrian Mouritz	München), Dirk Lukaszewicz		Nicolas Moulin (Ecole des		(University of Strathclyde	
			T-ZnOw/SMP composite	(RMIT University)	(BMW Group), Fabian Duddeck		mines de Saint-Etienne),	Viscose rayon fibres have the	), James L. Thomason	
	integrated fused deposition 3D printhead to wetout the	IndLtd.), Takashi Nishino (Kobe University)	and the remote actuation of complex shape transitions by	Fabio Pegorin is a Doctoral	(Technische Universität München)	show how locally arranged MWCNTs in prepreg interlay-	Pierre-Jacques Liotier (Ecole des mines de Saint-Etienne).	potential to bridge the gap be- tween natural (in this context	(University of Strathclyde), Povl Brøndsted (Technical	
	fibers. The properties com-	(NODE UNIVERSILY)	microwave is possible.	candidate in Aerospace	wunchen)	ers affect the global forming	Julien Bruchon (Ecole des	plant derived) and technical	University of Denmark).	
		ND reinforced PVA nanocom-		Engineering at RMIT	Variable Stiffness laminates	behavior. The study shows	mines de Saint-Etienne),	fibres. Data from mechanical	Yukihiro Kusano (Technical	
		posite fibers were prepared		University. His Ph.D aims to	are optimized by using	that MWCNT in the [0]/[45]	Sylvain Drapier (Ecole des	tests are prestented.	University of Denmark).	
		through gel process followed		create a multi-functional com-	bi-variate spline surfaces with	interfaces affects wrinkling.	mines de Saint-Etienne)		Kristoffer Almdal (Technical	
		by uniaxial drawing. The ex-		posite material for aerospace	a small number of control				University of Denmark)	
		cellent mechanical properties		structure using z-pinning	points. Our example showes		Based on a monolithic Stokes-			
		of the drawn nanocomposite		technique.	a significant increase of the		Darcy formulation coupled		The interfacial shear stress of	
		fibers were revealed.			buckling load for a curved		with a solid mechanics		a glass fibre and epoxy matrix	
					panel.		problem, this study describes a numerical approach for the		system was investigated. An inverse dependency of testing	
							simulation of composite parts		temperature and mixing ratio	
							made by infusion processes.		of hardener and epoxy resin	
									was found.	

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Meeting room 5	Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8
1311-3 DOES UNIT CELL	1312-3 THREE-	1313-3 EFFECTIVE	1314-3 ACOUSTIC	1315-3 A PROGRESSIVE	1316-3 ENF TEST	1317-3 NONLINEAR	1318-3 INFLUENCE OF THE	1319-3 STRUCTURAL	1320-3 THE EFFECTS	1321-3 CERAMIC-METAL
SIZE PLAY A ROLE?	DIMENSIONAL GRAPHENE	MECHANICAL PROPERTIES	EMISSION ANALYSIS FOR	FAILURE MODEL FOR	SIMULATION OF STITCHED	DYNAMIC CONSTITUTIVE	PIN SIZE ON THE TENSILE	ROBUSTNESS ANALYSIS	OF COST AND	HYBRID PARTICLES AS
AN OVERVIEW OF	FOAM/CNT/PDMS	OF A WELD LINE IN A	VALIDATION OF MICRO	COMPOSITE LAMINATES	COMPOSITES BASED ON	MODEL FOR CARBON/	AND FATIGUE BEHAVIOR	OF ANISOGRID COMPOSITE		FILLERS LEADING TO
MECHANICAL PROPERTIES	COMPOSITES WITH	SHORT GLASS FIBRE	MECHANICAL MODELS	INCLUDING MATRIX	SHEAR TESTING RESULTS	EPOXY TEXTILE	OF TI-CFRP HYBRID	LATTICE STRUCTURES	STRUCTURAL DESIGN	ENHANCED DIELECTRIC
OF WOVEN LAMINATES	EXCEPTIONAL MICROWAVE		Fatih Oz (Bogazici	CRACKS INTERNAL	OF SINGLE STITCHED	COMPOSITES	STRUCTURES PRODUCED	Ronald Wagner (German		PERFORMANCE OF THE
Mireia Olave (IK4-IKERLAN),	AND NOISE SHIELDING	66 BASED ON X-RAY	University), Nuri Ersoy	TRACTION	LAMINATES	Xing Liu (Vrije Universiteit	BY LASER ADDITIVE	Aerospace Centre),		POLYMERIC COMPOSITES
Igor Vara (IK4-IKERLAN),	Xinying Sun (The Hong Kong	MICRO-TOMOGRAPHY	(Bogazici University)	Mahdi Salavatian	Jonny Herwan (Tokyo	Brussel), Lincy Pyl (Vrije	MANUFACTURING	Steffen Niemann (German	BODY STRUCTURES	Shuhui Yu (Shenzhen
Hodei Usabiaga (IK4-	University of Science and	AND FINITE ELEMENT		(Washington State	Metropolitan University),	Universiteit Brussel), Danny	Daniel Huelsbusch (TU	Aerospace Centre), Christian	Per Mårtensson (Royal	Institutes of Advanced
IKERLAN), Laurentzi	Technology), Xu Liu (The	COMPUTATION	A comparison between the	University), Lloyd Smith	Atsushi Kondo (Tokyo	Van Hemelrijck (Vrije	Dortmund University),	Hühne (German Aerospace	institute of technology), Dan	Technology-Chinese
Aretxabaleta (Mondragon	Hong Kong University of	Abderrahmane Ayadi (Mines	predictions of finite element	(Washington State	Metropolitan University),	Universiteit Brussel), Wim	Matthias Haack (TU	Centre)	Zenkert (Royal institute of	Academy of Sciences),
Unibertsitatea), Stepan V.	Science and Technology),	Douai), Hedi Nouri (Mines	micromechanical analysis	University)	Satoshi Morooka (Tokyo	Van Paepegem (Ghent	Dortmund University),	ochirc)	technology), Malin Åkermo	Suibin Luo (Shenzhen
Lomov (KU Leuven), Dirk	Xiuyi Lin (The Hong Kong	Douai), Sofiane Guessasma	and results of tension tests	University)	Metropolitan University),	University), Laszlo Farkas	Andreas Solbach (Hamburg	The purpose of this paper	(Royal institute of tech-	Institutes of Advanced
Vandepitte (KU Leuven)	University of Science and	(INRA), Frederic Roger	with acoustic emission	This paper concerns the	Naoyuki Watanabe (Tokyo	(Siemens Industry Software	University of Technology),	is to compare the structural	nology)	Technology-Chinese
vanuepille (NO Leuven)	Technology), Xi Shen (The	(Mines Douai)	recording for a carbon	shear modulus reduction	Metropolitan University)	NV)	Claus Emmelmann (Laser	robustness of anisogrid	noiogy)	Academy of Sciences),
The unit cell size effect of	Hong Kong University of	(Willies Doual)	fibre reinforced composite	due to transverse cracks.		(110)	Zentrum Nord GmbH), Frank	composite lattice structures	An analysis of the effects	Fang Fang (Shenzhen
woven laminates for differ-	Science and Technology).	X-Ray micro-tomography is	material.	The effect of crack closure	End notch flexural (ENF) test	A constitutive model	Walther (TU Dortmund	with orthogrid composite	when dividing a composite	Institutes of Advanced
ent mechanical properties	Ying Wu (The Hong Kong	combined with a two-scale	material.	in the transverse and shear	simulation was developed	describing the behaviours	University)	structures when subjected	structure to improve the	Technology-Chinese
						(elastic fibers and viscoe-	University)			
is investigated: tensile	University of Science and	finite element computational		response of the laminates	based on single stitch test-		Quest statis and surfly	to axial compression.	cost effeciency of manu-	Academy of Sciences), Rong
strength, damage, static	Technology), Zhenyu Wang	method to quantify the local		was incorporated in the	ing, combined with cohesive		Quasi-static and cyclic		facturing. Cost and weight	Sun (Shenzhen Institutes
mode I/II and fatigue mode	(The Hong Kong University	anisotropic elastic proper-		damage model.	zone model to facilitate	composites is presented in	investigations were carried		impact is investigated by	of Advanced Technology-
I fracture toughness values	of Science and Technology),	ties within a hot weldline.			crack propagation. FE	this paper and verified in a	out in order to assess the		finite element analysis and a	Chinese Academy of
are analyzed.	Gang Liu (Xi'an Jiaotong				results agreed well with the	quasi-static loading case	influence of additive-man-		cost model.	Sciences)
	University), Jang-Kyo Kim				experiment.	from literature.	ufactured pin structures on			
	(The Hong Kong University						the mechanical properties			Hybrid particles of Nano
	of Science and Technology)						of a novel hybrid structure			Ag-depositing on BaTiO3
							interface.			were prepared, which as
	This paper reports novel GF/									fillers lead to high dielectric
	CNT/PDMS hybrid compos-									constant (235) and low
	ites with different porosities,									dielectric loss (0.11) of the
	densities and CNT contents									polymeric composites.
	for both high EMI shielding									
	and sound absorption per-									
	formances.									
1311-4 EFFECT OF THE	1312-4 FACILE		1314-4	1315-4 ANALYSIS OF	1316-4 MODE I FRACTURE		1318-4 EVALUATION		1320-4 DESIGN	1321-4 3D ORDERED
NUMBER OF LAMINATIONS	SYNTHESIS OF GRAPHENE		MICROMECHANICAL	BENDING STIFFNESS	OF THIN-PLY CARBON-	MICROMECHANICAL	OF AN ANALYTICAL		OPTIMIZATION OF A	GERMANIUM BASED
ON BENDING AND	SURFACE-MODIFIED		INVESTIGATION OF THE	REDUCTION IN	EPOXY LAMINATES:	MODELING OF CERAMICS-	ANALYSIS METHOD		BOGIE STRUCTURE FOR	COMPOSITE AND ITS
TRANSVERSE SHEAR	FLAKE ALUMINUM		INFLUENCE OF PLY	LAMINATES DUE TO	EFFECTS OF PLY	BASED COMPOSITES VIA	FOR INTERFERENCE FIT		A TRADE-OFF BETWEEN	ELECTROCHEMICAL
PROPERTIES OF	POWDER WITH LOW		THICKNESS ON FIBRE	TRANSVERSE CRACKS	THICKNESS	VORONOI-DELAUNAY	ASSEMBLIES FOCUSING		PROCESSING TIME AND	PROPERTIES
PLAIN WEAVE FABRIC	INFRARED EMISSIVITY		MATRIX DEBONDING	AND DELAMINATIONS IN	Guillaume Frossard (Ecole	NETWORKS	ON THICK-WALLED PARTS		STRUCTURAL PROPERTY	Jiupeng Zhao (Harbin
COMPOSITE LAMINATES	AND EXCELLENT		Christian Leopold (Technical	SURFACE LAYERS	polythechnique fédérale	Khalid Alzebdeh (Sultan	BASED ON EXPERIMENTAL		Moo Sun Kim (Korea	Institute of Technology),
<u>Keishiro Yoshida</u> (Kanazawa	ANTICORROSIVE		University Hamburg-	Andrejs Pupurs (Luleå	de Lausanne (EPFL)), Joël	Qaboos University),	DATA		Railroad Research Institute),	Yao Li (Harbin Institute
Institute of Technology),	PERFORMANCE		Harburg), Wilfried Liebig	University of Technology),	Cugnoni (Ecole polythech-	Uwe Kruger (Rensselaer	Philipp Fahr (Technische		Jeongseok Kim (Korea	of Technology), Jian
Motohiro Nakagami	Lihua He (Beijing Institute		(Technical University	Mohamed Loukil (Swerea	nique fédérale de Lausanne	Polytechnic Institute)	Universität München-Faculty		Railroad Research Institute),	Hao (Harbin Institute of
(Kanazawa Institute of	of Aeronautical Materials),		Hamburg-Harburg), Bodo	SICOMP), Fredrik Ahlqvist	(EPFL)), Thomas Gmür		of Mechanical Engineering),		Seung Mo Kim (Korea	Technology)
Technology), Yasuo Hirose	Pinggui Liu (Beijing		Fiedler (Technical University	(Swerea SICOMP), David	(Ecole polythechnique	Using a discrete modeling,	Roland Hinterhoelzl		university of technology and	
(Kanazawa Institute of	Institute of Aeronautical		Hamburg-Harburg)	Mattsson (Swerea SICOMP)	fédérale de Lausanne	we utilize Voronoi tessel-	(Technische Universität		education)	
Technology)	Materials), Yan Zhao				(EPFL)), John Botsis (Ecole	lation to simulate random	München-Faculty of			
	(Beihang University), Youwei		The influence of ply	Bending stiffness of lami-	polythechnique fédérale de	microstructure of 2D ce-	Mechanical Engineering)		The optimal product design	
Bending stiffness and trans-	Zhang (Beijing Institute of		thickness in the 90° layer	nates with micro-damage	Lausanne (EPFL))	ramics-based composites.	с с <i>/</i>		(thickness design) plan for	
verse shear stiffness of plain	Aeronautical Materials),		in cross-ply laminates on	was measured experimen-		Statistics on elastic moduli	The assembly process of in-		train bogie frame was sug-	
weave fabric composite	Wen Luo (Beijing Institute		fibre matrix debonding	tally. DIC was used to meas-	The ply thickness influences	are calculated via numerical	terference fit assemblies of		gested to consider process-	
laminates are investigated	of Aeronautical Materials),		and inter-fibre-fracture is	ure the mid-plane curvature.	the steady-state ERR in	simulations.	CFRP shafts and steel hubs		ing time of RTM process,	
considering the intra-lamina	Tong Zhang (Beijing Institute		investigated experimentally	Results vielded excellent	mode I fracture of car-		is investigated experimen-		weight and mechanical	
inhomogeneity through finite	of Aeronautical Materials)		with model composites and	agreement with FEM and	bon-epoxy laminates. The		tally and analytically. The		properties.	
element analysis.	(in the second and the second s		in FEM simulation.	analytical models.	difference of microstructure		applicability of an analytical		P	
station analytic.	GO was firstly functionalized				affects the amount of bridg-		approach is evaluated.			
	with -PO(OH)2, and then				ing fibres, which leads to		approach to cratation.			
	reacted with AI to obtain				this size effect.					
	graphene-modified Al				4113 3125 611661.					
	powder, which was efficient									
	in preparing lower infrared									
	emissivity and anticorrosive									
	coating.									
	1004000									

## Scientific programme · Tuesday 21 July

	Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	M8
			udies of composite materials:	The data rich mechanics oppo	ortunity S. Mark Spearing, Un	iversity of Southampton, United K	ingdom			
9:30	Mini Oral Session I in Co									2121 Special Symposium of
9:30	- see detailed programme	e page 22.								Active Composites 2121-1 Opening Remarks
	Programme number = po	ster id								BL. ("Les") Lee
9:50										2121-2 Avian Inspired
										Multifunctional Morphing Vehicles: Critical Issues
										Daniel Inman
										banor minar
10:10										2121-3 Sensory Systems
										and Flight Stability of Birds Graham Taylor
										Chanan rayion
10:30										2121-4 Power and Energy
										Issues for Morphing Wings Hugh Bruck
										Tuyi Diuck
	Poster Session in the Ex									
	Lunch in the Exhibition									
13:00	Mini Oral Session II in C - see detailed programme	ongress Hall A2								2321 Special Symposium Active Composites
13:00		e paye zz.								2321-1 Multifunctional
10.00	Programme number = po	ster id								Skin Material for Morphing
										Leading Edge Applications
										Hans Peter Monner
13:20										2321-2 Bio-Inspired
										Materials That Self-Shape
										Through Programmed
										Microstructures Andre Studart
										Andre Studart
14:10	Poster Session in the Ex	chibition								2521 Special Symposium of
14.50										Active Composites 2521-1 Co-Continuous
14:50										Metal-Elastomer Foam
										Actuators for Morphing
										Wing MAVs
										Robert Shepherd
15:10	1									2521-2 Intelligent CNT
										Composite Network:
										The Neurons for MAV
										Musculoskeletal System
										Yong Chen
	1									



#### Scientific programme · Tuesday 21 July

	<u> </u>	Auditorium 15	Auditorium 10		Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
	Manufacturing Technology 4	2102 Nano Composites 4	2103 Multifunctional Composites - Sensing and Actuation 4		2105 Structural Analysis and Optimization 4	2106 Process Induced Effects 3	2107 Process Modelling 4	2108 Biocomposites 4	2109 Interfaces and Interphases 4	2110 Foams, Cellular and Lattice Materials 3
15:00	OF EXPERIENCED PERSON IN HAND LAY-UP FABRICATION METHOD - CONVERTING TACIT KNOWLEDGE TO EXPLICIT IN THE FIBER REINFORCED PLASTICS MOLDING- Tetsuo KIKUCH! (Toyugiken CoLtd:-Kanagawa), Erika SUZUK! (Toyugiken CoLtd.), Yuka TAKA! (Dsaka Sangyo University), Akihiko GOTO (Dsaka Sangyo University), Hiroyuki HAMADA (Kyoto Institute of Technology) This study investigated the relation between the pressure force applied by the operator when using a roller for fabri- cation work and the degree of proficiency in the hand lay up	2102-1 REACTIVE SYNTHESIS: A PROMISING ROUTE FOR THE IN-SITU FORMATION OF NANOSIZED REINFORCEMENTS IN METAL MATRIX COMPOSITES Nassim Samer (University Lyon 1), Jérôme Andrieux (University Lyon 1), Bruno Gardiola (University Lyon 1), Sophie Gourdet (Airbus Group Innovations), Olivier Martin (Mecachrome), Hiroki Kurita (CEA-Saclay), Laurent Chaffron (CEA-Saclay), Laurent Chaffron (CEA-Saclay), Laurent Chaffron (CEA-Saclay), Univier Dezellus (University Lyon 1) The present paper describes a new in-situ synthesis route of MMCs leading to enhanced mechanical properties and to nanosized reinforcement without handling of nanosized particles.	2103-1 COMPARATIVE STUDY ON MONITORING STRUCTURAL DEFECTS IN FRPS USING GLASS FIBRES WITH CARBON NANOTUBES AND GRAPHENE COATING <u>Bin HAO</u> (The Xinjiang Technical Institute of Physics and Chemistry-Chinese Academy of Sciences), Peng- Cheng MA (The Xinjiang Technical Institute of Physics and Chemistry-Chinese Academy of Sciences) This paper studied the struc- tural defects in composites by monitoring the deformation of glass fibers with CNTs or graphene coating and compared the different effects between them.	CARBON FIBRE COMPOSITES CONTAINING INTERLAMINAR INKJET PRINTED POLYMER DROPLETS Andrew Cartledge (The University of Sheffield), Christophe Pinna (The University of Sheffield), Alma Hodzic (The University of Sheffield), Patrick Smith (The University of Sheffield) A study of the addition of interlaminar inkjet printed polymer droplets upon the fatigue life of unidirectional carbon fibre composites in 4 point bending	KEYNOTE 2105-1 RECENT DEVELOPMENTS OF DISCRETE MATERIAL OPTIMIZATION OF LAMINATED COMPOSITE STRUCTURES Erik Lund (Aalborg University), René Sørensen (Aalborg University) This presentation will give a quick summary of recent developments of the DMO approach for structural opti- mization of laminated com- posites including examples of challenging optimization problems.	2106-1 THICK-WALLED "CRACK-FREE" CFRP PIPES USING NOVEL STRESS REDUCTION METHOD Kazunori Takagaki (The University of Tokyo), Shu Minakuchi (The University of Tokyo) Significant radial tensile stress is induced in thick- walled CFRP pipes. This study proposes a novel stress reduction method using an asymmetric layup, and demonstrates a crack-free thick CFRP pipe.	2107-1 A RATE-TYPE CRYSTALLIZATION KINETICS MODEL FOR PROCESS MODELLING OF PEEK AND PEEK MATRIX COMPOSITES Kamyar Gordnian (The University of British Columbia), Anoush Poursartip (The University of British Columbia) A rate type modelling ap- proach is presented which is capable of predicting the degree of crystallinity during processing of carbon fibre re- inforced PEEK composites.	2108-1 RESIDUAL PROPERTIES AND DAMAGE EVOLUTION OF FLAX-EPOXY COMPOSITES SUBJECTED TO FATIGUE LOADING Farida Bensadoun (KU Leuven), Ignaas Verpoest (KU Leuven), Aart Willem Van Vuure (KU Leuven) The present study focuses on the characterization of the residual properties of flax- epoxy composites subjected to fatigue loading as well as the damage development.	THE MECHANICAL PROPERTIES OF UNSIZED CARBON FIBRE /EPOXY COMPOSITES <u>Kate O'Flynn</u> (University College Dublin), Denis Dowling (Dublin)	2110-1 EFFECT OF RELATIV DENSITY ON SHOCK WAVE SPEED OF CELLULAR MATERIAL UNDER DYNAMIC IMPACT Shilong Wang (University of Science and Technology of China), Yuanyuan Ding (University of Science and Technology of China), Changfeng Wang (University of Science and Technology of China), Zhijun Zheng (University of Science and Technology of China), Jilin Yu (University of Science and Technology of China) We investigated the dynamic mechanical behavior of closed-cell metallic foam un- der high constant-velocity im pact and found that the shocl wave speed increases linearf with the relative density.
15:20	EFFICIENT ASSEMBLY OF AERONAUTICAL COMPOSITE STRUCTURES Mathilda Karlsson Hagnell (Lightweight structures), Malin Åkermo (Lightweight structures) This research discusses cost implications and trends of a generic wing box with regards to integration and mechanical assembly. Costs are defined using a previously developed cost estimation model.	2102-2 APPLICATION OF THE EMBEDDED ELEMENT TECHNIQUE TO THE MODELLING OF NANO-ENGINEERED FIBER- REINFORCED COMPOSITES Anna Matveeva (KU Leuven), Valentin Romanov (KU Leuven), Stepan Lomov (KU Leuven), Larissa Gorbatikh (KU Leuven) The Embedded Element technique is applied to model fiber-reinforced composites with carbon nanotubes. Its advantages and limitations for micro-stress analysis are discussed.	2103-2 HYDROGEL CORE FLEXIBLE MATRIX COMPOSITE (H-FMC) ACTUATORS Michael Dicker (University of Bristol), Paul Weaver (University of Bristol), Ian Bond (University of Bristol), Ian Bond (University of Bristol), Jonathan Rossiter (University of Bristol), Charl Faul (University of Bristol) H-FMC actuators are mus- cle-like devices powered by soft, pH-responsive hydrogels. This presentation explores how anisotropic composites and hydrogel micro-structure effect H-FMC performance.	2104-2 A STUDY ON THE BIAXIAL FATIGUE OF E-GLASS/EPOXY LAMINATES UNDER NORMAL AND SHEAR LOADINGS Pankai Mallick (University of Michigan-Dearborn), Raghuram Mandapati (University of Michigan- Dearborn) Fatigue behavior of a fiber reinforced polymer laminate under a combination of normal and shear stresses is determined. The role of shear stress on biaxial fatigue life is demonstrated.		2106-2 EFFECT OF BUCKLES MESOSCOPIC DEFECTS ON THE COMPOSITE PROPERTIES Samir Allaoui (Orleans University), Madjid Haddad (UTC), Romain Agogue (ONERA), Kamel Khellii (UTC), Gilles hivet (Orleans University), Pierre Beauchene (ONERA), Zoheir Aboura (UTC) The aim of this study is to evaluate the effect of meso- scopic defects of shaping processes on composite. Specimens with calibrated defects were fabricated and then tested and compared to healthy ones.	3D FINITE ELEMENT SIMULATION OF THERMOPLASTIC COMPOSITE INDUCTION WELDING Miro Duhovic (Institut für Verbundwerkstoffe GmbH-Erwin-Schrödinger- StrGebäude 58), Pierre L'Eplattenier (Livermore Software Technology Corporation-7374 Las Positas Road), Inaki Caldichoury (Livermore Software Technology Corporation-7374 Las Positas Road), Joachim Hausmann (Institut für	2108-2 CALCIUM PHOSPHATE CEMENT REINFORCED WITH NATURAL CELLULOSIC FIBERS FROM DIFFERENT SOURCES <i>Piere Leuret</i> (Université de Nantes), Franck Tancret (Université de Nantes), Paul Pilet (Laboratoire d'ingénierie osteoarticulaire et dentaire), Jean-Michel Bouler (université de Nantes), Bruno Bujoli (uni- versité de Nantes) Mechanical properties of a novel injectable biomaterial cement for bone defect filling reinforced with natural cellulosic fibers from different sources.	FIBRE/MATRIX ADHESION Linden Servinis (Deakin University), Luke Henderson (Deakin University), Bronwyn Fox (Deakin University), Mickey Huson (CSIRO), Thomas Gengenbach (CSIRO)	2110-2 THE INFLUENCE OF REDUCING THE CELL SIZE TO THE NANOSCALE ON THE PHYSICAL PROPERTIES OF POLYMERIC NANOCELLULAF FOAMS. Belen Notario (University of Valladolid), Javier Pinto (Ittituto Italiano di Tecnologia (ITT), <u>Miquel Angel Rodriguez</u> <u>Perez</u> (University of Valladolid) The paper demonstrates that reducing the cell size to the nanoscale is a successful strategy to improve several physical properties of cellular polymers.

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omposites and Fibre     Base of the second sec	ased Composites 4 112-1 GRAPHENE VOVEN FABRICS/EPOXY OMPOSITES WITH XCEPTIONAL FRACTURE OUGHNESS AND MECHANICAL PROPERTIES ULIU (The Hong Kong Iniversity of Science and	Tomography 3 2113-1 FAILURE MECHANISMS IN CENOSPHERE EPOXY SYNTACTIC FOAMS UNDER	and Damage - Micromechanics 4	2115 Fracture and Damage - Laminate Scale 4 2115-1 NUMERICAL ANALYSIS ON OPEN-HOLE	2116 Fracture and Damage - Delamination 4 KEYNOTE	2117 Pressure Vessels and Piping 1	2118 Joints - Design, Manufacturing and Testing 4	2119 Applications - Aerospace 3	2120 Dynamic Fracture 1	
omposites and Fibre     Base of the second sec	ased Composites 4 112-1 GRAPHENE VOVEN FABRICS/EPOXY OMPOSITES WITH XCEPTIONAL FRACTURE OUGHNESS AND MECHANICAL PROPERTIES ULIU (The Hong Kong Iniversity of Science and	Tomography 3 2113-1 FAILURE MECHANISMS IN CENOSPHERE EPOXY SYNTACTIC FOAMS UNDER	Micromechanics 4 2114-1 EXPERIMENTAL AND NUMERICAL	Scale 4 2115-1 NUMERICAL		and Piping 1	Manufacturing and			
111-1 SIMULATION       21         IETHODOLOGY FOR       W         WPACT DAMAGE AND       CL         AILURE OF AERO-ENGINE       COMPONENTS MADE OF         OMPONENTS MADE OF       TO         EXTILE COMPOSITES       M         University of Nottingham), Cong Pan       University of Nottingham), Te         Tian-Hong Yu (University of Iotingham), Weiyi Kong       of         University of Nottingham), Weiyi Kong       of	VOVEN FABRICS/EPOXY OMPOSITES WITH XCEPTIONAL FRACTURE OUGHNESS AND IBCHANICAL PROPERTIES In Lin (The Hong Kong Iniversity of Science and	2113-1 FAILURE Mechanisms in Cenosphere Epoxy Syntactic Foams under	2114-1 EXPERIMENTAL AND NUMERICAL	2115-1 NUMERICAL	KEYNOTE		Testing 4			
IETHODOLOGY FOR     W       MPACT DAMAGE AND     CL       AILURE OF AERO-ENGINE     TO       JOMPONENTS MADE OF     TO       EXTILE COMPOSITES     M       Ideas Sitnikova (University f Nottingham), Qing Pan     U       Jniversity of Nottingham),     Te       Tian-Hong Yu (University of Iotitingham), Weiyi Kong     of       University of Nottingham),     V	VOVEN FABRICS/EPOXY OMPOSITES WITH XCEPTIONAL FRACTURE OUGHNESS AND IBCHANICAL PROPERTIES In Lin (The Hong Kong Iniversity of Science and	MECHANISMS IN CENOSPHERE EPOXY SYNTACTIC FOAMS UNDER	AND NUMERICAL		KEYNOTE		locally .			
WPACT DAMAGE AND AILURE OF AERO-ENGINE OMPONENTS MADE OF EXTILE COMPOSITES     EX M <i>Value Composites</i> Xu <i>Idea Sithikava</i> (University f Nottingham), Qing Pan University of Nottingham), Tean-Hong Yu (University of Iotitingham), Weiyi Kong University of Nottingham),     Te	COMPOSITES WITH XCEPTIONAL FRACTURE OUGHNESS AND MECHANICAL PROPERTIES (u Liu (The Hong Kong Iniversity of Science and	CENOSPHERE EPOXY SYNTACTIC FOAMS UNDER		ANALYSIS ON OPEN-HOLE	INCTINOTE .	2117-1 PROGRESSIVE	2118-1 DOMINANT EFFECT	2119-1 EVALUATION OF	2120-1 MODELING	
AILURE OF AERO-ENGINE OMPONENTS MADE OF EXTILE COMPOSITES Iena Sitnikova (University f Nottingham), Qing Pan University of Nottingham), Ten Tian-Hong Yu (University of Iotitingham), Weiyi Kong University of Nottingham), Xi	XCEPTIONAL FRACTURE OUGHNESS AND IECHANICAL PROPERTIES (u Liu (The Hong Kong Iniversity of Science and	SYNTACTIC FOAMS UNDER	ANALYSIS OF THE PEEL			FAILURE ANALYSIS OF	OF END DISTANCES ON	LIGHTNING DAMAGE	HYPERVELOCITY-IMPACT	
OMPONENTS MADE OF EXTILE COMPOSITES         TC M           lena Sithikova (University f Nottingham), Qing Pan University of Nottingham), Taan-Hong Yu (University of lottingham), Weiyi Kong University of Nottingham), Xit         Te Composition	OUGHNESS AND MECHANICAL PROPERTIES (u Liu (The Hong Kong Iniversity of Science and		EDAOTUDE ENEDOV	CARBON-FIBRE/EPOXY	2116-1	CARBON/EPOXY FILAMENT	GUARDED FAILURE OF	RESISTANCE OF PANI-	RESPONSE OF CFRP-AL/HC	
EXTILE COMPOSITES M <u>ilena Sitnikova</u> (University f Nottingham), Uing Pan University of Nottingham), Tian-Hong Yu (University of lottingham), Weiyi Kong University of Nottingham), Xi	AECHANICAL PROPERTIES ( <u>u Liu</u> (The Hong Kong Iniversity of Science and	UNIAAIAL GUINF RESSIUN	FRACTURE ENERGY BETWEEN ALUMINA	STITCHED LAMINATES WITH DIFFERENT STITCH	CHARACTERIZATION OF FATIGUE R-CURVES BASED	WOUND COMPOSITE TUBES UNDER BIAXIAL	COMPOSITE BOLTED JOINTS	BASED CONDUCTIVE THERMOSETTING	LAMINATE Vaibhav A Phadnis (The	
Iena Sitnikova (University f Nottingham), Qing Pan         XII           Jniversity of Nottingham), Tian-Hong Yu (University of Iotitingham), Weiyi Kong         (I           Joitingham), Weiyi Kong         of           Jniversity of Nottingham), XII         XII	<u>(u Liu</u> (The Hong Kong Iniversity of Science and		CERAMICS AND GLASS	ORIENTATION	ON GMAX-CONSTANT	LOADING	Fengrui Liu (Beihang	COMPOSITE	University of Sheffield),	
f Nottingham), Qing Pan University of Nottingham), Ter ian-Hong Yu (University of lottingham), Weiyi Kong University of Nottingham), Xii	Iniversity of Science and		FIBRE-REINFORCED	<u>Prabij Joshi</u> (Tokyo	DELAMINATION TESTS IN	José Humberto Almeida Jr.	University), Jianyu Zhang	Yoshiyasu Hirano (Japan	Vadim Silberschmidt	
University of Nottingham), Te Tian-Hong Yu (University of lottingham), Weiyi Kong of University of Nottingham), Xi	-		COMPOSITES	Metropolitan University),	CF/PEEK LAMINATES	(UFRGS - Federal University	(China), Libin Zhao (Beihang	Aerospace Exploration	(Loughborough University),	
lottingham), Weiyi Kong of University of Nottingham), Xi	ευπούσχη, λιτηπη σαπ	Technological University),	Tom Thorvaldsen	Satoshi Morooka (Tokyo	<u>Masaki Hojo</u> (Kyoto	of Rio Grande do Sul), Volnei	University)	Agency), Tomohiro Yokozeki	Anish Roy (Loughborough	
University of Nottingham), Xi	The Hong Kong University	Tong Liu (Singapore	(Norwegian Defence	Metropolitan University),	University), Takahira Aoki	Tita (Engineering School		(The University of Tokyo),	University)	
	f Science and Technology),	Institute of Manufacturing	Research Establishment	Atsushi Kondo (e-Xtream	(The University of Tokyo)	of São Carlos - University	Influence of end distances	Teruya Goto (Yamagata		
iantao Zhao (University of Ui	(iuyi Lin (The Hong Kong	Technology)	(FFI)), Luiz Kawashita	Engineering-MSC Software		of São Paulo), Hugo	on failure of composite	University), Tatsuhiro	A response of a composite	
lettingham) Chuguang Li Ta	Iniversity of Science and	Cumboolio foomo houo	(University of Bristol),	Company), Hikaru Hoshi	The true growth law which	Faria (INEGI - Institute of	double-lap single-bolt joints	Takahashi (Yamagata	structure with CFRP sheets	
0 // 0 0	0,0,0	Syntactic foams have become attractive in	Bernt Brønmo Johnsen (Norwegian Defence	(Japan Aerospace	is not affected by fiber	Mechanical Engineering and Industrial Management).	was studied by tests and	University), Danna Qian (Mitsubishi Plastics-Inc.),	and aluminium-foam core to	
		transpotation applications.	Research Establishment	Exploration Agency (JAXA)), Naoyuki Watanabe (Tokyo	bridging was obtained from a series of Gmax-constant	António Margues (FEUP -	PDM analyses. Lateral gaps between laminates and	Shouji Itou (Mitsubishi	hypervelocity impact (with velocity up to 1 km/s and	
		This work investigated the	(FFI)), Tyler Paul Jones	Metropolitan University)	fatigue tests. Then, the	Faculty of Engineering of the		Plastics-Inc.), Yuichi	projectile radius 3 mm) was	
		behaviour and the associ-	(Norwegian Defence	,	increase in the crack growth		were discovered.	Ishida (Japan Aerospace	studied with a developed 3D	
	-	ated failure mechanisms in	Research Establishment	Open-hole woven stitched	resistance was evaluated.	Amico (UFRGS - Federal		Exploration Agency),	FE model.	
		syntactic foams subjected to	(FFI)), Dennis Bo Rahbek	laminate showed a good		University of Rio Grande		Toshio Ogasawara (Japan		
		uniaxial compression.	(Norwegian Defence	agreement with experimen-		do Sul)		Aerospace Exploration		
	lang-Kyo Kim (The Hong		Research Establishment	tal stress-strain distribution.		A domogo model is de		Agency), Masaru Ishibashi		
	(ong University of Science and Technology)		(FFI))	Meanwhile, stress con- centration factor has been		A damage model is de- veloped for predicts the		(GSI Creos)		
onninercial Alician Engine) ai	nu rechnology)		The fixed arm peel test and	improved by 14% with lon-		mechanical behavior of		Newly developed PANI-		
multi-scale modelling Gr	raphene woven fabric		FEM using CZM have been	gitudinally than transve		composite tubes subjected		based conductive ther-		
	GWF) is synthesized by		employed to investigate the	5		to internal pressure. Failure		mosetting composite is		
redicting the constitutive a	template-based CVD		failure between an alumina			in matrix by transverse		proposed to improve a		
	nethod. The GWF/epoxy		ceramic and a GFRP com-			tensile stress and in-plane		lightning damage resistance		
	omposites exhibit excellent		posite under quasi-static			shear were noticed.		and their applicability was		
	lectrical conductivities,		loading.					confirmed with a simulated		
	igh mechanical properties nd fracture toughness.							lightening test.		
		2113-2 APPLICATION	2114-2	2115-2 COMPOSITE	-	2117-2 A NEW FIBER-	2118-2 USE OF	2119-2 LASER REMOVAL	2120-2 STRAIN RATE	
			CHARACTERISATION	SANDWICH STRUCTURE		BUNDLE BASED MODELING		OF RAC COATING FROM	DEPENDENT TENSILE	
OVEN COMPOSITE: BA	ASED COMPOSITES	MICRO-TOMOGRAPHY TO	OF VOIDS AND THEIR	WITH A NOTCH IN		APPROACH FOR THE	FILM SENSORS TO	COMPOSITE MATERIAL	PROPERTIES OF INJECTION	
N SITU X-RAY MICRO- Ju	unjun Shang (College of	THE STUDY OF DAMAGE	INFLUENCE ON DAMAGE	BENDING/TORSION: TEST		ANALYSIS OF COMPOSITE	MEASURE STRESS	SURFACES	MOLDED LONG GLASS	
			PROPAGATION IN RESIN	AND SIMULATION UP TO		PRESSURE VESSELS	DISTRIBUTION WITHIN A	Tong Zhang (Beijing Institute	FIBER REINFORCED	
		OF THERMOSTRUCTURAL	TRANSFER MOULDED	RUPTURE		Jörg Multhoff (ISATEC	LAP JOINT	of Aeronautical Materials),	THERMOPLASTICS	
			CARBON FIBRE	Olivier Montagnier (French		GmbH)	<u>Aikaterini Deligianni</u>	Yan Zhao (Beihang	Taesung Kim (Waseda	
		<u>Olivier Caty</u> (LCTS), Mathieu Herbreteau (LCTS), Francis	REINFORCED POLYMERS Sanjay Sisodia (Uppsala	Air Force), Jean-Paul Charles (CNRS), Gabriel Ever		A new approach motivated	(Newcastle University), George Kotsikos (newcastle	University), Zhiyong Wang (Beijing Institute of	University), Yoshihiko Arao (Doshisha University),	
<i></i>		Rebillat (LCTS), Gérard	<u>Sanjay Sisouna</u> (oppsaia University), Mark	(CNRS), Christian Hochard		by the tenets of netting	university), Jack Michael	Aeronautical Materials),	Norihiko Taniguchi	
		Vignoles (LCTS)	Mavrogordato (University	(CNRS), Noël Lahellec		analysis and based on a	Hale (Newcastle University)	Pengrui Liu (Beijing Institute	(ASICS Corporation),	
	echnology -Beijing	_ , ,	of Southampton), Andrew	(CNRS)		finite element formulation		of Aeronautical Materials),	Tsuyoshi Nishiwaki	
	Iniversity Of Technology)		George (Brigham Young			with an embedded fib-	A novel approach of obtain-	Shengrong Xiao (Beijing	(ASICS Corporation), Norio	
akotoarisoa (SNECMA)		nomena (mechanical and	University), Daniel Bull	The aim of this work is to		er-bundle model is being	ing quantitative, interfacial	Institute of Aeronautical	Hirayama (NITTO BOSEKI	
		chemical) are 3D and inside	(University of Southampton),	validate experimentally		explored.	strength information in	Materials)	CO.), Atsushi Hosoi (Waseda	
		the material. µCT is thus	Mark Spearing (University	a CDM model for woven			adhesively bonded joints	posting removal effects	University), Hiroyuki Kawada	
nermal loading of 3D woven ba olymer composite mate- tu		applied to the study of fail- ure for mechanical loading	of Southampton), Kristofer Gamstedt (Uppsala	materials on a structural part consisting of a large			is proposed, using piezo- electric thick film sensors	coating removal effects of three methods were	(Waseda University)	
		and to the oxidation of self	University)	sandwich notched specimen			embedded into the overlap	compared, and mechanical	Mechanical properties and	
nicro-tomograph and strain co	<b>.</b> .	healing phases.		loaded in static bending/			area of the bond	properties and surface	strain rate dependency of	
	alculation and time cost		This study focuses on the	torsion.				morphology of composite	injection molded long glass	
	re reduced remarkably.		formation of voids in resin					substrate after paint remov-	fiber reinforced thermoplas-	
			infused carbon composites					al processes were tested.	tics under impact loading	
			and their effect on the dam-						were investigated.	
			age development to final							
			failure during impact and fa-							
			tigue using X-ray computed							
			tomography.							

#### Scientific programme · Tuesday 21 July

	Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
15:40	2101-3 THE	2102-3 HIGH PERFORMANCE	2103-3 HOW HEAT	2104-3 FATIGUE STRENGTH	2105-2 EFFECT OF STEERING	2106-3 A NEW DEVICE FOR	2107-3 COMPRESSION	2108-3 INVESTIGATION OF	2109-3 THE INFLUENCE OF A	2110-3 RVE MODELLING OF
		NANO AND HIERARCHICAL	TREATMENT AFFECTS THE	PREDICTION OF BOLTED	LIMIT CONSTRAINTS ON	THE MEASUREMENT OF	MOLDING 3D-CAE OF	THE BEHAVIOUR OF FLAX		DEFORMATION AND FAILURE
		COMPOSITES	CHROMATIC RESPONSE	JOINT STRUCTURES	THE PERFORMANCE OF	DIMENSIONAL VARIATIONS	DISCONTINUOUS LONG	FIBRE REINFORCED EPOXY	TREATMENT ON THE	BEHAVIOUR OF CLOSED
		Tomi Herceg (Imperial College	OF CARBON NANOTUBE	OF CARBON FIBRE	VARIABLE STIFFNESS	OF ANISOTROPIC	FIBER REINFORCED	COMPOSITES IN HUMID		CELL RIGID POLYMER
			- POLYDIACETYLENE	REINFORCED POLYMER	LAMINATES	COMPOSITE MATERIALS	POLYAMIDE 6 - INFLUENCE	CONDITIONS	POLYMER/METAL HYBRIDS:	FOAMS
		London), Emile Greenhalgh								
	ITS EFFECT ON LIFE CYCLE	(Imperial College London),	COMPOSITES TO	COMPOSITE BASED ON THE	<u>Daniël Peeters</u> (Delft	DURING CURE	ON CAVITY FILLING AND		ADHESION BEHAVIOUR AND	Ralf Schlimper (Fraunhofer
		Alexander Bismarck (Imperial	ELECTRICAL STIMULUS	MICROMECHANICS	University of Technology),	Mael Péron (Laboratoire de	DIRECT FIBER SIMULATIONS	Kevin Hendrickx (KU Leuven),	POLYMER DYNAMICS.	Institute for Mechanics
	DOOR LIGHTWEIGTING	College London), Milo Shaffer	<u>Reinack Hansen</u> (Nanyang	Hongneng Cai (Xi'an Jiaotong	Mostafa Abdalla (Delft	Thermocinétique de Nantes	OF VISCOSITY FITTING	Ignace Verpoest (KU Leuven),	Marieke Fuellbrandt	of Materials IWM), Irene
	Deborah Sunter (U.S.	(Imperial College London),	Technological University),	University ), Wangnan LI (Xi'an	University of Technology)	- UMR CNRS 6607), Vincent	METHODS -	Aart Willem Van Vuure (KU	(Technische Universitaet	Vecchio (Fraunhofer Institute
	Department of Energy), Joe	David Anthony (London)	Jinglei Yang (Nanyang	Jiaotong University)		Sobotka (Laboratoire de	Masatoshi Kobayashi	Leuven)	Berlin-Stranski-Laboratorium	for Industrial Mathematics
	Cresko (U.S. Department of		Technological University),	3	A method to optimise manu-	Thermocinétique de Nantes	(Honda R&D CoLtd.), Koji		für Physikalische und	ITWM), Katja Schladitz
		A powder based prepregging	Lianxi Zheng (Khalifa	The theory of micro-mechan-	facturable variable stiffness	- UMR CNRS 6607). Nicolas	Dan (Honda R&D CoLtd.),		Theoretische Chemie	(Fraunhofer Institute for
	037	method was adapted to	University)	ics of failure (MMF) is ex-	laminates is shown and used	Boyard (Laboratoire de	Tsuyoshi Baba (Honda R&D		). Andreas Schoenhals	Industrial Mathematics ITWM),
			University)	· · · ·					//	
	a proprie pre la construction de la	engineer composite with	D., 1	tended to analyze the fatigue	to study the influence of	Thermocinétique de Nantes	CoLtd.), Daisuke Urakami		(Bundesanstalt fuer	Ralf Schaeuble (Fraunhofer
		matrix heterogeneity. The na-		progressive failure and predict		- UMR CNRS 6607), Steven	(Toray Engineering-Co.)		Materialforschung und -prue-	Institute for Mechanics of
		no-toughened materials have	improve stacking interactions	the strength for the bolted	on performance. Examples	Le Corre (Laboratoire de			fung), Regine von Klitzing	Materials IWM)
	light duty vehicle door with	at least 50 vol% fibres and	between PDA and MWCNTs	joint structures of carbon fibre	include buckling and strength	Thermocinétique de Nantes -	For compression molding CAE		(Technische Universitaet	
	a carbon fiber reinforced	could be used in structural	due to intercalation of	reinforced polymer (CFRP)	design.	UMR CNRS 6607)	of L-FRTP, a suitable method		Berlin-Stranski-Laboratorium	RVE modelling of PMI foam
	polymer door for vehicle light-	applications.	monomers between MWCNT	composite.			of viscosity measurement		für Physikalische und	by 3d random Laguerre tes-
	weighting.		bundles, improving the elec-			An original device measuring	and equation fitting has been		Theoretische Chemie)	sellation which was adapted
	roigitailigi		trochromic response in these			chemical shrinkage and ther-	proposed. Cavity filling and			to the cell size distribution of
						mal expansion coefficients	direct fiber simulations were		Polymor/motol bybrido oro	
			composites.						Polymer/metal hybrids are	the real foam. Experimental
						of anisotropic composite	examined by the method.		characterized with regard to	investigation by in situ X-ray
						materials along in-plane and			their adhesion behaviour and	computed tomography.
						through-thickness directions			polymer properties before and	
						during cure is presented.			after corrosion testing down	
									to a (sub)microscopic scale.	
16.00	2101-4 STUDY ON HYBRID	2102-4 ATMOSPHERIC	2103-4 FIBER REINFORCED	2104-4 CRACKING AND	2105-3 AN APPROXIMATE	2106-4 DETERMINATION OF	2107-4 MODELLING THE	2108-4 EFFECT OF THERMAL	2109-4 FINITE ELEMENT	
10.00		DC PLASMA PROCESSING	COMPOSITES WITH ZINC	DELAMINATION OF CROSS-	ANALYTIC SOLUTION	RESIDUAL STRESSES IN A	GEOMETRIC VIARIABILITY	TREATMENT ON THE	ANALYSIS OF INTERPHASES	
	CARBON FIBRE REINFORCED		OXIDE PIEZOELECTRIC	AND ANGLE-PLY GFRP	FOR THE STRESSES AND	LAMINATED THERMOSET	OF 3D WOVEN GLASS FIBRE	INTERFACIAL PROPERTIES	PROPERTIES: A CRUCIAL	
		NANOCOMPOSITE	NANOWIRES FOR	BENDING SPECIMENS	DISPLACEMENTS OF THIN-	COMPOSITE USING THE	FABRIC AND ITS EFFECTS	OF FLAX FIBERS.	PART IN THE DEGRADATION	
		Dan Sun (Queen's University	STRUCTURAL HEALTH	UNDER VERY HIGH CYCLE	WALLED COMPOSITE BEAMS		ON PERMEABILITY	Monica Francesca Pucci	OF A UD COMPOSITES	
		Belfast), Yazi Liu (Nanjing	MONITORING AND	FATIGUE LOADING	WITH MONO-SYMMETRIC	METHOD				
							Xiantao Zhao (University of	(Ecole des Mines de Saint-	Lenaik BELEC (University	
	CO ITD) Tatauna Tanaka	University), Sadegh Askari	ENHANCED INTERLAMINAR	Till Julian Adam (Technische	CROSS-SECTIONS	Michael Gower (National	Nottingham), Andrew Long	Etienne), <u>Pierre-Jacques</u>	of Toulon), Yoann JOLIFF	
	COLTD.), Tatsuya Tanaka									
		University), Sadegh Askari	ENHANCED INTERLAMINAR	Till Julian Adam (Technische	CROSS-SECTIONS	Michael Gower (National	Nottingham), Andrew Long	Etienne), <u>Pierre-Jacques</u>	of Toulon), Yoann JOLIFF	
	(Dohshisha Univ.)	University), Sadegh Askari (University of Ulster), Jenish	ENHANCED INTERLAMINAR STRENGTH	<u>Till Julian Adam</u> (Technische Universität Braunschweig),	CROSS-SECTIONS SUBJECTED TO BENDING	<u>Michael Gower</u> (National Physical Laboratory), Richard	Nottingham), Andrew Long	Etienne), <u>Pierre-Jacques</u> Liotier (Ecole des Mines de	of Toulon), Yoann JOLIFF (University of Toulon), Than	
	(Dohshisha Univ.)	University), Sadegh Áskari (University of Ulster), Jenish Patel (University of Ulster), Manuel Macias-Montero	ENHANCED INTERLAMINAR STRENGTH Sean Offenberger (Virginia Tech), Ayoub Boroujeni	<u>Till Julian Adam</u> (Technische Universität Braunschweig), Peter Horst (Technische	CROSS-SECTIONS SUBJECTED TO BENDING <u>Marko Vukasovic</u> (University of Split-Faculty of Electrical	<u>Michael Gower</u> (National Physical Laboratory), Richard Shaw (National Physical Laboratory), Louise Wright	Nottingham), Andrew Long (University of Nottingham) A 3D woven ply to ply angle	Etienne), <u>Pierre-Jacques</u> <u>Liotier</u> (Ecole des Mines de Saint-Etienne), David Seveno (Katholieke Univ Leuven),	of Toulon), Yoann JOLIFF (University of Toulon), Than Hoi NGUYEN (University of Danang), Jean François	
	(Dohshisha Univ.) This study relates to the	University), Sadegh Askari (University of Ulster), Jenish Patel (University of Ulster), Manuel Macias-Montero (University of ulster), Richao	ENHANCED INTERLAMINAR STRENGTH Sean Offenberger (Virginia Tech), Ayoub Boroujeni (Virginia Tech), Anahita Emami	<u>Till Julian Adam</u> (Technische Universität Braunschweig), Peter Horst (Technische Universität Braunschweig)	CROSS-SECTIONS SUBJECTED TO BENDING <u>Marko Vukasovic</u> (University of Split-Faculty of Electrical Engineering-Mechanical	<u>Michael Gower</u> (National Physical Laboratory), Richard Shaw (National Physical Laboratory), Louise Wright (National Physical Laboratory),	Nottingham), Andrew Long (University of Nottingham) A 3D woven ply to ply angle interlock glass fabric was	Etienne), <u>Pierre-Jacques</u> <u>Liotier</u> (Ecole des Mines de Saint-Etienne), David Seveno (Katholieke Univ Leuven), Carlos Fuentes (Katholieke	of Toulon), Yoann JOLIFF (University of Toulon), Than Hoi NGUYEN (University of	
	<i>(Dohshisha Univ.)</i> This study relates to the hybrid injection moulding. This	University), Sadegh Áskari (University of Ulster), Jenish Patel (University of Ulster), Manuel Macias-Montero (University of ulster), Richao Zhang (Zhejiang University),	ENHANCED INTERLAMINAR STRENGTH Sean Offenberger (Virginia Tech), Ayoub Boroujeni (Virginia Tech), Anahita Emami (Virginia Tech), Marwan Al-	<u>Till Julian Adam</u> (Technische Universität Braunschweig), Peter Horst (Technische Universität Braunschweig) A high frequency bending test	CROSS-SECTIONS SUBJECTED TO BENDING <u>Marko Vukasovic</u> (University of Split-Faculty of Electrical Engineering-Mechanical Engineering and Naval	<u>Michael Gower</u> (National Physical Laboratory), Richard Shaw (National Physical Laboratory), Louise Wright (National Physical Laboratory), Jeannie Urquhart (National	Nottingham), Andrew Long (University of Nottingham) A 3D woven ply to ply angle interlock glass fabric was characterized with X-ray	Etienne), <u>Pierre-Jacques</u> <u>Liotier</u> (Ecole des Mines de Saint-Etienne), David Seveno (Katholieke Univ Leuven), Carlos Fuentes (Katholieke Univ Leuven), Aart Van Vuure	of Toulon), Yoann JOLIFF (University of Toulon), Than Hoi NGUYEN (University of Danang), Jean François CHAILAN (University of Toulon)	
	(Dohshisha Univ.) This study relates to the hybrid injection moulding. This paper shows the influences	University), Sadegh Áskari (University of Ulster), Jenish Patel (University of Ulster), Manuel Macias-Montero (University of ulster), Richao Zhang (Zhejiang University), Davide Mariotti (University	ENHANCED INTERLAMINAR STRENGTH Sean Offenberger (Virginia Tech), Ayoub Boroujeni (Virginia Tech), Anahita Emamii (Virginia Tech), Marwan Al- Haik (Virginia Tech), <u>Michael</u>	<u>Till Julian Adam</u> (Technische Universität Braunschweig), Peter Horst (Technische Universität Braunschweig) A high frequency bending test rig is used to investigate fa-	CROSS-SECTIONS SUBJECTED TO BENDING Marko Vukasovic (University of Split-Faculty of Electrical Engineering-Mechanical Engineering and Naval Architecture), Radoslav	<u>Michael Gower</u> (National Physical Laboratory), Richard Shaw (National Physical Laboratory), Louise Wright (National Physical Laboratory), Jeannie Urquhart (National Physical Laboratory), Jon	Nottingham), Andrew Long (University of Nottingham) A 3D woven ply to ply angle interlock glass fabric was characterized with X-ray micro-CT technology, and	Etienne), <u>Pierre-Jacques</u> <u>Liotier</u> (Ecole des Mines de Saint-Etienne), David Seveno (Katholieke Univ Leuven), Carlos Fuentes (Katholieke Univ Leuven), Aart Van Vuure (Katholieke Univ Leuven),	of Toulon), Yoann JOLIFF (University of Toulon), Than Hoi NGUYEN (University of Danang), Jean François CHAILAN (University of Toulon) The evolutions of interphases	
	(Dohshisha Univ.) This study relates to the hybrid injection moulding. This paper shows the influences of the temperature of inserted	University), Sadegh Áskari (University of Ulster), Jenish Patel (University of Ulster), Manuel Macias-Montero (University of ulster), Richao Zhang (Zhejiang University), Davide Mariotti (University of Ulster), Paul Maguire	ENHANCED INTERLAMINAR STRENGTH Sean Offenberger (Virginia Tech), Ayoub Boroujeni (Virginia Tech), Anahita Emami (Virginia Tech), Marwan Al-	<u>Till Julian Adam</u> (Technische Universität Braunschweig), Peter Horst (Technische Universität Braunschweig) A high frequency bending test rig is used to investigate fa- tigue of GFRP flat specimens	CROSS-SECTIONS SUBJECTED TO BENDING Marko Vukasovic (University of Split-Faculty of Electrical Engineering-Mechanical Engineering and Naval Architecture), Radoslav Pavazza (University of	<u>Michael Gower</u> (National Physical Laboratory), Richard Shaw (National Physical Laboratory), Louise Wright (National Physical Laboratory), Jeannie Urquhart (National Physical Laboratory), Jon Hughes (National Physical	Nottingham), Andrew Long (University of Nottingham) A 3D woven ply to ply angle interlock glass fabric was characterized with X-ray micro-CT technology, and the influence of geometrical	Etienne), <u>Pierre-Jacques</u> <u>Liotier</u> (Ecole des Mines de Saint-Etienne), David Seveno (Katholieke Univ Leuven), Carlos Fuentes (Katholieke Univ Leuven), Aart Van Vuure (Katholieke Univ Leuven), Sylvain Drapier (Ecole des	of Toulon), Yoann JOLIFF (University of Toulon), Than Hoi NGUYEN (University of Danang), Jean François CHAILAN (University of Toulon) The evolutions of interphases in a UD composite are charac-	
	(Dohshisha Univ.) This study relates to the hybrid injection moulding. This paper shows the influences of the temperature of inserted and injected materials on the	University), Sadegh Áskari (University of Ulster), Jenish Patel (University of Ulster), Manuel Macias-Montero (University of ulster), Richao Zhang (Zhejiang University), Davide Mariotti (University	ENHANCED INTERLAMINAR STRENGTH Sean Offenberger (Virginia Tech), Ayoub Boroujeni (Virginia Tech), Anahita Emami (Virginia Tech), Marwan Al- Haik (Virginia Tech), <u>Michael</u> <u>Philen</u> (Virginia Tech)	<u>Till Julian Adam</u> (Technische Universität Braunschweig), Peter Horst (Technische Universität Braunschweig) A high frequency bending test rig is used to investigate fa- tigue of GFRP flat specimens in the very high cycle fatigue	CROSS-SECTIONS SUBJECTED TO BENDING Marko Vukasovic (University of Split-Faculty of Electrical Engineering-Mechanical Engineering and Naval Architecture), Radoslav Pavazza (University of Split-Faculty of Electrical	<u>Michael Gower</u> (National Physical Laboratory), Richard Shaw (National Physical Laboratory), Louise Wright (National Physical Laboratory), Jeannie Urquhart (National Physical Laboratory), Jon Hughes (National Physical Laboratory), Sam Gnaniah	Nottingham), Andrew Long (University of Nottingham) A 3D woven ply to ply angle interlock glass fabric was characterized with X-ray micro-CT technology, and the influence of geometrical variability on permeability	Etienne), <u>Pierre-Jacques</u> <u>Liotier</u> (Ecole des Mines de Saint-Etienne), David Seveno (Katholieke Univ Leuven), Carlos Fuentes (Katholieke Univ Leuven), Aart Van Vuure (Katholieke Univ Leuven),	of Toulon), Yoann JOLIFF (University of Toulon), Than Hoi NGUYEN (University of Danang), Jean François CHAILAN (University of Toulon) The evolutions of interphases in a UD composite are charac- terized during natural tropical	
	(Dohshisha Univ.) This study relates to the hybrid injection moulding. This paper shows the influences of the temperature of inserted and injected materials on the adhesion of the insert-injec-	University), Sadegh Áskari (University of Ulster), Jenish Patel (University of Ulster), Manuel Macias-Montero (University of ulster), Richao Zhang (Zhejiang University), Davide Mariotti (University of Ulster), Paul Maguire (University of Ulster)	ENHANCED INTERLAMINAR STRENGTH Sean Offenberger (Virginia Tech), Ayoub Boroujeni (Virginia Tech), Anahita Emami (Virginia Tech), Marwan Al- Haik (Virginia Tech), <u>Michael</u> <u>Philen</u> (Virginia Tech) Fiber reinforced plastics with	<u>Till Julian Adam</u> (Technische Universität Braunschweig), Peter Horst (Technische Universität Braunschweig) A high frequency bending test rig is used to investigate fa- tigue of GFRP flat specimens in the very high cycle fatigue range. Cracking, delamination	CROSS-SECTIONS SUBJECTED TO BENDING Marko Vukasovic (University of Split-Faculty of Electrical Engineering-Mechanical Engineering and Naval Architecture), Radoslav Pavazza (University of Split-Faculty of Electrical Engineering-Mechanical	Michael Gower (National Physical Laboratory), Richard Shaw (National Physical Laboratory), Louise Wright (National Physical Laboratory), Jeannie Urquhart (National Physical Laboratory), Jon Hughes (National Physical Laboratory), Sam Gnaniah (National Physical Laboratory),	Nottingham), Andrew Long (University of Nottingham) A 3D woven ply to ply angle interlock glass fabric was characterized with X-ray micro-CT technology, and the influence of geometrical variability on permeability	Etienne), <u>Pierre-Jacques</u> <u>Liotier</u> (Ecole des Mines de Saint-Etienne), David Seveno (Katholieke Univ Leuven), Carlos Fuentes (Katholieke Univ Leuven), Aart Van Vuure (Katholieke Univ Leuven), Sylvain Drapier (Ecole des Mines de Saint-Etienne)	of Toulon), Yoann JOLIFF (University of Toulon), Than Hoi NGUYEN (University of Danang), Jean François CHAILAN (University of Toulon) The evolutions of interphases in a UD composite are charac- terized during natural tropical ageing. A correlation is made	
	(Dohshisha Univ.) This study relates to the hybrid injection moulding. This paper shows the influences of the temperature of inserted and injected materials on the adhesion of the insert-injec- tion interface.	University), Sadegh Áskari (University of Ulster), Jenish Patel (University of Ulster), Manuel Macias-Montero (University of ulster), Richao Zhang (Zhejiang University), Davide Mariotti (University of Ulster), Paul Maguire (University of Ulster) In this paper, we report	ENHANCED INTERLAMINAR STRENGTH Sean Offenberger (Virginia Tech), Ayoub Boroujeni (Virginia Tech), Anahita Emami (Virginia Tech), Marwan Al- Haik (Virginia Tech), <u>Michael.</u> <u>Philen</u> (Virginia Tech) Fiber reinforced plastics with ZnO nanowires is investigated	<u>Till Julian Adam</u> (Technische Universität Braunschweig), Peter Horst (Technische Universität Braunschweig) A high frequency bending test rig is used to investigate fa- tigue of GFRP flat specimens in the very high cycle fatigue range. Cracking, delamination and stiffness degradation is	CROSS-SECTIONS SUBJECTED TO BENDING Marko Vukasovic (University) of Split-Faculty of Electrical Engineering-Mechanical Engineering and Naval Architecture), Radoslav Pavazza (University of Split-Faculty of Electrical Engineering-Mechanical Engineering and Naval	<u>Michael Gower</u> (National Physical Laboratory), Richard Shaw (National Physical Laboratory), Louise Wright (National Physical Laboratory), Jeannie Urquhart (National Physical Laboratory), Jon Hughes (National Physical Laboratory), Sam Gnaniah (National Physical Laboratory), Roger Morrell (National	Nottingham), Andrew Long (University of Nottingham) A 3D woven ply to ply angle interlock glass fabric was characterized with X-ray micro-CT technology, and the influence of geometrical variability on permeability	Etienne), <u>Pierre-Jacques</u> <u>Liotier</u> (Ecole des Mines de Saint-Etienne), David Seveno (Katholieke Univ Leuven), Carlos Fuentes (Katholieke Univ Leuven), Aart Van Vuure (Katholieke Univ Leuven), Sylvain Drapier (Ecole des Mines de Saint-Etienne) Effect of thermal treatment	of Toulon), Yoann JOLIFF (University of Toulon), Than Hoi NGUYEN (University of Danang), Jean François CHAILAN (University of Toulon) The evolutions of interphases in a UD composite are charac- terized during natural tropical ageing. A correlation is made with bending tests which are	
	(Dohshisha Univ.) This study relates to the hybrid injection moulding. This paper shows the influences of the temperature of inserted and injected materials on the adhesion of the insert-injec- tion interface.	University), Sadegh Áskari (University of Ulster), Jenish Patel (University of Ulster), Manuel Macias-Montero (University of ulster), Richao Zhang (Zhejiang University), Davide Mariotti (University of Ulster), Paul Maguire (University of Ulster)	ENHANCED INTERLAMINAR STRENGTH Sean Offenberger (Virginia Tech), Ayoub Boroujeni (Virginia Tech), Anahita Emami (Virginia Tech), Marwan Al- Haik (Virginia Tech), <u>Michael</u> <u>Philen</u> (Virginia Tech) Fiber reinforced plastics with	<u>Till Julian Adam</u> (Technische Universität Braunschweig), Peter Horst (Technische Universität Braunschweig) A high frequency bending test rig is used to investigate fa- tigue of GFRP flat specimens in the very high cycle fatigue range. Cracking, delamination	CROSS-SECTIONS SUBJECTED TO BENDING Marko Vukasovic (University of Split-Faculty of Electrical Engineering-Mechanical Engineering and Naval Architecture), Radoslav Pavazza (University of Split-Faculty of Electrical Engineering-Mechanical	Michael Gower (National Physical Laboratory), Richard Shaw (National Physical Laboratory), Louise Wright (National Physical Laboratory), Jeannie Urquhart (National Physical Laboratory), Jon Hughes (National Physical Laboratory), Sam Gnaniah (National Physical Laboratory),	Nottingham), Andrew Long (University of Nottingham) A 3D woven ply to ply angle interlock glass fabric was characterized with X-ray micro-CT technology, and the influence of geometrical variability on permeability	Etienne), <u>Pierre-Jacques</u> <u>Liotier</u> (Ecole des Mines de Saint-Etienne), David Seveno (Katholieke Univ Leuven), Carlos Fuentes (Katholieke Univ Leuven), Aart Van Vuure (Katholieke Univ Leuven), Sylvain Drapier (Ecole des Mines de Saint-Etienne)	of Toulon), Yoann JOLIFF (University of Toulon), Than Hoi NGUYEN (University of Danang), Jean François CHAILAN (University of Toulon) The evolutions of interphases in a UD composite are charac- terized during natural tropical ageing. A correlation is made	
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## Tuesday 21 July · Scientific programme

Meeting room 5	Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8
111-3 DEVELOPMENT OF	2112-3 CHLORINE-DOPED	2113-3 X-RAY CT IMAGING		2115-3 THE INFLUENCE OF		2117-3 DESIGN AND	2118-3 THROUGH	2119-3 RESEARCH ON	2120-3 MICRO AND	
ANALYTICAL MODEL	<b>GRAPHENE OXIDE/POLY</b>	OF DAMAGE UNDER IN-	DAMAGE EVOLUTION	FREE EDGES ON CURVED	RESISTANCE OF	ANALYSIS OF A MULTI-	THICKNESS REINFORCED	MULTI-PHYSICAL FIELD	MACROSCOPIC	
R TUBULAR BRAIDED	(VINYLIDENE FLUORIDE)	SITU LOADING	IN HIERARCHICALLY	BEAM STRENGTH	COMPOSITES USING	CELL SUBSCALE TANK	<b>CFRP/METAL JOINTS</b>	<b>COUPLING MECHANISM IN</b>	CHARACTERIZATION	
OMPOSITES	NANOCOMPOSITES:	Andrew Rhead (University of	STRUCTURED COMPOSITE	Timothy Fletcher (University	INCLINED Z-PINS	FOR LIQUID HYDROGEN	- THE IMPACT OF THE	TPS MATERIAL ABLATION	OF A-SMC UNDER HIGH	
<u>arrett Melenka</u> (University	EXCEPTIONAL DIELECTRIC		<u>Songyun Ma</u> (Institute	of Bath), Richard Butler	Beene M'membe (University	STORAGE	PINNING TECHNOLOGY	<u>Zhu Yanwei</u> (Harbin	SPEED TENSILE TEST	
<sup>f</sup> Alberta), Jason Carey	PROPERTIES		of Materials Research-	(University of Bath)	of Bristol), Sam Gannon	<u>Ilias Tapeinos</u> (DELFT	ON THE JOINT'S TENSILE	Institute of Technology),	Mohammadali SHIRINBAYAN	
Iniversity of Alberta)	<u>Ying Wu</u> (The Hong Kong	of Bath), Richard Butler	Helmholtz-Zentrum			UNIVERSITY OF	STRENGTH	Yi Fajun (Harbin Institute	(ARTS-ENSAM), Joseph	
	University of Science and	(University of Bath)	Geesthacht), Ingo Scheider	A new resin edge treatment	Yasaee (University of Bristol),		Ludwig Eberl (Technische	of Technology), Meng	Fitoussi (ENSAM), Fodil	
evelopment of a new	Technology), Xiuyi Lin (The		(Institute of Materials	for curved laminates is	Stephen Hallett (University	Koussios (DELFT	Universität München),	Songhe (Harbin Institute	MERAGHNI (ENSAM),	
eneralized analytical model	Hong Kong University of	In-situ X-ray CT reveals a	Research-Helmholtz-	developed. This improves	of Bristol), Ivana Partridge	UNIVERSITY OF	Swen Zaremba (Technische	of Technology), Pan	Benjamin SUROWIEC	
r the characterization of	Science and Technology),	two stage evolution of dam-	Zentrum Geesthacht), Ezgi	4-point bending strength by	(University of Bristol)	TECHNOLOGY), Roger	Universität München)	Weizhen (Harbin Institute	(PLASTIC OMNIUM), Michel	
bular braided composites.	Xi Shen (The Hong Kong	age in laminates subject to	Deniz Yilmaz (Hamburg	protecting the free edges		Groves (DELFT UNIVERSITY		of Technology), Peng	BOCQUET (ENSAM), Abbas	
ne model allows for the	University of Science and	transverse, near and on-	University of Technology),	and aids FE analysis, under-	This study explores the	OF TECHNOLOGY)	Quasistatic testing of pinned		TCHARKHTCHI (ENSAM)	
ediction of diamond, regu-	Technology), Xinying Sun	edge quasi-static impact.	Swantje Bargmann	taken alongside experimen-	effect of inclined Z-pins on		hybrid composite/steel	Technology)		
r and Hercules composite	(The Hong Kong University	Initial intra-ply cracking is	(Hamburg University of	tal work.	the fracture toughness of	Analysis of the structural	double lap joints by the help		Advanced Sheet Molding	
aids.	of Science and Technology),	seen to give way to Mode	Technology)			performance of a conforma-	of Digital Image Correlation		Compound (A-SMC) consists	
	Xu Liu (The Hong Kong	I peeling.			ELS specimens.	ble pressurizable tank con-	techniques. Joints were		of high weight content of	
	University of Science and		A continuum damage			sisting of intersecting spher-	created using laser pinning,		glass fibers. This work char-	
	Technology), Zhenyu Wang		mechanic model coupled to			ical shells (multi-cell tank)	inserted pinning and CMT		acterizes A-SMC behavior	
	(The Hong Kong University		hyperelasticity is developed			for application in cryogenic	pinning.		under high-speed tension.	
	of Science and Technology),		for modeling the initiation			medium (LH2) storage				
	Jang-Kyo Kim (The Hong		and evolution of damage							
	Kong University of Science		in mineral fibers as well as							
	and Technology)		protein matrix of enamel							
	We report a powel and facily									
	We report a novel and facile									
	method to fabricate the									
	chlorinated GO by direct ad-									
	dition of SOCI2 into the GO									
	dispersion and exceptional									
	dielectric properties are obtained for CI-rGO/PVDF									
111-4 THE	composites.		2114-4 MICR0-		2116-3 EPOXY REDUCED					
ANUFACTURE	2112-4 PREPARATION			2115-4 ANALYSIS OF		2117-4 DAMAGE AND	2118-4 FIBER- REINFORCEMENT-BASED	2119-4 AN ENGINEERING	2120-4 DEVELOPMENT OF	
IND MECHANICAL	OF REDUCED GRAPHENE OXIDE-BASED CARBON		MECHANICAL MODELING OF THE PRESSURE	INITIAL ACCUMULATION OF MATRIX CRACKS IN	GRAPHENE OXIDE/ EPOXY INTERLEAVED	PERMEABILITY OF	CRACK ARRESTER FOR	VISION ABOUT ACOUSTIC FATIGUE IN COMPOSITE	A WORKFLOW FOR THE VIRTUAL OPTIMIZATION	
ROPERTIES OF A NOVEL	COMPOSITE FILMS AND		DEPENDENT FAILURE OF	ANGLE-PLY LAMINATES	MULTI-SCALE FIBER	COMPOSITE LAMINATES	COMPOSITE BONDED	MATERIAL	OF A NANOFIBER-	
	THE CHARACTERIZATION		A HIGHLY CROSSLINKED			Hortense Laeuffer (DLA	JOINTS			
EGATIVE POISSON'S				Vladimir Vinogradov	REINFORCED COMPOSITES			Francisco Kioshi Arakaki	INTERLEAVED COMPOSITE	
ATIO 3-COMPONENT OMPOSITE	Yao Li (Harbin Institute		EPOXY RESIN	(Newcastle University)	WITH SIMULTANEOUS ENHANCEMENT IN	(Univ. Bordeaux), Jean-	Shu Minakuchi (The	(EMBRAER S.A.)	LAMINATE SUBJECTED TO IMPACT LOADING	
	of Technology), Yongan		<u>Jérémy Chevalier</u> (University	A new veriational stress		Christophe Wahl (Univ.	University of Tokyo)	According to the literature		
uanhua Zhang (University	Niu (Harbin Institute of		of Louvain), Xavier Morelle	A new variational stress	TOUGHNESS AND STRENGTH	Bordeaux), Nicolas Perry		According to the literature,	Alessandro Pirondi	
f Exeter ), Oana Ghita	Technology)		(University of Louvain),	analysis for angle-ply		(Arts et Metiers ParisTech)	A new crack arrester em-	of the early 60's until the	(Università di Parma),	
Iniversity of Exeter ), Ken				laminates with intralaminar	Jingjing Jia (The Hong Kong	This study investigates	ploying interlocked continu-	mid 80's, there were few	Francesco Musiari	
vans (University of Exeter)			Louvain), Thomas Pardoen	cracks is proposed. The	University of Science and	This study investigates	ous fibers is proposed. The	data on theoretical develop-	(Università di Parma), Cragoria Ciuliago (Università	
aia nanar intraduana a			(University of Louvain), Frédéric Lani (University of	method allows analysis of		the link between damage	apparent fracture toughness	ment about acoustic fatigue.	Gregorio Giuliese (Università di Parma), Andrea Zucchelli	
nis paper introduces a Inther development to			Louvain)	antisymmetric, staggered and random arrays of paral-		development and permea- bility evolution in laminates.	increased more than fivefold, and the maximum	By this time, abacus based on simple theoretical mod-	(Università di Bologna)	
le current Helical Auxetic			Louvain	lel cracks.		Permeability and damage	,	els has be	(Università ui DUIUyilà)	
arn by addition of a third			A new fracture criterion	ICI UIDUNS.	of Sydney), Xiuyi Lin (The Hong Kong University of	experiments were led and a	crack opening displacement doubled.	CI3 1145 DC	The aim of this work is to	
omponent (a sheath), the			of the epoxy resin RTM 6			prediction of the leak path	doubled.		develop a virtual optimiza-	
esence of the sheath is			is presented. The criterion		Xi shen (The Hong Kong	number is proposed.			tion procedure for the im-	
			explains the brittle fracture		University of Science and	number is proposed.			pact strength of a composite	
pected to overcome previ-										
s problems.			of the resin both in com- pression and tension by		Technology), Yiu-Wing Mai (The University of Sydney),				laminate with interleaved electrospun nylon fiber	
			the presence of microscale		Jang-Kyo Kim (The Hong				nanomats	
			defects.		Kong University of Science				nanomats	
			0010013.		and Technology)					
					Developing a novel					
					CVD-grown 3D network					
					graphene interleaves in fiber					
					reinforced composites with excellent interlaminar frac-					
					ture toughness and interint-					
					erlaminar shear strenth					

#### Scientific programme · Tuesday 21 July

	Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
	2201 Processing - Manufacturing Technology 5	2202 Nano Composites 5	2203 Multifunctional Composites - Sensing and Actuation 5	2204 Fatigue 5	2205 Structural Analysis and Optimization 5	2206 Process Induced Effects 4	2207 Process Modelling 5	2208 Biocomposites 5	2209 Interfaces and Interphases 5	2210 Ductile and Pseudo- ductile Composites 1
	2201-1 PERFORMANCE OF LIGHTWEIGHT HYBRID	2202-1 INFLUENCE OF MWCNTS ON MECHANICAL	KEYNOTE	2204-1 MICROCRACKING IN LAYERS OF COMPOSITE	2205-1 ON THE BENDING BEHAVIORS OF COMPOSITE	2206-1 INFLUENCE OF POST- CURE ON CARBON FIBRE	2207-1 VISCOELASTIC INTER-PLY SLIP IN UNCURED	2208-1 PROPERTIES OF	2209-1 TRIAL TO OPTIMIZE FRACTURE PROPERTIES	KEYNOTE
		AND INTERFACIAL	2203-1 POWERFUL	LAMINATES IN CYCLIC	CYLINDERS FILLED WITH AN		LAMINATES: EXPERIMENTAL	EARTH-BASED	AND BIODEGRADABILITY	2210-1 HIGH PERFORMANCE
		PROPERTIES OF CARBON	ARTIFICIAL MUSCLES FOR	LOADING WITH TENSILE	ELASTIC CORE	WITH GLASS TRANSITION	CHARACTERISATION AND	COMPOSITES: ADVANTAGES	IN HAP/PLA COMPOSITES	PSEUDO-DUCTILE
	AUTOMOTIVE PARTS:	FIBER /EPOXY FILAMENT	MORPHING COMPOSITES	TRANSVERSE AND SHEAR	Chaiwat Khurukijwanich	TEMPERATURES ABOVE	MODELLING	AND DRAWBACKS	AS BIO-ABSORBABLE BONE	COMPOSITES
	INFLUENCE OF PROCESS	WOUND COMPOSITES	Ray Baughman (University of	STRESS COMPONENTS	(King Mongkut's University	400C	Samuel Erland (University	WITH SYNTHETIC	SUBSTITUTE USING HYBRID	Michael Wisnom (University
	AND USE CONDITIONS	Gang Sui (Beijing University	Texas at Dallas)	Hiba Ben Kahla (Lulea Univ	of Technology Thonburi),	Patrik Fernberg (Swerea	of Bath), Timothy Dodwell	REINFORCEMENTS	INTERFACE CONTROL	of Bristol), G Czel (Budapest
		of Chemical Technology),		of Technology), Janis Varna	Sontipee Aimmanee (King	SICOMP), Roberts Joffe (Luleå		<u>Carmen Galan-Marin</u>	Mototsugu Tanaka (Kanazawa	University of Technology
	Centrale de Lyon), Michelle	Xiaoping Yang (Beijing		(Lulea Univ of Technology)	Mongkut's University of	University of Technology),	Butler (University of Bath)	(Universidad de Sevilla),	Institute of Technology),	and Economics), J D Fuller
		University of Chemical			Technology Thonburi)	Spyros Tsampas (Swerea		Carlos Rivera-Gomez	Tomoyuki TAKAHASHI	(University of Bristol), M
		Technology), Gang Li (Beijing		Intralaminar cracking in		SICOMP), Peter Mannberg	Experimental characterisation	(Universidad de Sevilla),	(Kanazawa Institute of	Jalavand (University of Bristol
	Centrale de Lyon)	University of Chemical		layers of a quasi-isotropic		(Swerea SICOMP)	and modelling of inter-ply	Francisco De Paula García-	Technology), Isao KIMPARA	
	The chieve of the court is	Technology)		carbon fiber NCF laminate	predicting bending response	The second	slip for varying ply angles to	Galindo (Universidad de	(Kanazawa Institute of	Pseudo-ductile response is
	The objective of this work is to characterize thermo-me-	The addition of liquid like		in tension-tension cyclic loading is studied experimen-	of composite cylindrical shells filled with an elastic core.	The communication presents results from an experimental	understand the shearing of an uncured laminate and its	Sevilla)	Technology)	created by means of hybridi- sation, rotation of angle plies
		The addition of liquid-like MWCNTs significantly im-		tally. Methodology based on	They are good for designing	study in which the influence	implications to manufacturing	This paper aims for a compre-	Previously, we had proposed	and interfacial slip in dis-
		proved the mechanical prop-		modified Weibull analysis is	and understanding the light-	of post-curing conditions on	Drocesses.	hensive review of literature of	the hybrid interface control in	continuous laminates, hence
	posites: laminate, injected and			suggested	weight components.	physical and microstructural	processes.	natural or synthetic reinforced		avoiding sudden catastrophic
		of T700 carbon fiber filament		buggoolou	weight compensite.	properties of polyimide com-		earth based composites.	as one of the most promising	failure.
		wound composites.				posites was investigated.		Characteristics such as type,	candidates of scaffold materi-	
						1		composition and mechanical	als for the bone regeneration,	
								properties of the studied m	using both pectin and c	
17:00	2201-2 QUASI-STATIC AND	2202-2 EFFECT OF "FUZZY"	1	2204-2 EFFECT OF	2205-2 DEVELOPMENT OF A	2206-2 EFFECT OF	2207-2 THE NUMERICAL	2208-2 CARBONIZED	2209-2 INVESTIGATION ON	
		FIBER MORPHOLOGY ON		EXTREME TEMPERATURES	15 METRE DIAMETER HIGH	PROCESSING PARAMETERS	AND EXPERIMENTAL	ELECTROSPUN LIGNIN	THE INTERFACE COATINGS	
		THE INTERNAL GEOMETRY		ON MICRODAMAGE	PERFORMANCE, LOW COST	ON OUT-OF-AUTOCLAVE	STUDIES ON THE	FIBERS: PROCESSING AND	WITHOUT STRENGTH	
		OF TEXTILE COMPOSITES		DEVELOPMENT IN CF/	RADIO ANTENNA FOR THE	COMPLEX-SHAPE PREPREG	COMPRESSION MOLDING	CHARACTERIZATION	DEGRADATION OF WOVEN	
		CHARACTERIZED BY MICRO-		POLYIMIDE LAMINATES	SQUARE KILOMETRE ARRAY	LAMINATE QUALITY	OF THERMOSET COMPOSITE	Manju Misra (University of	OXIDE CERAMIC FABRICS	
		COMPUTED TOMOGRAPHY		Hana Zrida (Lulea University	Gordon Lacy (National	AND MECHANICAL	MATERIALS	Guelph), Vida Poursorkhabi	<u>Nijuan Sun</u> (Aerospace	
	Richard Staehr (Laser Zentrum Hannover e.V). Peter	Mohammadali Aravand (KU Leuven), Oksana Shishkina		of technology), Andrejs Pupurs (Lulea University of	Research Council)	PERFORMANCE	Sejin Han (Autodesk), Roy Bendickson (Premix), Eric	(University of Guelph), Makoto Schreiber (University	Research Institute of Materials & Processing Technology),	
	,,	(KU Leuven), Ilya Straumit		technology), Roberts Joffe	The specifications for the	<u>Nicolas Krumenacker</u> (McGill University), Pascal Hubert	Henry (Hampshire)	of Guelph), Singaravelu	Juan Zhang (Science and	
		(KU Leuven), Andrew H. Liotta		(Lulea University of technolo-	radio reflector telescopes	(McGill University)		Vivekanandhan (VHNSN	Technology on Advanced	
		(Massachusetts Institute of		gy), Patrik Fernberg (Swerea	required for the Square		This is on the numerical	College), Amar Mohanty	Functional Composites	
	This paper investigates the	Technology), Sunny S. Wicks		Sicomp), Janis Varna (Lulea	Kilometer Array (SKA) project	High-guality flat composite	analysis and the comparison	(University of Guelph)	Laboratory-Aerospace	
	mechanical properties of laser	(Massachusetts Institute of		University of technology)	are particularly challenging	parts can now be readily	with experiment for the com-	(	Research Institute of Materials	
	cut CF-PPS & CF-PEI thermo-	Technology), Brian L. Wardle			and unique. The SKA project is	manufactured via out-of-au-	pression molding of thermoset	Novel carbon fibres were	& Processing Technology), Chi	
	plastic materials compared	(Massachusetts Institute		CF/polyimide composite was	an international project with t	toclave prepregs and vacu-	composite materials with an	produced by carbonization of	Wang (Aerospace Research	
		of Technology), Stepan V.		produced at arount 390°C.		um-bag-only processing. Still,	emphasis on the mechanical	lignin-based electrospun fib-	Institute of Materials &	
		Lomov (KU Leuven), Larissa		The composite was subjected		the aim of these technologies	properties and shrinkage of	ers. These fibers have poten-	Processing Technology), Dahai	
		Gorbatikh (KU Leuven)		to repeated temperature vari-		remains the robust manufac-	the par	tial applications in sustainable	Zhang (Aerospace Research	
	used			ations and to isothermal aging		turing of		energy storage devices and	Institute of Materials &	
		CNT growth can change		and the micro-damage devel-				air filters.	Processing Technology)	
		the fiber processibility and		opment was investigated.					Effective interfects continue	
		affect the composite meso/ microstructure, its properties.							Effective interface coatings prepared for fabric preforms,	
		We study the effects of grown,							which minimized the tensile	
		radially aligned CNTs on the							strength degradation of	
		textile composite architecture.							oxide fibers and improved the	
		tonale bompoorto aronitottaro.							strength of ceramic matrix	
									composite at high temper-	

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Meeting room 5	Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8
2211 Textile-Based		2213 X-ray Computed	2214 Fracture	2215 Fracture and	2216 Fracture and	2217 Pressure Vessels	2218 Joints - Design,	2219 Applications -	2220 Applications - Bio &	2621 Special Symposium
Composites and Fibre	Based Composites 5	Tomography 4	and Damage -	Damage - Laminate	Damage - Delamination 5	and Piping 2	Manufacturing and	Aerospace 4	Medical 1	on Active Composites
Architecture 5	•		Micromechanics 5	Scale 5			Testing 5			
2211-1 DYNAMIC	2212-1 IN-MOULD	2213-1	2214-1 IS A	2215-1 LOW-VELOCITY	2216-1 A STRESS	2217-1 DEVELOPMENT	2218-1 NOVEL HYBRID CO-	KEYNOTE	2220-1 MULTISCALE	2621-1 High-Bandwidth
MECHANICAL PROPERTIES	COATING OF	CHARACTERISATION OF	HOMOGENEOUS	IMPACT RESPONSE OF	GRADIENT APPROACH	OF DOME STRUCTURING	CURED CARBON/GLASS		ENTHESIS MECHANICS	Sensing and Feedback
OF WOVEN CARBON	THERMOSETTING	CRYOGENICALLY CYCLED	REINFORCEMENT	PLANT FIBRE REINFORCED	FOR PREDICTING SIZE	MODEL OF FILAMENT	FIBRE COMPOSITE JOINTS	2219-1 BONDING	Victor Birman (Missouri	<b>Control in Computational</b>
FIBRE REINFORCED		AUTOCLAVE & ATL CF/	DISTRIBUTION	HYBRID COMPOSITES	EFFECTS ON MODE II	WOUND COMPOSITE	FOR SAFETY CRITICAL	OF CFRP PRIMARY	University of Science and	Meta-materials
THERMOPLASTIC		PEEK LAMINATES USING	OPTIMAL? - COMPOSITES	Yiou Shen (Tongji University),		PRESSURE VESSEL	STRUCTURES	AEROSPACE STRUCTURES	Technology), Guy Genin	Nikolaus Correll
COMPOSITE MATERIALS		3-D X-RAY CT	WITH TAILORED	Yan Li (Tongji University),	<u>Giuliano Allegri</u> (Imperial	El Moussaid Mohammed	Jasim Ahamed (RMIT),	- CRACKSTOPPING IN	(Washington University),	
Diyar Kaka (University of		David Grogan (National	INHOMOGENEOUS	Junjie Zhong (Tongji	College London)	(University of Bordeaux),	Mathew Joosten (RMIT),	COMPOSITE BONDED	Stavros Thomopoulos	
Sheffield), Jem Rongong	Alexander Bismarck	University of Ireland-	MICROSTRUCTURE	University), Hao Ma (Tongji		Wahl jean-christophe	Chun Wang (RMIT)	JOINTS UNDER FATIGUE	(Washington University)	
(University of Sheffield),	(University of Vienna)	Galway), Sean Leen	<u>Hua-Xin Peng</u> (Zhejiang	University)	A nonlocal elastic fracture	(University of Bordeaux),		<u>Thomas Kruse</u> (Airbus		
Alma Hodzic (University		(National University of	University), Lujun Huang		mechanics approach is	Perry Nicolas (Arts et	New structurally efficient	Operations GmbH ), Thomas	Mechanical issues pertinent	
of Sheffield), Charles Lord	We have shown that an	Ireland-Galway), <u>Conchúr Ó</u>	(Harbin Institute of	This paper studied the	presented and applied to	Métiers ParisTech)	joining technique for inte-	Körwien (Airbus Defence	to multiscale mechanics of	
(University of Sheffield)	amorphous thermoplastic	Brádaigh (University College	Technology)	effect of hybrid ratios on	predicting the size effect		grally co-cured hybrid com-	and Space), Matthias	enthesis concentrating on	
The documents of the table	PES film can be used as an	Cork)		the low-velocity impact	due to through-thickness	A structuring model of com-	posite structures has been	Geistbeck (Airbus Group	state-of-the art knowledge	
The dynamic mechanical	in-mould coating material			performance and energy	compression on mode II	posite pressure vessel dome	proposed. Analysis method-	Innovations)	are outlined. Coupling	
properties of woven carbon	for the fabrication of carbon			absorption capacity of the	delamination in "transverse	is proposed. The structuring	ology has been developed	Entique testing of composite	between nanoscale, micros-	
fibre reinforced Poly ether Ether ketone (PEEK) was	fibre reinforced epoxy composites.			jute/ramie fibre reinforced hybrid composites.	crack tension" coupons	model takes into account the variability and specificity	for accurate prediction of	Fatigue testing of composite bonded joints validating the	cale and macroscale effects is demonstrated.	
investigated over a range of	composites.			nybriu composites.		of the geometry of the dome	joint strength.	crackstopping capability of	is demonstrated.	
temperatures by using both						area.		different crack stopping fea-		
experimental and numerical						aica.		tures to adress aerospace		
methods.								certification of bonded		
inouiouo.								composite joints		
2211-2 MICRO-DEBOND	2212-2 STUDY OF	2213-2 ALGORITHMS FOR	2214-2 PARAMETRIC	2215-2 IN-SITU	2216-2 A VARIATIONAL	2217-2 ASSESSMENT OF	2218-2 MULTI AXIAL		2220-2 DEVELOPING AN	2621-2 Closing Remarks
DEVELOPMENT IN THE	FUNCTIONALIZED-	THE DETERMINATION	STUDY OF PROGRESSIVE	MEASUREMENTS OF	ASYMPTOTIC METHOD	THE TYPE OF STATISTICAL	TESTING OF ADHESIVELY		IN-SITU POLYMERISATION	Daniel Inman
FATIGUE OF A NON-CRIMP	GRAPHENE	OF ORIENTATION-	DAMAGE GROWTH AT THE	STRUCTURAL DAMAGE	BASED FREE VIBRATION	DISTRIBUTION	BONDED JOINTS OF		PROCESS FOR	
3D ORTHOGONAL WEAVE	BASED POLYMER	TENSORS FROM THREE	FIBER/MATRIX SCALE	IN NOTCHED COMPOSITE	ANALYSIS OF A THIN	CONCERNING STRENGTH	FIBER REINFORCED		BIOCOMPOSITE	
COMPOSITE LOADED IN	NANOCOMPOSITES	DIMENSIONAL MICRO-CT	USING COHESIVE ZONE	LAMINATES	PRETWISTED AND	PROPERTIES OF	THERMOPLASTIC		MANUFACTURE	
THE WARP AND WEFT		IMAGES WITH VARIOUS	ELEMENTS	Yuri Nikishkov (University	DELAMINATED	COMPOSITE CYLINDERS	POLYMERS		Menghao Chen (the	
DIRECTIONS		MICROSTRUCTURES	M. Keith Ballard (Texas A&M	of Texas at Arlington),	ANISOTROPIC STRIP	Georg Mair (BAM), Ben	Nans ARGOUD (University		University of Nottingham),	
Matthew Poole (University	<u>Vagelis Harmandaris</u>	Pascal Pinter (KIT), Stefan	University), <u>John Whitcomb</u>	Guillaume Seon (University	Santosh Salunkhe (Indian	Becker (BAM), Florian	of Burgundy), Stéphane		Derek Irvine (the University	
of Surrey), Steven Ogin	(University of Crete), Petra	Dietrich (KIT), Kay André	(Texas A&M University)	of Texas at Arlington),	Institute of Technology	Scherer (BAM)	FONTAINE (University of		of Nottingham-UK), Andrew	
(University of Surrey),	Bacova (Foundation for	Weidenmann (KIT)		Andrew Makeev (University	Bombay), P. J. Guruprasad		Burgundy), Benoit PIEZEL		Parsons (the University of	
Paul Smith (University of	Research and Technology		Cohesive zone elements	of Texas at Arlington)	(Indian Institute of	Distribution function influ-	(University of Burgundy),		Nottingham), Christopher	
Surrey), Garry Wells (DSTL),	Hellas (FORTH)), Anastassia	Three algorithms for orien-	were evaluated for use in	This words in a structure the	Technology Bombay)	ences safety assessment,	Jérôme ROUSSEAU		Rudd (the University of	
Prasad Potluri (University of	Rissanou (University of	tation analysis, based on	modeling damage initiation	This work investigates the	In this work on attempt was	but individual determination	(University of Burgundy),		Nottingham), Ifty Ahmed (the	
Manchester), Philip Withers	Crete)	the concepts of anisotropic	and growth at the fiber/ma-	in-situ development of	In this work an attempt was	isn't possible. It is shown	Antoine FIORE (VOLVO GTT)		University of Nottingham)	
(University of Manchester), Tristan Lowe (University of	We present results through	Gaussian filtering, Hessian matrix and structure tensor	trix scale. Various aspects of the parametric study will be	structural damage around notches in composite lami-	made to analyze the modal behavior of pretwisted	why Weibull distribution with T0=0 is recommanded for	This study present a multi		Investigations into man-	
Manchester)	detailed atomistic molecular	were implemented and	discussed in the paper.	nates based on high fidelity	anisotropic strips in the	LC-assessment of compos-	axial device for testing ad-		ufacturing technique of	
Wanchester)	dynamics simulations of	evaluated.	uiscusseu in me papei.	three-dimensional X-Ray CT	presence of delamination	ite cylinders.	hesively bonded composite		fully bioresorbable polymer	
Early stage fatigue damage	hybrid nanostructured poly-	evaluateu.		measurements under static	based on the mathematical	no cynnucia.	joints. Results show a large		composites using In-situ	
development of a 3D non-	mer/graphene materials for			loading.	framework of VAM with		dependency on the load		polymerisation technique	
crimp orthogonal weave	different polymer matrices.				sub-laminate approach.		orientation, joint thickness,		in order to improve and	
glass fibre composite has	and one polymor matheod.						loading speed and test		replace metal implants for	
been studied using optical							temperature.		hard tissue repair.	
microscopy and plan view										
photography of transparent										
specimens.										

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Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
7:20 2201-3 INVESTIGATIONS ON		2203-2 DAMAGE DETECTION	2204-3 VARIABLE LOADING	2205-3 LEVEL SET	2206-3 INFLUENCE OF	2207-3 NUMERICAL	2208-3 MECHANICAL	2209-3 INFLUENCE OF FIBER	2210-2 CELLULOSE
THE PROCESS STRATEGY OF	BUCKYPAPER/	IN A COMPOSITE SKIN-	FATIGUE LIFE OF WOVEN	OPTIMISATION FOR	CARBON FIBRES ON	EVALUATION OF RESIDUAL	PROPERTY AND	SIZING ON PROPERTIES OF	NANOCOMPOSITES WITH
	POLYURETHANE COMPOSITES	STRINGER PANEL USING	FABRIC CARBON/EPOXY	COMPOSITE FIBRE PATHS	THE CRYSTALLNITY OF	MANUFACTURING	FRACTURE BEHAVIOR OF		DUCTILE MECHANICAL
	USING CARBON AND BORON	LAMB WAVE PROPAGATION	LAMINATES UNDER	<u>H Alicia Kim</u> (University of	POLYAMIDE-6	DEFORMATIONS IN	THERMOSETTING FRP	COMPOSITE	BEHAVIOR
PLASTICS WITH A	NITRIDE NANOTUBES	TECHNIQUE: A NUMERICAL	ALTERNATING EQUAL-LIFE	Bath), Christopher Brampton	Thomas Guglhoer (University	COMPLEX PULTRUDED	REINFORCED CARBON	Lichao Yu (Donghua	Lars Berglund (KTH Royal Ins
THICKNESS OF MORE THAN	Yadienka Martinez Rubi (SDT-	STUDY	WAVEFORMS OF DIFFERENT	(University of Bath)	of Augsburg), Marco Korkisch	COMPOSITE PROFILES	FIBERS AND PAPERBOARD	University), <u>Zhenjin Cui</u> (Kyoto	
3 MM	National Research Council	Mohammad Hossein Sherafat	R-RATIOS	This work and an interim	(University of Augsburg),	Alexander Safonov (Skolkovo	<u>Takanori Kitamura</u> (Kyoto	Institute of Technology), Yuqiu	Ansari (KTH Royal Inst of
<u>Matthias Schmidt-Lehr</u> (Hamburg University	Canada), Michael Jakubinek (SDT-National Research Council	(McGill University), Pascal	<u>Masamichi Kawai</u> (University of Tsukuba)	This work optimises vari- able orientation composite	Markus G. R. Sause (University of Augsburg)	Institute of Science and Technology), Alexander	Institute of Technology), Keisuke Kitai (Kitai Seisakusyo	Yang (Donghua University)	Technology)
of Technology), Max	Canada), Behnam Ashrafi	Larry Lessard (McGill	UI TSUKUDA)	structures using a level set	() Augsburg)	Konstantinov (Mechanics	CoLtd), Kanta Ito (Daiwa	Comparison and analysis have	Ductility mechanisms in
Oberlander (Hamburg	(Aerospace-National Research	University)	Effect of repeated alternations		The influence of carbon	Research Institute of the	Itagami Co. Ltd.), Suguru	been carried out to discuss	biocomposites based on cel-
University of Technology),	Council Canada), Keun Su	onnoiony)	in R-ratios on fatigue life of a	feature continuous fibre	fibres on the crystallinity of	Lobachevsky State University	Teramura (Daiwa Itagami Co.	the change of mechanical	lulose nano fibers (CNF) are
Dirk Herzog (Hamburg	Kim (SDT-National Research	The finite element modelling	guasi-isotropic woven fabric	paths, suitable for advanced	Polyamide 6 was investigated	of Nizhny Novgorod)	Ltd.), Zhiyuan Zhang (Daiwa	property by chang the PUD	discussed.Preparation is as
University of Technology),	Council Canada), Kayla ONeill	of guided wave propagation	CFRP laminate has been stud-	fibre placement (AFP) man-	in dependence of the cooling		Itagami Co. Ltd.), Hiroyuki	pick-up ratio on basalt fibre	follows: porous CNF networks
Marten Canisius (Hamburg	(Aerospace-National Research	for a composite skin-stringer	ied. A variable loading fatigue	ufacture.	rate during crystallization	The purpose of this study is	Hamada (Kyoto Institute of	and improved mechanical	are formed, and impregnated
University of Technology),	Council Canada), Christopher	assembly is developed, and	life prediction methodology is		from melt.	to develop a methodology	Technology)	properties compared with	by unsaturated polyester or
Markus Radek (Hamburg	Kingston (SDT-National	the results justify the appli-	also developed.			for numeric evaluation of		virgin one.	ероху.
University of Technology),	Research Council Canada),	cation of the methods for				residual deformations after	Deforestation is a big problem		
Claus Emmelmann (Hamburg	Stéphane Dénommée (SDT-	disbond detection.				pultrusion in complex profiles	to the world. The usage of		
University of Technology)	National Research Council					of composite materials with thermoset resin.	paperboard can release the		
Cutting CFRP with laser leads	Canada), Benoit Simard (SDT- National Research Council					inermosei resin.	needs to the timber. The paperboard FRP gives paper-		
to a wear-free, fast process.	Canada)						board new properties.		
State of the art is the cutting	ounddy						board new properties.		
of thin laminates of max 3	Carbon nanotube & boron ni-								
mm. This paper introduces a	tride nanotube papers are pro-								
laser process for parts with	duced and modified by integra-								
thicknesses up to 10 mm.	tion of polyurethane, providing								
	improved/tailorable mechanical								
	properties and an intermediate								
	for hybrid composites								
7:40 2201-4 RESEARCH ON	2202-4 TENSILE	2203-3 INTERNAL	2204-4 REDUCTION	2205-4 AN IMPROVED	2206-4 STUDY OF	2207-4 TWO DIMENSIONAL		2209-4 INTERFACIAL	2210-3 BIO-INSPIRED
CUTTING FORCE AND DELAMINATION DURING	PROPERTIES OF CARBON NANOTUBE/EPOXY	TEMPERATURE AND THERMAL GRADIENT	OF FATIGUE DAMAGE EQUIVALENT LOADS IN THE	VIRTUAL TESTING APPROACH FOR LAMINATED	NON-DESTRUCTIVE MEASUREMENT APPROACH	FINITE ELEMENT MODELING		ADHESION BETWEEN GLASS FIBERS AND	CONCEPTS FOR NATURAL & CELLULOSE FIBRE-
MILLING CFRP WITH	COMPOSITE FABRICATED	SENSING OF COMPOSITES	WIND TURBINE SYSTEM	COMPOSITES BASED ON	OF RESIDUAL STRESS ON	YARNS COMPOSITES		ACRYLIC-BASED	REINFORCED COMPOSITES
VARIOUS WORKPIECE	BY PULTRUSION OF CARBON		THROUGH THE USE OF OFF-	MICROMECHANICS	FRP LAMINATE BASED ON	CONSOLIDATION PROCESS		MATRICES AS STUDIED	WITH DUCTILE BEHAVIOUR
INCLINED ANGLES	NANOTUBE SPUN YARN	PLASMON RESONANCE	AXIS PLIES IN THE SPAR	Pierre Ladeveze (ENS	THERMAL EXPANSION	Mylene Lagardere (Mines		BY MICROMECHANICAL	Jörg Müssig (Hochschule
Yan Chen (Nanjing	Yoshinobu Shimamura	SPECTROSCOPY	CAPS OF COMPOSITE WIND	Cachan), David Néron (ENS	Satoshi Hayashi (Kanazawa	Douai), Baochao Li (Mines		TESTING	Bremen - University of
University of Aeronautics	(Shizuoka University), Kahori	Jeffery Baur (Air Force	TURBINE BLADES	Cachan), Hadrien Bainier (ENS		Douai), Chung-Hae Park		Quentin Charlier (INSA-Lyon-	Applied Sciences), Nina
and Astronautics), Yucan	Oshima (Shizuoka University),	Research Laboratory),	Altan Kayran (METUWind	Cachan)	Hirokuni Adachi (Kanazawa	(Mines Douai)		Ingénierie des Matériaux	Graupner (Hochschule
Fu (Nanjing University of	Keiichiro Tohgo (Shizuoka	Joshua Kennedy (Air Force	Center for Wind Energy),		Institute of Technology),			Polymères-IMP-CNRS	Bremen - University of Applie
Aeronautics and Astronautics		Research Laboratory), Keith	Mehmet Ozan Gözcü	The work deals with two	Hiroshi Saito (Kanazawa	Modelling of consolidation		UMR5223-F-69621),	Sciences )
Jingwen Zhou (Nanjing	(Shizuoka University), Yoku	Slinker (Air Force Research	(METUWind Center for Wind	enhancements of our damage	Institute of Technology), Isao	processes for thermoplastic		Frédéric Lortie (INSA-Lyon-	
University of Aeronautics	Inoue (Shizuoka University)	Laboratory), Brent Volk (Air	Energy-Middle East Technical	mesomodel for laminated	Kimpara (Kanazawa Institute	matrix composite structures is		Ingénierie des Matériaux	Biological materials show
and Astronautics), Honghua	Llich machanical parformance	Force Research Laboratory),	University), Touraj Farsadi	composites: microme-	of Technology)	adressed, considering hybrid		Polymères-IMP-CNRS	impressive combinations of
Su (Nanjing University of Aeronautics and Astronautics	High mechanical performance carbon nanotube/epoxy	Hilmar Koerner (Air Force	(METUWind Center for Wind Energy-Middle East Technical	chanics-based modeling of coupling between ply microc-	We focused on the correlation	yarns textiles. Model is vali- dated through analytical and		UMR5223-F-69621), Jean- François Gérard (INSA-Lyon-	mechanical properties like strength and toughness. The
Aeronautics and Astronautics,	composite fabricated by a	Ehlert (Air Force Research	University), Özgün Şener	racking and delamination, and	between thermal expansion	experimental studies.		Ingénierie des Matériaux	structure of a red rhubarb
CFRP laminates with varied	pultrusion technique has	Laboratory)	(METUWind Center for Wind	prediction of splits.	behavior and residual stress.	experimental studies.		Polymères-IMP-CNRS	petiole and a coconut pericar
bottom fiber direction angle	developed by using carbon	Laboratory	Energy-Middle East Technical	production of opinio.	Then it is clear there is strong			UMR5223-F-69621)	are transferred to composites
were trimmed at various	nanotube spun yarn produced	Here we discuss a new	University)		linear relationship between				
workpiece inclination angles.	from spinnable carbon nano-	method for the determination			residual stress and linear			Acrylic/glass fiber model	
The cutting forces, delamina-	tube forest.	of internal temperatures	REDUCTION OF FATIGUE		expansion coefficient.			specimens were prepared by	
tions, and model for delami-		and temperature gradients	DAMAGE EQUIVALENT LOADS					in-situ polymerizing a MMA-	
nation were studied.		within a composite using a	IN THE WIND TURBINE					based reactive mixture onto	
		color change related to the	SYSTEM THROUGH THE USE					a single filament and studied	
		aspect ratio of dispersed gold						with single fiber fragmenta-	
		nanorods.	SPAR CAPS OF COMPOSITE					tion test and microbond test.	
			WIND TURBINE BLADES.						

## Tuesday 21 July · Scientific programme

Meeting room 5	Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8
2211-3 EMBEDDED	2212-3 STRUCTURAL	2213-3 FOUR	2214-3 IMPLEMENTATION	2215-3 RESIDUAL	2216-3 INTERLAMINAR	2217-3 INTEGRATED	2218-3 EXPERIMENTAL	2219-2 SIMULATION OF	2220-3 COMPOSITES OF	-
ELEMENT METHOD IN	HEALTH MONITORING	DIMENSIONAL	OF A MOLECULAR	FLEXURAL STRENGTH	DAMAGE ANALYSIS OF	DESIGN AND PRODUCTION	AND NUMERICAL	COMPOSITE DAMAGE DUE	MGB2 - RARE-EARTH-	
MESO- FINITE ELEMENT	OF CEMENT BASED	SYNCHROTRON	INTERPHASE MODEL	AFTER IMPACT AND		OF FILAMENT-WOUND	INVESTIGATION INTO CO-	TO LIGHTNING STRIKE	OXIDES: FABRICATION	
MODELLING OF TEXTILE	MATERIALS REINFORCED	TOMOGRAPHY OF FATIGUE		HYDROSTATIC CYCLING IN	USING ROBUST INTERFACE		BONDED PATCH REPAIRS	<u>Cédric Huchette</u> (Onera	BY SPARK PLASMA	
COMPOSITE: A"GALLERY"	WITH GRAPHENE	CRACK GROWTH AND	FRAMEWORK FOR	GLASS/SYNTACTIC FOAM	ELEMENTS	COMPROMISE BETWEEN	FOR STRUCTURAL	the French Aerospace lab),	SINTERING AND	
<u>Seyed Ahmad Tabatabaei</u>	NANOPLATELETS	DAMAGE IN METAL	POLYMER MATRIX	SANDWICH LAMINATES	<u>Tillmann Herwig</u> (Institute	STRENGTH AND	COMPOSITES	Johann Rannou (ONERA	FUNCTIONAL PROPERTIES	
(Katholieke Universiteit	Zoi S. Metaxa (National	MATRIX COMPOSITES	COMPOSITES	Prasad Potluri (University	for Structural Analysis),	MANUFACTURABILITY	ADDITIONALLY	the french Aerospace Lab),	Dan Batalu (University	
Leuven), Stepan Lomov	Technical University of	Peter Hruby (Arizona State	Joel Johnston (Arizona State	of Manchester), Sofia	Werner Wagner (Institute for	Lei Zu (Wuhan University	REINFORCED WITH	Laurent Chemartin (ONERA	POLITEHNICA of Bucharest),	
(Katholieke Universiteit	Athens)	University), Sudhanshu	University), Bonsung Koo	Pavlopoulou (University of	Structural Analysis)	of Technology), Jihui	HIGH PERFORMANCE	the french Aerospace Lab)	Robert Bololoi (University	
Leuven-Leuven)	/ laionoj	Singh (Arizona State	(Arizona State University),	Manchester)		Wang (Wuhan University	MULTIFILAMENT YARN	and monitori interespiece Eab)	POLITEHNICA of Bucharest),	
	The present work focuses	University), Jason Williams	Aditi Chattopadhyay (Arizona	manonootory	For the development of	of Technology), Shuxin	Markus Linke (Hamburg	The aim of this study is to	Gheorghe Aldica (National	
The application of the	on the use of graphene		State University)	Residual flexural strength	robust interface elements	Li (Wuhan University of			Institute of Materials	
a state a second s	• •	(Arizona State University),	State University)				University of Applied	propose a first comprehen-		
embedded element method	nanoplatelets for the devel-	Xianghui Xiao (Argonne		of syntactic foam sandwich	a hybrid mixed formulation	Technology)	Sciences), Marie Moebius	sion model of the matrix	Physics), Petre Badica	
in different aspect of textile	opment of smart cement	National Laboratory),	A novel multiscale model	composites have been	based on the potential by		(Hamburg University of	damage due to electro	(National Institute of	
composites ranging from	based nanocomposites	Francesco DeCarlo (Argonne		investigated. Influence of	Hu-Washizu and a non-po-	An integrated design and	Applied Sciences), Frank-	thermal loading imposed by	Materials Physics)	
calculation of the homoge-	that, contrary to traditional	National Laboratory), Nik	which studies the effect	cyclic hydrostatic pressure	tential mixed mode cohesive	production method of	David Georges (Hamburg	lightning strike impact on		
nized stiffness properties,	approaches that require the	Chawla (Arizona State	of the interphase between	and impact energy levels	law are applied.	filament-wound structures	University of Applied	carbon/epoxy laminates.	Dense MgB2 samples	
stress/strain fields, etc is	use of high-cost attach	University)	carbon fiber and polymer	on flexural properties have		was outlined to offer an	Sciences), Philipp Abel		with La203 addition were	
investigated.	gir i bor attaon		matrix using atomistic scale	been reported.		effective tool able to fill the	(RWTH Aachen University),		obtained by spark plasma	
mooligatou.		MMCs have high strength	simulations and subcell	boon reported.		gap between "design for	Thomas Gries (RWTH		sintering. Formation of	
							`		, v	
		and toughness, In situ x-ray	based micromechanics.			structures" and "design for	Aachen University)		phosphate needles, gath-	
		synchrotron tomography				manufacturability".			ered in bouquets, show a	
		and extended finite element					A co-bonding repair method		possible bioactive behavior	
		modeling of damage in					is experimentally as well		of MgB2.	
		2080 aluminum alloy re-					as numerically investigated			
		inforced with SiC particles					using high performance			
		was conducted.					multifilament yarns to re-			
		was conducted.					inforce the bonding area of			
							· · · · · · · · · · · · · · · · · · ·			
							single lapped joints.			
2211-4 DAMAGE	2212-4 POLYETHYLENE/		2214-4 EFFECT OF FIBER		2216-4 INTERLAMINAR		2218-4 MODELING BLAST	2219-3 A PROOF-OF-	2220-4 A NOVEL DESIGN	
DEVELOPMENT IN STEEL	GRAPHENE		WAVINESS ON TENSILE		FRACTURE TOUGHNESS OF		FAILURE OF FIBRE METAL	CONCEPT OF SMART	OF INJECTABLE POROUS	
FIBRE COMPOSITES WITH	NANOCOMPOSITES		STRENGTH OF FLAX		FIBER METAL LAMINATES		LAMINATES	HANGAR FOR COMPOSITE	HYDROGELS WITH IN SITU	
UNIDIRECTIONAL AND	OBTAINED BY SUPPORTED		FIBER-REINFORCED		Carlos Rubio-Gonzalez			AIRCRAFT	PORE FORMATION	
QUASI-UNIDIRECTIONAL	CATALYST OVER FEW		COMPOSITES		(CIDESI), Jorge Quintero		of Liverpool), Elena Sitnikova		Ortal Yom-Tov (Technion),	
WOVEN ARCHITECTURES	GRAPHENE LAYERS									
			Taweesak Piyatuchsananon		(ITESM), Edgardo Perez-		(University of Nottingham),	Advanced Institute of	Havazelet Bianco-Peled	
Michaël Guy Callens (KU	Griselda Barrera Galland		(Yamaguchi University),		Hermosillo (ITESM)		Wesley Cantwell (Khalifa	Science and Technology),	(Technion), Dror Seliktar	
Leuven), <u>Larissa Gorbatikh</u>	(Universidade Federal do Rio		Akira Furuya (Yamaguchi				University of Science-	Syed Haider Abbas (Korea	(Technion)	
(KU Leuven), Ignaas	Grande do Sul/Instituto de		University), Koichi Goda		The aim of this paper is to		Technology and Research)	Advanced Institute of		
Verpoest (KU Leuven)	Química), Giovani Pavoski		(Yamaguchi University)		investigate the feasibility			Science and Technology),	The use of injectable porous	
	(Universidade Federal do				of applying different DCB		The perforation failure	Hye-Jin Shin (LANL-CBNU	hydrogels is of great interest	
The effect of the micro-	Rio Grande do Sul/Instituto		The purpose of this study is		models to predict interlami-		of fibre metal laminates	Engineering Institute-	in biomedical applications	
structure on the damage	de Química), Nara Regina		to analyze the effect of the		nar toughness of composite		subjected to blast has been	Korea-Chonbuk National	due to their excellent	
development in steel fiber	de Sousa Basso (Pontifícia		fiber waviness on the tensile		laminates and FMLs and					
			Inder waviness on the tensile		LIGHTHOUGS AND FIVES AND			(Iniversity) Truena Thank	normoshility and asso of	
			atronath of flore file and in				simulated. The model em-	University), Truong Thanh	permeability and ease of	
	Universidade Católica do		strength of flax fiber-rein-		compare with experimental		ploys modified 3D Hashin's	Chung (Korea Advanced	integration into sites of	
Quasi-unidirectional and	Rio Grande do Sul), Thuany		forced composites by using				ploys modified 3D Hashin's criteria with consideration	Chung (Korea Advanced Institute of Science and	integration into sites of surgical intervention. By	
Quasi-unidirectional and					compare with experimental		ploys modified 3D Hashin's	Chung (Korea Advanced	integration into sites of	
Quasi-unidirectional and perfectly unidirectional fibre	Rio Grande do Sul), Thuany		forced composites by using		compare with experimental		ploys modified 3D Hashin's criteria with consideration	Chung (Korea Advanced Institute of Science and	integration into sites of surgical intervention. By	
Quasi-unidirectional and perfectly unidirectional fibre	Rio Grande do Sul), Thuany Maraschin (Pontifícia		forced composites by using Tsai-Hill theory and spatial		compare with experimental		ploys modified 3D Hashin's criteria with consideration of damage evolution and	Chung (Korea Advanced Institute of Science and Technology), <u>Jung-Ryul Lee</u>	integration into sites of surgical intervention. By	
Quasi-unidirectional and perfectly unidirectional fibre	Rio Grande do Sul), Thuany Maraschin (Pontifícia Universidade Católica do Rio Grande do Sul), Marcéo Auler		forced composites by using Tsai-Hill theory and spatial		compare with experimental		ploys modified 3D Hashin's criteria with consideration of damage evolution and	Chung (Korea Advanced Institute of Science and Technology), <u>Jung-Ryul Lee</u> (Korea Advanced Institute of	integration into sites of surgical intervention. By	
Quasi-unidirectional and perfectly unidirectional fibre	Rio Grande do Sul), Thuany Maraschin (Pontificia Universidade Católica do Rio Grande do Sul), Marcéo Auler Milani (Universidade Federal		forced composites by using Tsai-Hill theory and spatial		compare with experimental		ploys modified 3D Hashin's criteria with consideration of damage evolution and	Chung (Korea Advanced Institute of Science and Technology), <u>Jung-Ryul Lee</u> (Korea Advanced Institute of Science and Technology)	integration into sites of surgical intervention. By	
Quasi-unidirectional and perfectly unidirectional fibre	Rio Grande do Sul), Thuany Maraschin (Pontificia Universidade Católica do Rio Grande do Sul), Marcéo Auler Milani (Universidade Federal do Rio Grande do Sul/Instituto		forced composites by using Tsai-Hill theory and spatial		compare with experimental		ploys modified 3D Hashin's criteria with consideration of damage evolution and	Chung (Korea Advanced Institute of Science and Technology), <u>Jung-Ryul Lee</u> (Korea Advanced Institute of Science and Technology) To enhance the efficiency	integration into sites of surgical intervention. By	
Quasi-unidirectional and perfectly unidirectional fibre	Rio Grande do Sul), Thuany Maraschin (Pontificia Universidade Católica do Rio Grande do Sul), Marcéo Auler Milani (Universidade Federal do Rio Grande do Sul/Instituto de Química), Raúl Quijada		forced composites by using Tsai-Hill theory and spatial		compare with experimental		ploys modified 3D Hashin's criteria with consideration of damage evolution and	Chung (Korea Advanced Institute of Science and Technology), <u>Jung-Ryul Lee</u> (Korea Advanced Institute of Science and Technology) To enhance the efficiency of the aircraft maintenance	integration into sites of surgical intervention. By	
Quasi-unidirectional and perfectly unidirectional fibre	Rio Grande do Sul), Thuany Maraschin (Pontificia Universidade Católica do Rio Grande do Sul), Marcéo Auler Milani (Universidade Federal do Rio Grande do Sul/Instituto de Química), Raúl Quijada (Universidad de Chile), Denise		forced composites by using Tsai-Hill theory and spatial		compare with experimental		ploys modified 3D Hashin's criteria with consideration of damage evolution and	Chung (Korea Advanced Institute of Science and Technology), <u>Jung-Ryul Lee</u> (Korea Advanced Institute of Science and Technology) To enhance the efficiency of the aircraft maintenance performance, a new	integration into sites of surgical intervention. By	
Quasi-unidirectional and perfectly unidirectional fibre	Rio Grande do Sul), Thuany Maraschin (Pontificia Universidade Católica do Rio Grande do Sul), Marcéo Auler Milani (Universidade Federal do Rio Grande do Sul/Instituto de Química), Raúl Quijada (Universidad de Chile), Denise Azambuja (Universidade		forced composites by using Tsai-Hill theory and spatial		compare with experimental		ploys modified 3D Hashin's criteria with consideration of damage evolution and rate-dependence.	Chung (Korea Advanced Institute of Science and Technology), <u>Jung-Ryul Lee</u> (Korea Advanced Institute of Science and Technology) To enhance the efficiency of the aircraft maintenance performance, a new cutting-edge paradigm	integration into sites of surgical intervention. By	
Quasi-unidirectional and perfectly unidirectional fibre	Rio Grande do Sul), Thuany Maraschin (Pontificia Universidade Católica do Rio Grande do Sul), Marcéo Auler Milani (Universidade Federal do Rio Grande do Sul/Instituto de Química), Raúl Quijada (Universidad de Chile), Denise Azambuja (Universidade Federal do Rio Grande do Sul/		forced composites by using Tsai-Hill theory and spatial		compare with experimental		ploys modified 3D Hashin's criteria with consideration of damage evolution and rate-dependence.	Chung (Korea Advanced Institute of Science and Technology), <u>Jung-Ryul Lee</u> (Korea Advanced Institute of Science and Technology) To enhance the efficiency of the aircraft maintenance performance, a new cutting-edge paradigm of structural health man-	integration into sites of surgical intervention. By	
composites is investigated. Quasi-unidirectional and perfectly unidirectional fibre architectures are studied.	Rio Grande do Sul), Thuany Maraschin (Pontificia Universidade Católica do Rio Grande do Sul), Marcéo Auler Milani (Universidade Federal do Rio Grande do Sul/Instituto de Química), Raúl Quijada (Universidad de Chile), Denise Azambuja (Universidade		forced composites by using Tsai-Hill theory and spatial		compare with experimental		ploys modified 3D Hashin's criteria with consideration of damage evolution and rate-dependence.	Chung (Korea Advanced Institute of Science and Technology), <u>Jung-Ryul Lee</u> (Korea Advanced Institute of Science and Technology) To enhance the efficiency of the aircraft maintenance performance, a new cutting-edge paradigm	integration into sites of surgical intervention. By	
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	Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
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9:30	3101 Processing - Manufacturing Technology 6	3102 Nano Composites 6	3103 ONR Special Symposium on Marine Composites 1	3104 Fatigue 6	3105 Structural Analysis and Optimization 6	3106 Process Induced Effects 5	3107 Process Modelling 6	3108 Fibre reinforcement	3109 Interfaces and Interphases 6	3110 Damage Tolerance of Composite Structures 1
	JAPANESE TRADITIONAL SENSE OF BEAUTY- Yuki Ikenobo (Ikenobo), Tetsuo KIKUCHI (Toyugiken CoLtd.), Hiroyuki HAMADA (Kyoto Institute of Technology) This study has focused on the FRP. By combining superior FRP functionality, and the Japanese traditional sense of beauty originating in tradition- al Japanese Kyo-yuzen fabric and Ikebana.	3102-1 A MODEL FOR THE ENHANCEMENT OF YOUNG'S MODULUS OF MACROSCOPIC CARBON NANOTUBE FIBERS VIA POLYMER INFILTRATION Bartolomé Mas (IMDEA Materials Institute), Juan José Vilatela (IMDEA Materials Institute) We studied stress transfer mechanisms that take place in carbon nanotube fibres infiltrated with different polymers under axial load. A model to predict the final composite properties is proposed.	KEYNOTE 3103-1 DEFORMATIONS DUE TO EXPLOSIVE AND IMPLOSIVE LOADS OF SANDWICH CYLINDERS USING THIRD ORDER SHEAR AND NORMAL DEFORMABLE THEORY (TSNDT) Romesh Batra (Virginia Polytechnic Institute and State University), Priyal Shah (Virginia Polytrechnic Institute and State University) We use an equivalent single layer third order shear and normal deformable shell the- ory (TSNDT) to study transient deformations of linear elastic sandwich cylinders under im- plosive and explosive loads.	3104-1 EVALUATION OF BENDING FATIGUE CHARACTERISTICS OF CFRP FOR MARINE PROPELLERS Daichi Ogawa (School of Engineering-University of Tokyo), Hideaki Murayama (School of Engineering- University of Tokyo), Kazuro Kageyama (Graduate School of Engineering-University of Tokyo), Toshio Yamatogi (Nakashima Propeller Co. Ltd.), Makoto Kanai (School of Engineering-University of Tokyo), Takaya Sakurai (Nakashima Propeller Co. Ltd.), Makoto Kanai (School of Engineering-University of Tokyo), Takaya Sakurai (Nakashima Propeller Co. Ltd.) This paper reports the bend- ing fatigue characteristics of CFRP manufactured from VaRTM process about stiff- ness. Stiffness degradation among the number of cycles was evaluated.	3105-1 FEASIBILITY STUDY OF A SANDWICH CHOPPER DISC FOR A TIME OF FLIGHT (TOF) SPECTROMETER Valeria Antonelli (Technische Universität München), Matthias Weinzierl (Technische Universität München), Horst Baier (Technische Universität München) The aim of the feasibility study is the maximisation of the natural frequency of a chopper disc. A sandwich design reduces the weight penalty caused by a CFRP disc with the same natural frequency.	3106-1 INTEGRATED ANALYSIS OF COMPACTION, EDGE DISTORTION AND RESIDUAL DEFORMATION OF WIND-TURBINE THICK COMPOSITES SPAR-CAP Ganapathi Ammasai Sengodan (Nanyang Technological University), Sunil C. Joshi (Nanyang Technological University), Zhong Chen (Nanyang Technological University) A numerical method is established to integrate the compaction and cure defor- mation of a composite wind turbine spar cap. This predicts the non-uniform thickness and curvature of the cured spar cap.	Ushakov (skoltech), Alexander Safonov (skoltech), Boris Fedulov (skoltech) The research is the succesfull attempt to demonstrate that the thermoplastic composites forming problem can be solved in the framework of the single problem.	3108-1 INVESTIGATION OF MECHANICAL PROPERTIES OF FILAMENT WOUND UNIDIRECTIONAL BASALT FIBER REINFORCED POLYMERS FOR AUTOMOTIVE AND PRESSURE VESSEL APPLICATION Eduard Kessler (NuCellSys GmbH), Rainer Gadow (University of Stuttgart), Patrick Weichand (University of Stuttgart) Comparison of tensile prop- erties of fibers and filament wound polymer composites for filament wound pressure vessels with focus on basalt fibers and basalt fiber com- posites.	3109-1 THE ROLE OF THE EPOXY RESIN: CURING AGENT RATIO IN COMPOSITE INTERFACIAL STRENGTH BY SINGLE FIBRE MICROBOND TEST Ross Minty (University of Strathclyde), James Thomason (University of Strathclyde), Helga Petersen (Technical University of Denmark) Found that the apparent IFSS of the glass fibre-epoxy matrix measured using the microbond test showed a significant dependence on the stoichiometric ratio of the epoxy resin and curing agent present.	
	HEATING OF POLYMER RESIN WITH DISPERSED CARBON NANOTUBES USING INTERDIGITAL ELECTRODE FILM Ryosuke Matsuzaki (Tokyo University of Sicence), Shinya Hatori (Tokyo University of Science), Akira Todoroki	3102-2 ESTIMATION OF STRENGTH AND FRACTURE TOUGHNESS FOR NANOMATERIALS Chyanbin Hwu (National Cheng Kung University), Yu-Kuei Yeh (National Cheng Kung University) The molecular-continuum model proposed previously for the estimation of elastic constants was extended here for the prediction of ultimate strength and fracture tough- ness of nanomaterials.		3104-2 FATIGUE-INDUCED DAMAGE MECHANISMS IN CARBON/EPOXY LAMINATES INFLUENCED BY MEAN STRESS AND FIBRE VOLUME CONTENT Julia Brunbauer (Montanuniversitaet Leoben), Gerald Pinter (Montanuniversitaet Leoben) The combined effect of fibre volume content, ani- sotropy, load amplitude and mechanical mean stress on the mechanical behaviour and the fatigue damage of carbon/epoxy laminates was investigated.	BOXES	3106-2 INFLUENCE OF MANUFACTURING-INDUCED DEFECTS ON THE INTRA- AND INTER-LAMINAR PROPERTIES OF CARBON/ EPOXY NCF LAMINATES Paolo Andrea Carraro (University of Padova), Lucio Maragoni (University of Padova), Marino Quaresimin (University of Padova) The influence of inter-tow voids on the inter-laminar and intra-laminar properties of carbon/epoxy NCF was analysed on specimens infused with different process parameters.	3107-2 3-D DYNAMIC SIMULATION OF FLEXIBLE FIBER WITH A SYSTEM OF ARTICULATED BODIES Khalid El Azzouzi (IRT Jules Verne), Christophe BINETRUY (Institute of Civil Enginneering and Mechanics (GeM)- Ecole Centrale de Nantes ), Sébastien COMAS CARDONA (Institute of Civil Enginneering and Mechanics (GeM)-Ecole Centrale de Nantes) A new discrete element meth- od is developed to study the dynamic motion of a flexible fibre using articulated body system and recursive algo- rithms based on the Newton- Euler equations.	3108-2 MORI-TANAKA METHODS FOR MICROMECHANICS OF RANDOM FIBRE COMPOSITES Stepan Lomay (KU Leuven), Yasmine Abdin (KU Leuven), Atul Jain (KU Leuven) Eshelby/Mori-Tanaka predict adequately the homogenised stiffness, non-linear stress- strain curves stresses in the fibres and on the fibre/matrix interface and progressive fibre debonding.	3109-2 INFLUENCE OF DIFFERENT SIZING ON FRACTURE TOUGHNESS AND FLEXURAL PROPERTIES OF CARBON FIBER REINFORCED POLYPHTHALAMIDE Veronika RadImaier (Technische Universität München-Faculty of Mechanical Engineering), Andreas Erber (Technology & Innovation), Patrik-Vincent Brudzinski (Technology & Innovation), Patrik-Vincent Brudzinski (Technology & Innovation), Hannes Koerber (Technische Universität München-Faculty of Mechanical Engineering), Klaus Drechsler (Technische Universität München-Faculty of Mechanical Engineering) In this study, the influence of two different carbon fiber siz- ing materials was investigated on mode I interlaminar frac- ture toughness and flexural properties of composites with PPA matrix.	OF THERMOPLASTIC- TOUGHENED CFRP COMPOSITES Julián Luis Merino-Pérez (The University of Sheffield), Alma Hodzic (The University of Sheffield), Eleanor Merson (Sandvik Coromant-Sandvik AB), Sabino Ayvar-Soberanis (The University of Sheffield) This investigation focused on the assessment of the induced thermal and mechan- ical damage in the vicinity of the machined surface in the drilling of carbon fibre reinforced polymer (CFRP) composites.

Meeting room 5	Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8
3111 Textile-Based Composites and Fibre Architecture 6	3112 Graphene, Graphene- Based Composites 6	3113 Matrix Materials 1	3114 Fracture and Damage - Materials Scale 1	3115 Models Homogenization – Micro to Macro 1	3116 Nanocomposites for Structural Lightweight - Modelling and Testing 1	3117 Ductile and Pseudo- ductile Composites 2	3118 Fire Resistance 1	3119 Applications - Aerospace 5	3120 New Structural Testing Methods 1	3121 Multifunctional Composites - Sensing and Actuation 6
3111-1 THERMOFORMING SIMULATION OF THERMOPLASTIC PRE- IMPREGNATED TEXTILE REINFORCEMENT Masato Nishi (JSOL Corporation), Tei Hirashima (JSOL Corporation), Tetsusei Kurashiki (Osaka University), Masashi Kurose (Gunma National College of Technology), Tetsushi Kaburagi (Gunma), Keisuke Uenishi (Osaka University) We propose a shell and membrane hybrid FE model of CFRTP for non-isothermal forming simulation. The pro- posed model can describe temperature dependent non-linear in-plane and out- of-plane behaviors.	KEYNOTE 3112-1 STRUCTURAL GRAPHENE COMPOSITES: TAKING THE LESSONS OF FUNDAMENTAL STUDIES THROUGH TO BULK COMPOSITES lan Kinloch (University of Manchester), Lei Gong (University of Manchester), Zhe Ling Li (University of Manchester), Konstantin Novoselov (University of Manchester), Konstantin Novoselov (University of Manchester), Robert Young (University of Manchester) The micromechanics of graphene composites has been explored using Raman spectroscopy on model experimental systems. The knowledge gained has been used to produce bulk com- positen with bich Iondine	3113-1 CURING OF EPOXY RESINS: A NANOSCALE VIEW David Seveno (KU Leuven), Adri Van Duin (Penn State) This study presents a meth- odology to model the curing process of an epoxy system at the atomistic scale using reactive molecular dynamics simulations (ReaxFF force field).	3114-1 A METHOD TO CHARACTERIZE BIAXIAL STRENGTHENING EFFECTS WITH A UNIAXIAL TEST Adam Biskner (LoadPath), Emmett Nelson (Autodesk), Jeffry Welsh (Operationally Responsive Space Office), Andrew Williams (Air Force Research Laboratory Space Vehicles Directorate) This paper seeks to charac- terize the biaxial behavior of composites using a unique uniaxial experimental and verifying it with biaxial data and Autodesk Helius analyti- cal predictions	3115-1 A MULTI-SCALE MODEL FOR THE MECHANICAL PROPERTIES OF FIBER-REINFORCED SILICA AEROGEL COMPOSITE Zeshuai Yuan (Beihang University), Zixing Lu (Beihang University), Zhenyu Yang (Beihang University), Guiping Lin (Beihang University) A new multi-scale model is proposed to investigate the relationship between the mechanical properties and microstructure of fib- er-reinforced silica aerogel composites.	3116-1 MODELING AND PREDCITION OF FRACTURE PROPERTIES IN NANO- GRAPHENE REINFORCED POLYMERS Samit Ray (University of Alabama), Avinash Akepati (University of Alabama), Vinu Unnikrishnan (University of Alabama) In this paper, an atomistic (MD) methodology is employed to compute J-integral using atomistic data obtained from molecu- lar dynamics simulations for epoxy/nanographene using the Reax force field.	HIGH PERFORMANCE PSEUDO-DUCTLE FIBRE REINFORCED COMPOSITES Omar Bacarreza Nogales (Imperial College London), Alexander Bismarck (Imperial College London), Jonny Blaker (University of Manchester), Hele Diao (Imperial College London), Gael Grail (Imperial College London), Paul Robinson (Imperial College London), Soraia Pimenta (Imperial College London), Milo Shaffer (Imperial College London) Approaches are presented for creating composites which exhibit pseudo-duc- tile behaviour. These include discontinuous composites pre-weakened composites	3118-1 POST-FIRE TENSILE PROPERTIES OF SANDWICH COMPOSITES ANDWICH COMPOSITES Aslina Anjang (HMIT University), Mark Spiteri (RMIT University), Venkata Chevali (RMIT University), Stefanie Feih (Singapore Institute of Manufacturing Technology), <u>Adrian Mouritz</u> (RMIT University) A validated thermal-me- chanical model for calcu- lating the residual stiffness and strength of burnt sand- wich composite structures following fire exposure is presented.	3119-1 DEVELOPMENT AND INVESTIGATION OF A HYBRID CURVATURE- MORPHING SKIN STRUCTURE André Schmitz (TU Braunschweig), Peter Horst (TU Braunschweig) A new curvature-morphing skin structure is presented. Large bending fatigue in morphing-direction and transverse strength (avoid- ance of buckling of rubber embedded composite bun- dles) is focused on.	3120-1 MEASUREMENT OF IN-PLANE RESIDUAL STRESSES IN AN AS4/8552 COMPOSITE LAMINATE USING THE DEEP-HOLE DRILLING METHOD C. Garza (University of Bristol), D. J. Smith (University of Bristol), A. Shterenlikht (University of Bristol), M. Pavier (University of Bristol) The in-plane residual stresses in an AS4/8552 composite laminate are experimentally measured using the Deep-Hole Drilling and compared to finite ele- ment predictions and classi- cal lamination theory.	3121-1 SELF SENSING GLASS/EPOXY CROSS- PLY LAMINATES FOR DAMAGE MONITORING UNDER FATIGUE LOADING: MODELLING AND EXPERIMENTS Paolo Andrea Carraro (University of Padova), Michele Zappalorto (University of Padova), Marino Quaresimin (University of Padova), Francesco Panozzo (University of Padova) A solution is presented to predict the variation of the electrical resistance in crossply laminates, caused by matrix cracking. The accuracy of the model is verified by comparison to FE analyses.
3111-2 A STUDY OF WARP-KNITTED FABRIC STRUCTURE PARAMETERS AFFECTING THE MECHANICAL PROPERTIES OF TEXTILE-REINFORCED CONCRETE Olge Stolyarov (St. Petersburg State Polytechnical University), Thi Quadflieg (RWTH Aachen University), Thomas Gries (RWTH Aachen University) The results of investigations on the warp-knited rein- forced fabric and concrete samples from glass and carbon reinforced rovings with three common types of warp-knit stitches are presented.	posites with high loadings.	3113-2 NANO-RUBBER TOUGHENING IN EPOXY AND EPOXY/CARBON FIBRE COMPOSITES: TEMPERATURE EFFECT Feng Xu (The University of Sydney), <u>Hong-Yuan Liu</u> (The University of Sydney) In this paper, we present the results of our recent work on the nano-rubber toughening effects on bulk epoxy and epoxy/carbon fibre composites tested in temperature range -80 to 50.	3114-2 EFFECT OF DAMAGE ON COMPRESSIVE STRENGTH IN FIBER DIRECTION FOR CFRP Gabriel Ever (Laboratoire de Mecanique et d'Acoustique), Olivier Montagnier (Centre de Recherche de l'Airn), Christian Hochard (Laboratoire de Mecanique et d'Acoustique), Jean-Paul Charles (Laboratoire de Mecanique et d'Acous- tique), Frédéric Mazerolle (Laboratoire de Mecanique et d'Acoustique) Compressive strength of CFRP in filber direction is investigated. The effect of matrix damage is particular- ly studied. It is shown that matrix damage decreases significantly the compres- sive strength.	3115-2 MICROMECHANICS MODELING OF MAGNETO- SENSITIVE POLYMERIC MATERIALS DURING CURING George Chatzigeorgiou (Arts et Métiers ParisTech), Mokarram Hossain (University of Erlangen- Nuremberg), Fodil Meraghni (Arts et Métiers ParisTech), Paul Steinmann (University of Erlangen-Nuremberg) This work proposes a cou- pled magneto-mechanical multi-scale model, based on the Mori-Tanaka method, for simulating the curing pro- cess of magneto-sensitive polymers.	3116-2 NANOCOMPOSITES BASED ON NONWOVEN BORON NITRIDE NANOTUBE SHEETS: PROCESSING AND PROPERTIS Behnam Ashrafi (National Research Council), Michael Jakubinek (National Research Council), Jingwen Guan (National Research Council), Yadienka Martinez- Rubi (National Research Council), Keun Su Kim (National Research Council), Kayla ONeili (National Research Council), Meysam Rahmat (National Research Council), Neun Su Kim (National Research Council), Kayla ONeili (National Research Council), Meysam Rahmat (National Research Council), Ali Yousefpour (National Research Council), Andrew Johnston (National Research Council), Benoit Simard (National Research Council) This study focuses on the development of nanocom- posites based on impreg- nation of boron nitride nanotube (BNNT) buckypa- per using a low viscosity aerospace arade epoxy.	Waviness. 3117-2 EXPLORING THE POTENTIAL OF HIERARCHICAL COMPOSITE FIBRE BUNDLES TO IMPROVE THE TENSILE PERFORMANCE OF UNIDIRECTIONAL COMPOSITES Gael Grail (Imperial College London), Marie Coq (Imperial College London), Soraia Pimenta (Imperial College London), Silvestre T. Pinho (Imperial College London), Paul Robinson (Imperial College London) A numerical study on the ability of hierarchical composites (i.e. small FRP bundles embbeded in a soft matrix) to reduce stress of broken fibres and delay final failure.	<u>Katherine Grigoriou</u> (RMIT University ), Adrian Mouritz (RMIT University)	3119-2 STRUCTURAL DESIGN OF THE DTU-ESA MM-WAVE VALIDATION STANDARD ANTENNA Kim Branner (Technical University of Denmark), Peter Berring (Technical University of Denmark), Christen Malte Markussen (Technical University of Denmark), Oleksiy S. Kim (Technical University of Denmark), Sergey Pivnenko (Technical University of Denmark), Olav Breinbjerg (Technical University of Denmark), Olav Breinbjerg (Technical University of Denmark), Olav Breinbjerg (Technical University of Denmark) A new validation antenna is designed in cooperation between DTU and TICRA for European Space Agency. The antenna is designed using CFRP and Invar36 to be extremely thermally and mechanically stable.	3120-2 AN INNOVATIVE MECHANICAL TESTING METHOD FOR MEASURING YOUNG'S MODULUS OF MULTI-LAYERED MATERIALS (OWN-WEIGHT CANTILEVER METHOD) Atsumi Ontsuki (Meijo university) Considering large defor- mation behaviors due to own-weight, an innovative method is developed to measure Young's modulus of each layer in a flexible multi-layered materials (thin plate, rod, wire).	3121-2 BIOCOMPOSITE SUBSTRATES FOR WIRELESS SOIL SENSORS Chad Ulven (North Dakota State University), Mitchel Nordahi (North Dakota State University), Frederik Haring (North Dakota State University), Robert Sailer (North Dakota State University) Biocomposites of flax fiber reinforced polylactic acid were demonstrated as potential substrates for biobased circuit boards used to fabricate wireless soil sensors.

	Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
1:10	3101-3 INNOVATIVE EQUIPMENT CONCEPTS FOR COATING OF COMPOSITE PRODUCTS WITH DUROPLASTIC ADD HERMOPLASTIC ADD HERMOPLASTIC ADD HERVES. Ludger Michels (Coatena Coating Machinery GmbH) Growing market and new pol- ymer and fabric developments demand new and highly innovative impregnation and coating machinery concepts for all kind of prepregs.	3102-3 DEVELOPMENT OF POLYMER NANOCOMPOSITES REINFORCED BY CARBON NANOTUBES WITH 3-D NETWORKS Linfang Cui (The Xinjiang Technical Institute of Physics and Chemistry-Chinese Academy of Sciences), Peng-Cheng Ma (The Xinjiang Technical Institute of Physics and Chemistry-Chinese Academy of Sciences) CNT foam as reinforcement for polymer nanocomposites was developed, ultimately eliminating the problems associated with the dispersion and agglomeration of CNTs in polymers.	3103-2 BLAST PERFORMANCE OF COMPOSITE SANDWICH STRUCTURES Mark Kelly (Imperial College London), Hari Arora (Imperial College London), Alex Worley (Imperial College London), Paolo Del Linz (Imperial College London), Alexander Fergusson (Canterbury Court-1-3 Brixton Road), Paul Hooper (Imperial College London), Brian Hayman (University of Oslo), John Dear (Imperial College London) Full scale air blast testing and finite element analysis on underwater blast testing performed on sandwich com- posite materials, to assess their suitability for naval applications.	3104-3 AN APPROACH TO IDENTIFY MULTIAXIAL FATIGUE LIFE MODEL DEDICATED TO WIND TURBINE BLADES Damien Caous (I2M), Christophe Bois (I2M), Jean- Christophe Wahl (I2M), Thierry Palin-Luc (I2M), Julien Valette (TENSYL) An approach is proposed to investigate multiaxial cyclic stress states in non crimp fabrics wind turbine blade plies and laminates, and iden- tify critical stress states.	3105-3 A TWO-PLY TERMINATION STRATEGY FOR MECHANICALLY COUPLED TAPERED LAMINATES <i>Christopher York</i> (University of <i>Glasgow</i> ) A two-ply termination al- gorithm is used to develop permissible tapered designs, with ply contiguity constraints, giving consistent mechanical coupling characteristics and immunity to thermal warping.	INVESTIGATION OF PROCESS INDUCED DEFORMATIONS	3107-3 VARIABILITY OF PERMEABILITY IN FIBRE PREFORMS MANUFACTURED WITH AFP Mikhail Matveev (The University of Nottingham), Andrew Long (The University of Nottingham), Arthur Jones (The University of Nottingham) Geometry of Automated Fibre Placement (AFP) preforms is analysed by means of image analysis. Results of the anal- ysis are used for prediction of realistic variability of permea- bility in the preforms.	CELLULOSE NANOPAPERS <u>Katri Kontturi</u> (Imperial College London), Koon-Yang Lee (University College London), Eero Kontturi	3109-3 IMPROVING THE INTERFACE IN CARBON FIBRE REINFORCED COMPOSITES WITH WARIABLE STIFFNESS Henry Maples (University of Vienna), Damilola Smith (Imperial College London), (Christoph Burgstaller (Transfercenter für Kunststofftechnik (TCKT)), Paul Robinson (Imperial College London), Alexander Bismarck (University of Vienna) An investigation into how improving adhesion at the in- terleaf/CFRP interface affects the mechanical properties of interleaved composites with controllable stiffness.	3110-3 EXPERIMENTAL CHARACTERIZATION AND NUMERICAL MODELING OF BEARING BEHAVIOUR OF 3D INTERLOCK WOVEN COMPOSITES <i>Richard Mounien (SAFRAN)</i> <i>François-Xavier Irisarri</i> ( <i>ONERA</i> ), <i>Christian Fagiano</i> ( <i>ONERA</i> ), <i>Bastien Tranquart</i> ( <i>SAFRAN</i> ), <i>Nicolas Carrère</i> ( <i>ENSTA-BRETAGNE/LBMS- Brest</i> ) An experimental approach to characterize the bearing behaviour of 3D woven composites is presented. Experimental setups descri tion and damage and failur mechanisms analysis are carried out.
	3101-4 A STOCHASTIC APPROACH TO MODEL VOID FORMATION DURING OUT- OF-AUTOCLAVE PREPREG CONSOLIDATION Rhena Helmus (Technische Universität München), Pascal Hubert (McGill University), Roland Hinterhoelzl (Technische Universität München) A description of mathe- matical models available in stochastics that are suitable to account for variability in Out-of-Autoclave prepregs which may result in voids after material processing.	3102-4 EFFECT OF THE CRYSTALLINITY ON THE BARRIER PROPERTIES OF PLA BASED NANOCOMPOSITES Jon Trifol (DTU), Caglar Mericer (University of Bologna), Anders Egede Daugaard (DTU), Cecile Sillard (Grenoble INP - Pagora), Ole Hassager (DTU), David Plackett (The University of British Columbia), Julien Bras (Grenoble INP - Pagora), Marco Giacinti (University of Bologna), Peter Szabo (DTU) The nanocellulose is an effec- tive filler to improve the barri- er properties of PLA, specially when it is combined with clay decreases the water diffusi- tion through the matrix.	3103-3 A FLUID/SOLID MODEL FOR COMPOSITE SANDWICH SHELLS UNDER WATER BLAST <u>Michelle Hoo Fatt</u> (Univ of Akron), Dushyanth Sirivolu (Univ of Akron) The water blast response of a composite sandwich panel is examined. Blast resistances under water blast/water back and air blast/water back and air blast/air back conditions are compared.	3104-4 INTER FIBRE CRACKING BEHAVIOUR OF CFRP UNDER VERY HIGH CYCLE FATIGUE LOADING: EXPERIMENTAL AND NUMERICAL MULTI-SCALE APPROACH Gordon Just (TU Dresden), Ilja Koch (TU Dresden), Maik Gude (TU Dresden) An energy based approach to model the fatigue behavior of CFRP under VHCF loading is proposed. Verification with ex- perimental results for off-axis cracking in tension and bend- ing shows good agreement.	3105-4 ENERGY METHOD FOR BUCKLING OF CFRP INTERCONNECTED PLATES WITH ARBITRARY BOUNDARY CONDITIONS. Jose Antonio Martin Esteban (Airbus Operations S.L.) An energy method based on the Rayleigh-Ritz approach is developed for the determi- nation of the critical buckling loads of structures formed by a set of interconnected com- posite plates.	3106-4 MEASUREMENT AND SIMULATION OF EDGE DEFECTS IN TURNING OF SICP/AL COMPOSITES Li Zhou (Shenyang) SiC particle reinforced Al matrix (SiCp/Al) composites exhibit excellent physical and mechanical properties compared with conventional materials, such as high specific modulus, improved resistance to	3107-4 MODELLING OF COMPRESSION MOULDING PROCESS CYCLE TIME AND APPLICATION OF DFMA CONCEPT TO EVALUATE THE TOOLING COSTS FOR CARBON FIBER REINFORCED THERMOPLASTIC COMPOSITES T-SHAPE PARTS Anh Dung Ngo (Ecole de tech- nologie superieure), Mohamed EL Wazziki (Ecole de technolo- gie superieure) The simulated compression moulding process cycle time and the estimated mould costs for carbon fiber rein- forced thermoplastic com- posites T-shape parts were validated		3109-4 ASSESSMENT OF INTERFACIAL ADHESION BETWEEN CARBON FIBER AND EPOXY BY TRANSVERSE FIBER BUNDLE AND SINGLE FIBER FRAGMENTATION TESTS Guocheng Qi (Beihang University), Jaxin Liu (Beihang University), Jaxin Liu (Beihang University), Jaxin Liu (Beihang University), Jaxin Liu (Beihang University), Soming Zhang (Beihang University) Du (Beihang University) This work concentrates on contrasting interfacial normal strength and interfacial shear strength results separately from the transverse fiber bundle test and fragmenta- tion test.	3110-4 USING A POLYEST POWDERCOATING FOR THE INTERLAMINAR TOUGHENING OF GLASS/ EPOXY COMPOSITE LAMINATES Lode Daelemans (Ghent University), Sam van der Heijden (Ghent University), Ives De Baere (Ghent University), Hubert Rahier (Vrije Universiteit Brussel), Wim Van Paepegem (Ghen University), Karen De Clerc (Ghent University) In this study we will show a proper selection of bisph nol A based polyester bind (FILCO, ATLAC,) concen tion increase the mechanic properties of GFRP laminat

Meeting room 5	Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8
3111-3 A STUDY	3112-2 WIDEBAND,	3113-3 THE STUDY		3115-3	3116-3 CHEMICAL,	3117-3 BIO-INSPIRED	3118-3 SIMULATION OF	3119-3 UNDERSTANDING	3120-3 DAMAGE	3121-3 ARTIFICIAL
ON GEOMETRICAL	FLEXIBLE AND HIGH	OF HCL PENETRATION	CRITICAL DAMAGE	MICROMECHANICAL	MORPHOLOGICAL	MICROSTRUCTURE		VOLTAGE AND CURRENT	DETECTION OF COMPOSITE	
PARAMETERS	PERFORMANCE EMI	BEHAVIOR INSIDE OF	ENVELOPES FOR	MODELING OF THE	AND MECHANICAL	DESIGN TO IMPROVE		DISTRIBUTION OF COST	LAMINATES BASED ON	FROM STRUCTURAL
INFLUENCING THE	SHIELDING THIN FILM	AN UNSATURATED	MULTIDIRECTIONAL	NONLINEAR DEFORMATION		TRANSLAMINAR	EXPOSED FRP COMPOSITE		VIBRATION TESTING	MICROFIBERS AND CNT
MECHANICAL SPREADING	BASED ON GRAPHENE-	POLYESTER RESIN		OF LFTS UNDER	OF THE INTERPHASE		BULKHEAD	COMPOSITE TEST		ARRAYS FOR EMBEDDED
OF FIBER BUNDLES	NANOTUBE-IRON 3D	UNDER TEMPERATURE	UNDER MULTIAXIAL	CONSIDERATION OF THE	OF POLYMER MATRIX	THIN-PLY COMPOSITES		SAMPLES FOR AIRCRAFT		FLOW SENSING
Maximilian Toneic	NANOSTRUCTURE	GRADIENT TO SIMULATE	LOADING CONDITIONS	EFFECTS OF INTERFACE	COMPOSITES	Gianmaria Bullegas (Imperial	Research Institute of	LIGHTNING STRIKE TESTS		Keith Slinker (Air Force
(Processing of Composits ),	Si-Hwa Lee (KAIST), II-Kwon			DAMAGE	Dhriti Nepal (Universal	College London), Silvestre	Sweden), Johan Sandström	Giuseppe Mastrolembo	A superposed waveform	Research Laboratory),
Ewald Fauster (Processing	Oh (KAIST)	ROOF FAILURE OF FRP	of Toronto), Chandra Veer	Sascha Fliegener	Technology Corporation).	T. Pinho (Imperial College	(SP Technical Research	(Cardiff University), A. Manu	method (SWM) is proposed	Corev Kondash (Air Force
of Composits). Ralf		OUTDOOR STORAGE	Singh (University of Toronto)	(Fraunhofer Institute for	Allison Echer (Universal	London), Soraia Pimenta	Institute of Sweden). Joakim	Haddad (Cardiff University),	as a fast, easy and universal	Research Laboratory),
Schledjewski (Processing of		TANK CONTAINING HIGH		Mechanics of Materials	Technology Corporation),	(Imperial College London)	Albrektsson (SP Technical	Matthew Cole (Airbus Group		Matthew Maschmann (Air
Composits)		CONCENTRATION HCL		IWM), Jörg Hohe (Fraunhofer	James Moller (Miami	(imperial conege zenach)	Research Institute of	Innovations), Simon Evans	detection technique of com-	Force Research Laboratory),
composito)		SOLUTION		Institute for Mechanics of	University), Steve Barr	We developed an analytical	Sweden), Johan Anderson	(Airbus Group Innovations)	posite structures, especially	Benjamin Severin (Federal
To fully understand the		Pradchar Pradyawong		Materials IWM). Benedikt	(Universal Technology	model and a manufacturing	(SP Technical Research		at high frequencies.	Republic of Germany
mechanisms which influ-		(Tokvo Institute of		Haspel (Karlsruhe Institute	Corporation), Rajiv Berry	technique which allowed us		Current distribution within a	at high hoqueholde.	Liaison Office for Defense
ence geometrical behaviour		Technology), Masatoshi		of Technology KIT), Kay	(Air Force Research Lab),	to promote and control the		laminated CFRP sample with		Material USA/Canada).
of direct rovings a study on		Kubouchi (Tokyo Institute		André Weidenmann	Timothy Breitzman (Air	formation of large bundle	Finite element simulation	a fastener at its center and		Gregory Reich (Air Force
spreading was carried out,		of Technology), Saiko		(Karlsruhe Institute of	Force Research Lab)	pull-outs during translam-	of large scale fire tests	voltage drop between the		Research Laboratory),
via rollers causing mechani-		Aoki (Tokyo Institute of		Technology KIT)		inar fracture of composite		current injection point and		Beniamin Dickinson (Air
cal deflection.		Technology), Tetsuya Sakai			The key focus includes	laminates.	· · · · · · · · · · · · · · · · · · ·	the grounding system using		Force Research Laboratory),
		(Nihon University)		Fiber debonding is eval-	understanding the chemical		degradation induced	a parametric simulation		Jeffrey Baur (Air Force
		(		uated by fiber pushout	network structure of the		delamination and collapse,			Research Laboratory)
		A study aims to investigate		experiments. The results are	bulk matrix and the inter-		simulated in 2D and 3D			
		a roof failure of FRP chem-		fed into a micromechanical	phase in PMC and property		and compared to tested			Artificial hair sensors for air
		ical tank containing high		model (RVE) of LFT. Interface			behavior.			flow detection or structural
		HCI. Temperature gradient		damage inside the nonwo-	and simulation.					monitoring are fabricated
		experiment show signifi-		ven structure is visualized						from S2 microfibers and
		cantly affect to the strength		by FE-simulation.						CNT arrays to transduce
		of UP resin , which decrease								small force or displacement
		about 50%.								changes into changes in
										resistance.
3111-4 MECHANICAL	3112-3 SYNTHESIS OF	3113-4 MECHANICAL	3114-4 MODE I	3115-4 DAMAGE	3116-4 TUNING	3117-4 USE OF	3118-4 EFFECT OF DOPO-		3120-4 DOUBLE BEAM	
CHARACTERISATION	GRAPHENENANOPLATES	PROPERTIES OF A HIGH	FRACTURE TOUGHNESS	BEHAVIOR IN ANGLE-	INTERFACE VIA MULTI-	INTERMITTENT	BASED COMPOUND ON		SHEAR (DBS) – A	
OF COMPOSITES	FROM ORGANOCLAY	STRENGTH ALUMINIUM	OF TRANSVERSELY	PLY CFRP LAMINATES	SCALE MODELING FOR	INTERFACES AND	THE FLAMMABILITY AND		NEW TEST METHOD	
WITH 3D-WOVEN	TEMPLATES AND THEIR	ALLOY DEVELOPED	LOADED LAYERS OF	WITH DIFFERENT PLY	SUPERIOR CARBON	WEAKENED PLIES TO	MECHANICAL PROPERTIES		FOR DETERMINING	
REINFORCEMENT	REINFORCEMENT IN	THROUGH POWDER	GFRP'S FABRICATED WITH	THICKNESS	NANOTUBE-POLYMER	ACHIEVE PSEUDO-	OF RAMIE/POLY(LACTIC		INTERLAMINAR SHEAR	
Tomas Ekermann	THERMOSET POLYMER	METALLURGY	DUCTILE MATRICES	Nurul Nabihah A Hamid	NANOCOMPOSITES/	DUCTILITY IN CARBON-	ACID) COMPOSITES		PROPERTIES OF	
(Lightweight Structures),	<u>Vijaya Rangari</u> (Tuskegee	Hippolyte Queudet (French-	Davi Montenegro (Inspire	(Tokyo University of	YARNS	EPOXY COMPOSITES	Tao Yu (Tongji University),		COMPOSITE LAMINATES	
Stefan Hallström	University), Emmanuel	German Research Institute	AG), Francesco Bernasconi	Science), Shinji Ogihara	Elif Ozden-Yenigun (Istanbul	Omar Bacarreza (Imperial	Yan Li (Tongji University)		Gang Zhou (Loughborough	
(Lightweight Structures)	Akugre (Tuskegee	of Saint-Louis), Sébastien	(ETH Zurich), Rafael Libanori	(Tokyo University of Science)	Technical University), Canan	College London), Paul			University), Pete Nash	
	University), Shaik Jeelani	Lemonnier (French-German	(ETH Zurich), Markus Zogg		Atilgan (Sabanci University),	Robinson (Imperial College	Flame retardant ramie		(Loughborough University),	
Carbon/epoxy composite	(Tuskegee University)	Research Institute of Saint-	(Inspire AG), Paolo Ermanni	Nowadays, CFRP is being	James Elliott (University of	London)	reinforced PLA composites		Joanne Whitaker	
specimens, with fully		Louis), Elodie Barraud	(ETH Zurich), André Studart	widely used especially	Cambridge)		were prepared loaded with		(Loughborough University),	
interlaced 3D-woven rein-	In this research we have	(French-German Research	(ETH Zurich)	in aircraft industry in		The deliberate introduction	DOPO-COOH by twin-screw		Nicholas Jones (Nicholas	
forcement, were tested and	successfully synthesized	Institute of Saint-Louis),		regards to its strength and	This study is concerned with		extruder. DOPO-COOH in the		Jones and Associates Ltd)	
the results are presented.	graphene platelets by	Nathalie Allain (Université de		light-weighted properties.	finding an improved route to		composites are proved to			
Focus is on the weave ar-	simple autogenic pressure	Lorraine), Thierry Grosdidier		A unidirectional CFRP lami-	achieve superior properties	was studied as a means of	be very effective to improve		Loughborough University	
chitecture's influence on the	reaction. The as synthesized	(Université de Lorraine),	90°) and mode I intralaminar	nates has high stiffness and	of carbon nanotube (CNT)-	producing a pseudo-ductile	flame retardancy.		has developed a new inter-	
mechanical properties.	materials is characterized	Eric Gaffet (Université de	fracture toughness (90°) of	strength in its fib	reinforced nanocomposites	tensile stress-strain be-			laminar shear test method,	
	using Rama spectrometer	Lorraine)	unidirectional GFRPs fabri-		by designing their interface	haviour.			called the Double Beam	
	and X-ray diffraction.		cated either with an epoxy		using multi-scale modeling.				Shear, It not only guarantees	
			or a thermoset polyurethane						ILS failure but also provides	
			resin.						greater ILS strength.	

	Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
11:20	3201 Processing - Manufacturing Technology 7	3202 Nano Composites 7	3203 ONR Special Symposium on Marine Composites 2	3204 Fatigue 7	3205 Structural Analysis and Optimization 7	3206 Process Induced Effects 6	3207 Process Modelling 7	3208 Biocomposites 6	3209 Interfaces and Interphases 7	3210 Damage Tolerance of Composite Structures 2
-	PROCESSING CONDITIONS IN UNIDIRECTIONAL CARBON FIBER THERMOPLASTIC TAPE LAVING Daiki Tanabe (Osaka universi- ty), Kazuaki Nishiyabu (Kinki university), Tetsusei Kurashiki (Osaka university) In this study, the effects of processing parameters for carbon fiber thermoplastic tape laying using near infra- red heater was investigated to predict the optimum process- ing conditions.	3202-1 INTERFACIAL AND INTERNAL STRESS TRANSFER IN CARBON NANOTUBE BASED NANOCOMPOSITES Bobert Young (University of Manchester), Ian Kinloch (University of Manchester), Libo Deng (Chinese Academy of Sciences), Tamer Wafy (Military Technical College) This study is concerned with structure-property relationships in different types of CNTs, in particular investigating both interfacial and internal stress transfer for CNTs in nanocomposites.	3203-1 LOW TEMPERATURE IMPACT OF COMPOSITE HULL WALL WITH FLOATING RIGID BODY Giancarlo Caprino (University of Naples "Federico II"), Antonio Langella (University of Naples "Federico II"), Valentina Lopresto (University of Naples "Federico II") Experimental activity to assess the impact behavior at room and low temperature of laminates used in the ship- building industry. Impacts of a hull with a solid body in the water were reproduced.	3204-1 MICROSCOPIC Damage evolution in OFF-	3205-1 FORCED VIBRATION ANALYSIS AND OPTIMIZATION OF MODERATELY-THICK FIBER STEERED LAMINATES WITH EMBEDDED GAPS AND OVERLAPS Abdolhamid Akbarzadeh. Shafaroudi (McGill University), Mahdi Arian Nik (McGill University), Damiano Pasini (McGill University) Numerical results have shown that plates with gaps have a higher amplitude of dynamic deflection and a lower response frequency compared to a defect-free plate, as opposed to a plate with overlaps.	3206-1 INFLUENCE OF THE THERMO-MECHANICAL PROPERTIES ON THE PREDICTIONS OF THE CURE- INDUCED DEFORMATIONS IN THERMOSET-BASED COMPOSITE PARTS Antoine Parmentier (Cenaero), Benoît Wucher (Cenaero), David Dumas (Cenaero) The present study aims at determining the numerical model complexity in terms of material properties and boundary conditions allowing to predict the cure-induced spring-in with sufficient accuracy.	3207-1 PREDICTION OF AUTOCLAVE CURING OF AERONAUTICAL COMPOSITES PARTS AND OF RESULTING SPRING-IN THROUGH ESI COMPOSITES SIMULATION SOLUTION Laurent Dufort (ESI Group), Jia Lijie (Shanghai Aircraft manufacturing), Liu Weiping (Shanghai Aircraft manufac- turing), Yan Dongxiu (Shanghai Aircraft manufacturing) Prediction of autoclave curing of SAMC aeronau- tical composites parts and resulting spring-in through ESI Composites Simulation Solution (funding from BPI Fr N°A1207028 Q & ISTCP N°2013DFG52420)	3208-1 OPPORTUNITIES FOR BIO-BASED COMPOSITES IN ADVANCED INDUSTRIAL SECTORS Maya John (CSIR), Steve Chapple (CSIR) The presentation highlights recent research at the Council for Scientific and Industrial Research (CSIR), South Africa on bio-composites for ad- vanced industrial applications.	THERMAL HISTORIES ON CARBON FIBER/POLYAMIDE 6 MICROCOMPOSITE LOAD TRANSFER EFFICIENCY:	KEYNOTE 3210-1 CONSTITUTIVE MODELING AND EXPERIMENTAL CHARACTERIZATION OF THE NON-LINEAR STRESS- STRAIN BEHAVIOR OF UNIDIRECTIONAL CARBON- EPOXY UNDER HIGH STRAIN RATES Matthias Vogler (Leibniz University Hannover), Hannes Koerber (Technical University Hannover), Hannes Koerber (Technical Hannes Koerber (Technical H
-	PERFORMANCE AND PROCESS CONDITIONS OF THERMOPLASTIC COMPOSITE LAMINATES PROCESSED BY AUTOMATED TAPE PLACEMENT Norimichi Nanami (Nagoya University), Takashi Sato (Nagoya University), Tadashige Ikeda (Nagoya University), Takashi Ishikawa (Nagoya	3202-2 DEVELOPING COMPONENT-SCALE HEIRARCHICAL COMPOSITES USING PLASMA FUNCTIONALISED NANO- CARBONS Mark Eaton (Cardiff University), Wayne Ayre (Cardiff University), Martin Williams (Haydale Limited), Rhys Pullin (Cardiff University), Samuel Evans (Cardiff University)	3203-2 EFFECT OF FRIGID TEMPERATURES ON THE DYNAMIC PROPERTIES OF FIBER REINFORCED MARINE COMPOSITES Maen Alkhader (Stony Brook University), Fu-Pen Chiang (stony brook university) Fibre reinforced composites, such as carbon reinforced vinyl-ester, are increasingly being considered as practical structural materials for cur- rent and new classes of civil- ian and military naval craft		3205-2 ROBUST AEROELASTIC OPTIMISATION OF COMPOSITE WINGS SUBJECT TO MATERIAL PROPERTY AND MANUFACTURING UNCERTAINTY Carl Scarth (University of Bristol), Pia Sartor (University of Bristol), Pia Sartor (University of Bristol), Jonathan Cooper (University of Bristol), Faul Weaver (University of Bristol), Gustavo Silva (Embraer S.A.) An efficient approach using adaptive surrogate modelling techniques is presented for the robust aeroelastic opti- misation of composite plate wings with manufacturing uncertainty in the plies.	3206-2 SHAPE DISTORTION ANALYSIS OF A COMPLEX SHAPED WING SKIN SECTION Erik Hörberg (Saab AB), Tonny Myman (Saab AB), Thomas Hellström (Saab AB), Anas Bohlin (Saab AB), Rolf Berg (Saab AB) In the Clean Sky programme Saab has developed a co- cured fully integrated carbon fibre upper wing-cover. This paper covers the shape distortion analysis and tooling technology used.	3207-2 3D THERMO- MECHANICAL MODEL BASED SIMULATION OF THE WELDING OF THERMOPLASTIC COMPOSITE TAPE USING AUTOMATED TAPE LAYING (ATL) PROCESS Yann Duplessis Kergomard (ESI GROUP), Britto Satheesh (Montanuniversität Leoben), Laurent Dufort (ESI GROUP), Raft Schledjewski (Montanuniversität Leoben) This paper presents the works done in the STELLAR project about the 3D ther- mo-mechanical model based simulation of the welding of thermoplastic composite tape using Automated Tape Laying process.	3208-2 MECHANICAL PERFORMACE OF NCC-FOAM Peter Mannberg (Swerea SICOMP AB), Birgitha Nyström (Swerea SICOMP AB), Fredrik Ahlqvist (Swerea SICOMP AB) A newly developed self-as- sembling technique for crystalline nano cellulose into foam gives opportunities to tailor properties to a com- petitive material against fos- sil-based oil based foam.	3209-2 PATTERNED GLASS FIBER SURFACES - ROUTE TO INTERFACE MODIFICATION? Seethalakshmi Chandramouli (Katholieke University Leuven), Mengshi Liu (Katholieke University Leuven), Frederik Ceyssens (Katholieke University Leuven), Larissa Gorbatikh (Katholieke University Leuven), David Seveno (Katholieke University Leuven) The work reports results relat- ed to the surface modification of glass fibers, by formation of line-space patterns composed of hydrophilic and hydro- phobic functional sequences along the fiber length.	dynamic strain rates.

Meeting room 5	Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8
3211 Textile-Based	3212 Graphene, Graphene-	3213 Matrix Materials 2	3214 Fracture	3215 Models	3216 Fracture and	3217 Ductile and Pseudo-	3218 Fire Resistance 2	3219 Applications -	3220 New Structural	3221 Multifunctional
Composites and Fibre Architecture 7	Based Composites 7		and Damage - Micromechanics 6	Homogenization – Micro to Macro 2	Damage - Delamination 6	ductile Composites 3		Aerospace 6	Testing Methods 2	Composites - Adaptive Response and Reconfiguration 1
3211-1 RATE-DEPENDENT BEHAVIOR OF ARAMID FIBERS COATED WITH SHEAR THICKENING FLUIDS Sungjin Han (Seoul national university), Wonjin Na (Seoul national university), Hyunchul Ahn (Seoul nation- al university), Woong-Ryeol Yu (Seoul national university) In this study, the shear stress of STF-coated single aramid fiber was evaluated by single fiber pull-out test. The rate-dependent behavior can be ascribed to the STF effects at micros- cale level.	3212-1 MELT PROCESSING AND PROPERTIES OF POLYAMIDE 6/GRAPHENE NANOPLATELET COMPOSITES Beatriz Mayoral (Queen's University), Eileen Harkin- Jones (University of Ulster), Noorunnisa Khanam (Qatar University) Mariam (Qatar University), Mariam (Qatar University), Mariam (Qatar University), Mariam (Qatar University), Mariam (Qatar University), Dan Sun (Queen's University) Processing and charac- terization (morphological, thermal, mechanical and electrical properties) of Polyamide 6 (PA6)/graph- ite nanoplatelets (GNPs) composites prepared by melt-mixing extrusion.	3213-1 MECHANICAL PERFORMANCE OF NOVEL HIGH TG POLYIMIDE MATRIX CARBON FIBRE- REINFORCED LAMINATES Spyros Anastasios Tsampas (Swerea SICOMP AB), Patrik Sven Fernberg (Swerea SICOMP AB), Roberts. Joffe (Luleâ University of Technology) Mechanical properties of a newly developed carbon fiber/polyimide composite T650/NEXIMID® MHT-R with exceptionally high Tg (~370-420°C) are evaluated and compared with other commercial materials.	3214-1 COMPUTATIONAL MICROMECHANICS APPLIED TO POLYMER MATRIX COMPOSITES: FIBER-DEPENDENT PROPERTIES Fernando Naya (IMDEA Materials), Miguel Monclús (IMDEA Materials), Carlos González (Polytechnic University of Madrid- ETSCCP), Jon M. Molina- Aldareguia (IMDEA Materials), Claudio Lopes (IMDEA Materials) A coupled experimen- tal-computational micro- mechanical framework has been developed to determine longitudinal mechanical properties of a fiber-reinforced composite lamina.	3215-1 STRENGTH PREDICTION FOR TEXTILE COMPOSITES USING ARTIFICIAL NEURAL NETWORK, PRINCIPLE COMPONENT ANALYSIS AND UNIT CELLS Qing Pan (University of Nottingham), Elena Sitnikova (University of Nottingham), Shuguang Li (University of Nottingham) Shuguang Li (University of Nottingham) Unit cell and Artificial Neural Network has been employed to represent the damage initiation and evolution of 3D textile composites under 3D textile composites under index of the solution of 3D textile composites under from micro to macro scale level.	3216-1 MULTI-SCALE MECHANICAL ANALYSIS OF INTERFACE DELAMINATION IN HIGH-TOUGHNESS METAL-ELASTOMER INTERFACES Johan Hoefnagels (Eindhoven University of Technology), Jan Neggers (Eindhoven University of Technology), Marc Geers (Eindhoven University of Technology), Marc Geers (Eindhoven University of Technology)		3218-1 FIRE STRUCTURAL PERFORMANCE OF FLAX FIBER ERLINFORCED LAMINATES Tammay Bhat (RMIT University), Venkata Chevali (RMIT University) Adrian Mouritz (RMIT University) The fire structural perfor- mance of a flax reinforced polymer matrix composite is experimentally assessed in this paper. Strength loss at high temperatures are investigated.	3219-1 MODELLING ACOUSTIC EMISSION EVENTS IN CARBON FIBRE LAMINATES FOR DAMAGE DETECTION AND IDENTIFICATION UNDER STATIC AND CYCLIC LOADS Luiz Kawashita (University) of Bristol), Mark Eaton (Cardiff University), Carol Featherston (Cardiff University) Techniques for scale-up of hierarchical composite manufacture are presented. Including plasma function- alization of MWCNT and graphene and liquid infusion of stiffened panels up to 0.9 x 0.55m in size.		3221-1 ACTIVE COMPOSITES AND 4D PRINTING Kai Yu (Georgia Institute of Technology), Yiqi Mao (Georgia Institute of Technology), Martin Dunn (Singapore University of Design and Technology), <u>H.</u> Jerry Qi (Georgia Institute of Technology) We present the paradigm of printed active composites and 4D printing where the shape of a printed 3D object can change upon external stimuli, thus offering one additional dimension, time.
3211-2 THE EFFECT OF PREFORMING QUALITY OF NON-CRIMP FABRICS AND THE MECHANICAL PROPERTIES OF THEIR COMPOSITES Long Li (Beihang University), Yan Zhao (Beihang University), Shitai Liu (Beihang University), Shitai Liu (Beihang University), Gang Liu (AVIC Composites Center), Jianwen Bao (AVIC Composites Center) Shear deformation, permea- bility of the non-crimp fabric and mechanical behavior of the composites are in- vestigated, after draping the reinforcements on a hemisphere.	3212-2 COMPRESSION BEHAVIOUR OF GRAPHENE FLAKES OF VARIOUS THICKNESSES EMBEDDED IN POLYMER MATRICES Charalampos Androulidakis (ICEHT/FORTH), Georgia Tsoukleri (ICEHT/FORTH), Georgia Tsoukleri (ICEHT/FORTH), Dimitris Sfyris (ICEHT/FORTH), John Parthenios (ICEHT/FORTH), John Parthenios (ICEHT/FORTH), John Parthenios (ICEHT/FORTH), Konstantinos Papagelis (ICEHT/FORTH), Costas Galiotis (ICEHT/FORTH) COMPRESSION BEHAVIOUR OF GRAPHENE FLAKES OF VARIOUS THICKNESSES EMBEDDED IN POLYMER MATRICES by J. Parthenios, C. Androulidakis, E. N. Koukaras, G. Tsoukleri, D Sfyris, K. Papagelis and C Galiotis	3213-2 SYNTHESIS AND CHARACTERIZATION OF CONDUCTIVE CFRP & GFRP USING PANI- BASED ELECTRICALLY CONDUCTIVE THERMOSET POLYMER MATRIX <i>Vipin Kumar</i> (The University of Tokyo), Tomohiro Yokozeki (The University of Tokyo), T. Goto (Yamagata University) Tatsuhiro Takahashi (Yamagata University) In the present work, PANI-based electrically conductive matrix used to prepare conductive ther- mosetting FRP composites. The conducting component of the matrix is polyaniline, protonated with DBSA.	3214-2 INFLUENCE OF MOLDING OPERATION TIMES ON MECHANICAL PROPERTIES OF THE COMPOSITES PREPARED BY HAND LAY-UP METHOD Masakazu Migaki (Kyoto), Tetsuo Kikuchi (Kyoto Institute of Technology) Hiroyuki Hamada (Kyoto Institute of Technology) Fiber reinforced plastic (FRP) has been referred to a composite material which has been impregnated fib- er-reinforcement with curing resin as the base material. FRP is used as an alterna- tive replacemen	3215-2 EFFECT OF INTERFACIAL SHEAR STRENGTH ON MECHANICAL PROPERTY OF 4D CARBON/CARBON COMPOSITES <i>Yingqiang_Liag (Xi'an aero-space composites research institute)</i> average stiffness increases when interfacial shear strength increases, and axial elastic modulus is essentially in accord with experiment test result when the interfacial shear strength is 10.0MPa.	T-JOINT: EXPERIMENT AND SIMULATION Yu E Ma (Northwestern Poltechnical University), Rong Hua Du (School of Aeronautics), Pan Fu Xu	of Manchester), Prasad Potluri (University of Manchester), Stephen Ogin (University of Surrey) The paper presents a cohe- sive study of effect of braid angle, effect of tow bound-	3218-2 CHARACTERISATION OF COMPOSITE MATERIAL BEHAVIOUR UNDER MECHANICAL LOADING AND FIRE EXPOSURE Abdelkibit BENELFELLAH (Institut Pprime UPR 3346 – CNRS – ENSMA – Université de Poitiers), Thi Hai Yen QUACH (Institut Pprime UPR 3346 – CNRS – ENSMA – Université de Poitiers), Damien HALM (Institut Pprime UPR 3346 – CNRS – ENSMA – Université de Poitiers), Thomas ROGAUME (Institut Pprime UPR 3346 – CNRS – ENSMA – Université de Poitiers), Denis BERTHEAU (Institut Pprime UPR 3346 – CNRS – ENSMA – Université de Poitiers), Denis BERTHEAU (Institut Pprime UPR 3346 – CNRS – ENSMA – Université de Poitiers) Hydrogen is expected to be valuable energy carrier for the future. To exploit its benefits, a study of thermal degradation property and influence of a fire on resid- ual mechanical behavior is	3219-2 FULL-FIELD THROUGH-TRANSMISSION ULTRASONIC WAVE PROPAGATION IMAGING FOR NONDESTRUCTIVE COMPOSITE INSPECTION Seung-Chan Hong (LANL- CBNU Engineering Institute Korea, Jung-Ryul Lee (Korea Advanced Institute of Science and Technology) In this study, full-field pulse- echo ultrasonic wave prop- echo ultrasonic wave prop- echo ultrasonic wave prop- inspection visualizes the de- fects induced in composite structures.	3220-2 CRITICAL STRAIN DETERMINATION BASED ON THE EULER-FRESNEL JIG Sotiris Koussios (Delft University of Technology), Katrin Tazelaar (Camposites), Bert Rozen (Catholic University of Leuven), Adriaan Beukers (Delft University of Technology), Rene Alderliesten (Delft University of Technology) In this paper we present a novel method for the deter- mination of critical strain on composite strip-formed specimens. The definition "critical strain" reflects here on the strain level at which the fi	3221-2 MATERIALS WITH VARIABLE STIFFNESS Angelika Bachinger (Swerea SICOMP AB), Peter Hellströn (Swerea SICOMP AB), Erik Marklund (Swerea SICOMP AB), Edit AB), Gaurav Vyas (Swerea SICOMP AB), Leif E. Asp (Swerea SICOMP AB) Different stiffness-modifi- able composite materials were evaluated regarding their mechanical and thermal properties as well as their feasibility for traffic safety applications.

	Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
		3202-3 INFLUENCE OF	3203-3 MIXED-MODE	3204-2 FATIGUE LIFE	3205-3 MULTI-MATERIALS	3206-3 MODELING OF	3207-3 NUMERICAL STUDY	3208-3 WHAT DOES	3209-3 SURFACE	3210-2 STATIC AND IMPACT
		CARBON NANOTUBES ON	DEBOND FRACTURE	EVALUATION OF SPAR CAP	SELECTION USING GENETIC	MESO-SCALE VOID	OF THE INFLUENCE ON	NANOCELLULOSE DO	PROPERTIES OF CARBON	TESTING OF COMPOSITE
		HEATING EFFICIENCY OF THE		MATERIALS BY FOUR POINT	ALGORITHM	FORMATION IN AN	THE MAX TEMPERATURE	TO THE PROPERTIES OF	FIBERS: IMPACT ON	FAN BLADE LEADING
		AU NANOPARTICLES SMALL	FOAM CORE SANDWICH	BENDING TEST ON WIDTH-	Baracchini Paul (CNRS-I2M-	ARBITRARY RESIN	INSIDE THE RESIN MATRIX	THERMOPLASTIC NATURAL	THE MECHANICAL	EDGE SUBCOMPONENT
		HEAT SOURCE	COMPOSITES UNDER	TAPERED SPECIMENS	UMR 5295), Guillebaud Claire	IMPREGNATION ANGLE OF	COMPOSITES WITH	FIBRE COMPOSITES?	PERFORMANCE OF SHORT	DEMONSTRATING IMPROVED
		Rongguo Wang (Harbin	ARCTIC LOW TEMPERATURE		(Univ. Bordeaux-I2M-UMR	VARTM	DIFFERENT THICKNESS	Marta Fortea Verdejo (Institute	FIBER REINFORCED	DAMAGE TOLERANCE
	(University of Twente), Laurent		CONDITIONS	Institute for Materials re-	5295), Kromm Francois-Xavier			of Materials Chemistry	POLYPROPYLENE	THROUGH THERMOPLASTIC
		Chenggin Dai (Harbin Institute	Arash Farshidi (Technical	search and Testing). Ricardo	(Univ. Bordeaux-I2M-UMR	of Science). Rvosuke	CURING PROCESS	and Research-Faculty of	COMPOSITES	POLYURETHANE INTERLEAVE
		of Technology ), <u>Lifeng Hao</u>	University of Denmark).	Basan (Siemens)	5295). Wargnier Hervé (Univ.	Matsuzaki (Tokvo Universitv	Fei Sun (Huazhong University	Chemistry), Elias Bumbaris	Christoph Unterweger	Sandi Miller (NASA Glenn
		(Harbin Institute of Technology			Bordeaux-I2M-UMR 5295)	of Science), Daigo Seto (Tokyo	of Science and Technology),	(Institute of Materials	(Kompetenzzentrum Holz	Research Center), Gary
		), Qi Wang (Harbin Institute of	University of Denmark)	The paper focuses on a		Institute of Technology), Akira	Dunming Liao (Huazhong	Chemistry and Research-	GmbH (Wood K plus)), Jiri	Roberts (NASA Glenn
	strength of laser assisted fiber			new method to evaluate the	The aim of this study is to	Todoroki (Tokyo Institute of	University of Science and	Faculty of Chemistry), Koon-	Duchoslav (Johannes Kepler	Research Center), Lee
	placement produced lami-	(Harbin Institute of Technology	Mixed-mode I/II fracture	fatigue strength of thick unidi-	propose a multi-material	Technology)	Technology), Yongzhen Jia	Yang Lee (Imperial College	University (JKU) Linz),	Kohlman (NASA Glenn
		), Ping Peng (Harbin Institute	characterization of low tem-	rectional laminates to be ap-	design method allowing a		(Huazhong University of	London), Alexander Bismarck	David Stifter (Johannes	Research Center). Paula
		of Technology ), Dongyao	perature fracture properties	plied in spar caps. Therefore,	simultaneous selection of	For the inhibition of the for-	Science and Technology), Liu	(Imperial College London)	Kepler University (JKU)	Heimann (Ohio Aerospace
	tion on fracture toughness are		for typical naval foam core	a width-tapered bending	architectures and materials	mation of void, we evaluated	Cao (Huazhong University of		Linz). Christian Fürst	Institute). Michael Pereira
		Technology ), Wenbo Liu	sandwich composites has	specimen was developed	using genetic algorithm.	the void formation during	Science and Technology), Tao	Bacterial cellulose was shown	(Kompetenzzentrum Holz	(NASA Glenn Research
		(Harbin Institute of Technology		and tested.	3.3	VaRTM experiments. Based	Chen (Huazhong University of	to improve the tensile prop-	GmbH (Wood K plus))	Center), Charles Ruggeri
		), Weicheng Jiao (Harbin	mixed mode bending (MMB)			on the experiments, analytical	Science and Technology)	erties of PLA/flax composites	,, p	(NASA Glenn Research
		Institute of Technology ),	test fixtrure.			model developed for predict-	3)/	by acting as a melt support	Impact of carbon fiber surface	
		Fan Yang (Harbin Institute of				ing the void fraction.	Some numerical simulations	for PLA. The effect of nanocel-	properties and coupling agent	(Cleveland State University)
		Technology )				3	for resin matrix composites	lulose on PP/flax composites	content on the mechanical	
							are conducted. The tempera-	was also investigated.	performance of short carbon	The intent of this paper is to
		We studied the thephotother-					ture and degree of cure fields	j in the second s		evaluate the influence of a
		mal effect of the AuNP in a					are obtained. The max tem-		composites	thermoplastic polyurethane
		polymer composites by finite					perature during the exother-			veil interleave on the static
		element simulation. Primary					mic curing is discussed.			and dynamic performance of
		research the influence of CNT					-			composite test articles.
		added to Near the AuNP on								
		temperature distribution.								
12:20	3201-4 EFFICIENT	3202-4 IMPROVING	3203-4 MIXED-	3204-3 EFFECT OF HIGH	3205-4 STRUCTURAL	3206-4 POROSITY CONTROL	3207-4 BENDING OF	3208-4 NANOFIBRE	3209-4 A 3D MULTISCALE	3210-3 MODELLING THE
	POST-MACHINING AND	TOUGHNESS AND	MODE G-CONTROL	TEMPERATURE ON THE	DESIGN AND STRENGTH	BY PROCESS PARAMETERS	FIBRE-REINFORCED	COMPOSITES FROM	COHESIVE ZONE MODEL	MECHANICAL PROPERTIES
	AUTOMATED REPAIR	ELECTRICAL CONDUCTIVITY	DEBOND FATIGUE	FATIGUE LIFE OF A PLAIN	ANALYSIS OF THE NEW	<u>Cédric PUPIN</u> (École	THERMOPLASTIC TUBES	CAPRINE BIOMASS	ACCOUNTING FOR	OF WRINKLED COMPOSITES
	PREPARATION USING	OF EPOXY ADHESIVE	CHARACTERIZATION OF	WEAVE CFRP LAMINATE	TANK-CONTAINER	Polytechnique), Annie ROSS	Jan Böcking (University	Nurul Ain Mohd Kamal	FRICTION, DAMAGE AND	FROM NDT DATA
	ADAPTIVE MACHINING	COMPOSITE JOINTS	SANDWICH COMPOSITES	UNDER TENSION-TENSION	WITH COMPOSITE TANK	(École Polytechnique),	of Siegen), Bernd Engel	(Imperial College London),	INTERLOCKING	Ningbo Xie (University
	TECHNOLOGY	USING ALIGNED CARBON	WITH PVC FOAM CORES	LOADING	FOR MULTIMODAL	Edu RUIZ (Formerly ERFT	(University of Siegen)	Koon-Yang Lee (Imperial	Marco Albarella (Universita'	of Bristol), Robert Smith
		NANOFIBRES	Marcello Manca (DTU	Martin Cardonne (École de	TRANSPORTATIONS	Composites), Martine		College London), Alexander	degli studi del Sannio),	(University of Bristol), Supratik
		Chun Wang (Sir Lawrence	- Technical University	Technologie Supérieure (ÉTS)),	OF CHEMICALLY	DAUCHIER (HERAKLES),	A bending process for endless	Bismarck (University of	Roberto Serpieri (Universita'	Mukhopadhyay (University
		Wackett Aerospace Research	of Denmark), Christian	Mohamed Khay (École de	AGGRESSIVE FLUIDS AND	Nicolas VERNET (SAFRAN	fibre reinforced thermoplastic	Vienna)	degli studi del Sannio), <u>Giulio</u>	of Bristol), Stephen Hallett
		Centre-RMIT University), Raj	Berggreen (DTU - Technical	Technologie Supérieure (ÉTS)),	PETROCHEMICAL PRODUCTS		tubes is presented. Heating		Alfano (Brunel University), Elio	(University of Bristol)
	the product of the state of the	Ladani (Sir Lawrence Wackett	University of Denmark), Leif	Pierre-Luc Vachon (École	I. Sergeichev (Skoltech),	DAMBRINE (SNECMA SAFRAN	tests are performed and used	The demand of milk, meat	Sacco (Università di Cassino e	
		Aerospace Research Centre-	A. Carlsson (FAU - Florida	de Technologie Supérieure	A. Ushakov (Skoltech), A.	Group)	for validation of a thermal FE	and other livestock products	del Lazio Meridionale)	This paper introduced the
	role. Adaptive machining	RMIT University), Shuying	Atlantic University)		Safonov (Skoltech), B. Fedulov		analysis. Bending tests are	increases every year due to		process that FE models were
		Wu (Sir Lawrence Wackett		Technologie Supérieure (ÉTS)),		A resol phenolic resin	performed and analysed.	population growth, urbaniza-		created to investigate the
		Aerospace Research Centre-	This paper presents exper-	Anh Dung Ngô (École de	(Lightweight Structures B.V.),	was investigated by TGA.		tion and increasing income in	advances in the development	mechanical performance of
		RMIT University), Kamran	imental results from cyclic	Technologie Supérieure (ÉTS))	M. Timofeev (ApATeCh Co),	Injection process parameters		developing countries. This re-	of CZMs that are able to	wrinkled composites, based
		Ghorbani (RMIT University),	crack propagation tests		Yu. Klenin (ApATeCh Co), A.	were chosen based on the		sults in a significant increase	account for damage, friction	on the NDT data obtained
		Adrian Mouritz (Sir Lawrence	performed on sandwich spec-	In this study, the experimental	Fedorenko (Skoltech)	results. The appearance			and interlocking, including in	from 3D-characterisation
				characterization of the effect		of defects were observed			particular their extension to a	techniques.
		Wackett Aerospace Research	imens with glass/epoxy face			directly through the RTM mold			general 3D case.	
		Centre-RMIT University),	sheets and PVC foam cores	of a high temperature on	A complete cycle of design,				3	
		Centre-RMIT University), Anthony Kinloch (Imperial		of a high temperature on the delamination onset of a	manufacturing and finite ele-	window.				
		Centre-RMIT University),	sheets and PVC foam cores	of a high temperature on the delamination onset of a plain weave CFRP laminate is	manufacturing and finite ele- ment strength analysis of the					
		Centre-RMIT University), Anthony Kinloch (Imperial College)	sheets and PVC foam cores	of a high temperature on the delamination onset of a	manufacturing and finite ele- ment strength analysis of the tank-container with fiberglass					
		Centre-RMIT University), Anthony Kinloch (Imperial College) Aligning carbon nanofillers by	sheets and PVC foam cores	of a high temperature on the delamination onset of a plain weave CFRP laminate is	manufacturing and finite ele- ment strength analysis of the tank-container with fiberglass composite tank for multimod-					
		Centre-RMIT University), Anthony Kinloch (Imperial College) Aligning carbon nanofillers by external electric or magnetic	sheets and PVC foam cores	of a high temperature on the delamination onset of a plain weave CFRP laminate is	manufacturing and finite ele- ment strength analysis of the tank-container with fiberglass composite tank for multimod- al transportation of chemically					
		Centre-RMIT University), Anthony Kinloch (Imperial College) Aligning carbon nanofillers by external electric or magnetic field can dramatically improve	sheets and PVC foam cores	of a high temperature on the delamination onset of a plain weave CFRP laminate is	manufacturing and finite ele- ment strength analysis of the tank-container with fiberglass composite tank for multimod-					
		Centre-RMIT University), Anthony Kinloch (Imperial College) Aligning carbon nanofillers by external electric or magnetic field can dramatically improve the mechanical and electric	sheets and PVC foam cores	of a high temperature on the delamination onset of a plain weave CFRP laminate is	manufacturing and finite ele- ment strength analysis of the tank-container with fiberglass composite tank for multimod- al transportation of chemically					
		Centre-RMIT University), Anthony Kinloch (Imperial College) Aligning carbon nanofillers by external electric or magnetic field can dramatically improve the mechanical and electric properties of epoxy nanocom-	sheets and PVC foam cores	of a high temperature on the delamination onset of a plain weave CFRP laminate is	manufacturing and finite ele- ment strength analysis of the tank-container with fiberglass composite tank for multimod- al transportation of chemically					
		Centre-RMIT University), Anthony Kinloch (Imperial College) Aligning carbon nanofillers by external electric or magnetic field can dramatically improve the mechanical and electric	sheets and PVC foam cores	of a high temperature on the delamination onset of a plain weave CFRP laminate is	manufacturing and finite ele- ment strength analysis of the tank-container with fiberglass composite tank for multimod- al transportation of chemically					

Meeting room 5	Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8
3211-3 OLU-PREG®	3212-3 OPTIMISATION OF	3213-3 IMPROVED		3215-3 GENERATION	3216-3 EFFICIENT FINITE	3217-3 MODELLING THE	3218-3 FIRE PROTECTED	3219-3 MECHANICAL	3220-3 DEVELOPMENT OF	3221-3 ACTIVE
TEXTILE-BASED	THE IN-SITU EXFOLIATION/	MANUFACTURING METHOD		OF VIRTUAL FIBER	ELEMENT MODELLING	NON-LINEAR MECHANCIAL	CARBON FIBER	TESTING AND FINITE	A TESTING METHOD FOR	AERODYNAMIC
THERMOPLASTIC NCF-	DISPERSION PROCESSING	OF P-DCPD USING W. MO	HETEROGENEOUS	ARCHITECTURES IN	OF Z-PIN REINFORCED	BEHAVIOUR OF TRIAXIAL	REINFORCED PLASTICS	ELEMENT ANALYSIS OF	VIBRATION FATIGUE AT	COMPONENTS
COMPOSITES	PARAMETERS	OR RU TYPE CATALYSTS IN			COMPOSITES USING THE	BRAIDED COMPOSITES	FOR STRUCTURAL	LATTICE STRUCTURE	RESONANCE	FOR AUTOMOTIVE
Stefanie Schindler	OF GRAPHENE	AIR CONDITION	Rostislav Rypl (Brno	MODIFIED FORCE-BIASED	BINARY MODEL	Tobias Wehrkamp-Richter	AIRCRAFT COMPONENTS	FUSELAGE PROTOTYPE	Fabrizio Magi (University	APPLICATIONS – FRP
(Technische Universität	NANOPLATELETS IN	Joung-Man Park	University of Technology),	ALGORITHM	Matthew Blacklock (RMIT	(Technische Universität	Imke Roese-Koerner (DLR	Amirhossein Hajdaei	of Bristol), Dario Di Maio	REAR SPOILER WITH
Chemnitz), Frank Helbig	EPOXY FOR ENHANCED	(Gyeongsang National	Rostislav Chudoba (RWTH	Lucie Chapelle (Rockwool	University), Mathew Joosten	München), Silvestre T.	German Aerospace Center),	(Element Materials	(University of Bristol),	INTEGRATED SMA
(Technische Universität	MECHANICAL AND	University), Zuo-Jia Wang	Aachen University), Miroslav	International A/S), Povl	(RMIT University), Adrian	Pinho (Imperial College	Benjamin Schuh (DLR	Technology), Vladimir	Ibrahim Sever (Rolls Royce)	ACTUATION
Chemnitz), Mike Scheika	ELECTRICAL PROPERTIES	(Gyeongsang National	Vo echovský (Brno University		Mouritz (RMIT University)	London), Roland Hinterhölzl	German Aerospace Center),	Mat ják (Element Materials		Moritz Hübler (Institute
(SKM – Schwergewebe	<u>Yan Li</u> (Queen Mary	University), Dong-Jun Kwon	of Technology)	University of Denmark),		(Technische Universität	Jens Bachmann (DLR	Technology), Stefanos	A testing methodology for	for Composite Materials),
Konfektion Moers GmbH)	University of London),	(Gyeongsang National		Yukihiro Kusano (Technical	This study investigates the	München)	German Aerospace Center),	Giannis (Element Materials	characterizing the fatigue	Sebastian Nissle (Institute
	Han Zhang (Queen Mary	University), Pyeong-Su	The contribution describes	University of Denmark),	feasibility of the compu-		Peter Wierach (DLR German	Technology)	behaviour of composite	for Composite Materials),
The OLU-Preg® technology	University of London),	Shin (Gyeongsang National	a semi-analytical proba-	Mathilde R. Foldschack	tationally efficient binary	A framework for predicting	Aerospace Center)		components under resonant	Martin Gurka (Institute
offers lightweight materials	Emiliano Bilotti (Queen	University), Jin-Yeong Choi	bilistic multiscale model	(Rockwool International A/S)	model for textile composites			A scaled down prototype	conditions is described. A	for Composite Materials),
for large series production	Mary University of London),	(Gyeongsang National	of the tensile response of	A more start as a dat for the	in predicting the mode	highly compacted triaxial	Investigation on hybrid	of a CFRP lattice fuselage	temperature based critical	Ulf Breuer (Institute for
that meet demands for	Oliver Picot (Queen Mary	University), Jung-Chan Ha	unidirectional brittle-matrix	A numerical model for the	I fracture toughness of	braids with meso FE contin-	carbon fibre reinforced	section was tested under	event is defined as the fail-	Composite Materials)
structural variability, free- dom of design, process	University of London), Ton	(Doha industry CoLTD.),	composites with heteroge- neous reinforcement and its	generation of the fibers architectures is presented	z-pin reinforced composite laminates.	uum unit cells is proposed. Nesting effects.delamina-	plastics materials for struc- tural aircraft components by	pure bending (30 kN.m) to evaluate its mechanical	ure criterion.	This contribution focuses on
compatibility - reproducible	Peijs (Queen Mary University of London)	Gyu-Sang Jeong (Doha in- dustry CoLTD.), Lawrence	validation.	here. Non-overlapping fibers	aminates.	tion, damage and plasticity	incorporated flame protec-	response and validate the		the application potential of
and recyclable.		DeVries (Doha industry	vandation.	with complex shapes and		are investigated	tion layers and powdered	developed FE models via the		active fiber reinforced pol-
and recyclapic.		CoLTD.)		controlled orientation and		are investigated	additives.	recorded strains.		ymer (FRP) structures with
		00. 110.)		bending are achieved in			addiavoo.			integrated shape memory
		The DCPD fabricated in air		this work.						alloy (SMA) elements for
		condition possibly, the best								new aerodynamic functions.
		parameters were with 15								
		psi at 80 °C until 12 hours								
		exposure time. However, it								
		is good to fabricate as soon								
		as possible.								
3211-4 IMPROVING	3212-4 GRAPHENE-	3213-4 DEVELOPMENT	3214-4 A NON LOCAL	3215-4 SEMI-ANALYTIC	3216-4 MODE I, MODE II	3217-4 ENERGY	3218-4 HIGH	3219-4 ANISOGRID	3220-4 INVESTIGATION	3221-4 SHAPE MEMORY
AND MODELLING	BASED POLYMER	OF COST EFFECTIVE	DAMAGE MODEL FOR	SOLUTION OF NON-		DISSIPATION IN WEB-	TEMPERATURE	LATTICE STRUCTURE	OF FRACTURE	BEHAVIOURS OF CARBON
THE ELECTRICAL	NANOCOMPOSITES:	THERMOPLASTIC	ADHESIVE INTERFACES		II FATIGUE DELAMINATION	FLANGE JUNCTIONS OF	BEHAVIOR OF PPS-	FOR AN INNOVATIVE	BEHAVIOR OF CARBON	FIBRE REINFORCED
CONDUCTIVITY OF NCF-	THE EFFECT OF FILLER	COMPOSITES FOR	Marcelo Krajnc Alves		OF DIFFERENT CARBON FIBER REINFORCED	PULTRUDED GFRP DECKS	BASED COMPOSITES	COMPOSITE USV FUSELAGE	FIBER REINFORCED	POLYURETHANE
REINFORCED CFRP	ORIENTATION AND DISTRIBUTION ON	ADVANCED AIRFRAME STRURCTURES	(Universidade Federal de Santa Catarina), David Roza	BEAMS EMPLOYING A SERIES APPROXIMATION	COMPOSITE LAMINATES	Sonia Yanes (Ecole	FOR AERONAUTICAL APPLICATIONS: INFLUENCE		THERMOPLASTICS BY 3-POINT BENDING IMPACT	COMPOSITES
Johannes Rehbein (German Aerospace Center (DLR))	THE ELECTRICAL AND	<u>Tim Krooß</u> (Institut für	José (Universidade Federal	BASED ON LEGENDRE	Steffen Stelzer	Polytechnique Fédérale de Lausanne (EPFL)),	OF FIRE EXPOSURE		TEST	Xinying Cheng (The University of Sydney), Lin Ye
Aerospace Genier (DLN))	MECHANICAL PROPERTIES	Verbundwerkstoffe GmbH).	de Santa Catarina)	POLYNOMIALS	(Montanuniversitaet	Julia de Castro (Ecole	ON TENSILE AND	Center), Felice De Nicola	Fumiaki Yano (Shimadzu	(The University of Sydney)
Silver coated knitting yarn	Giovanni Santagiuliana	Martin Gurka (Institut für	ue Santa Gatanna)	Juan Manuel González-	Leoben). Andreas	Polytechnique Fédérale de	COMPRESSIVE BEHAVIORS		Corporation). Wataru	(The University of Syuney)
is used in NCF textiles. The	(Queen Mary University	Verbundwerkstoffe GmbH),	The work proposes a non	<u>Cantero</u> (FIDAMC), Enrique	Brunner (EMPA-Swiss	Lausanne (EPFL)), Thomas	Aurélien PETIT (Institut	Research Center)	Nagatsuka (The University	The mechanical properties
z-conductivity of CFRP lam-	of London), Luca Rubini	Viktor Dück (Institut für	local damage model and a	Graciani (Universidad de	Federal Laboratories for	Keller (Ecole Polytechnique	National des Sciences		of Tokyo), Tsuyoshi Matsuo	and shape memory recovery
inates produced from these	(University of Trento),	Verbundwerkstoffe GmbH),	numerical scheme for the	Sevilla), Federico París	Materials Science and	Fédérale de Lausanne	Appliquées de Rouen),	An approach to the optimal	(The University of Tokyo)	behaviours of carbon fibre
textiles is up to 100-times	Olivier T. Picot (Queen	Ulf Breuer (Institut für	analysis of the debonding	(Universidad de Sevilla).	Technology). Gerald Pinter	(EPFL))	Benoit VIEILLE (Institut	design of complex double		reinforced shape memory
higher than in laminates	Mary University of London),	Verbundwerkstoffe GmbH)	process of guasi-brittle	Bernardo López-Romano	(Montanuniversitaet Leoben)	()	National des Sciences	curvature anisogrid lattice	In this study, we performed	polyurethanes were studied
with non-conductive yarn.	Ettore Barbieri (Queen		adhesives subjected to uni-	(FIDAMC), Daniel Meizoso-	(	The energy dissipation	Appliquées de Rouen), Alexis		3-point bending impact test	and compared with pure
	Mary University of London),	The investigation aims at	lateral contact and friction	Latova (Airbus)	Monotonic and cyclic mixed	capacity resulting from	COPPALLE (Institut National	lage of an unmanned space	of two kinds of carbon fiber	polyurethanes.
	Nicola M. Pugno (Queen	the development of ther-	effects.		mode I/II delamination tests	progressive cracking of	des Sciences Appliquées	reentry vehicle (USV) being	reinforced thermoplastic	
	Mary University of London),	moplastic PPS-PESU blends		Semi-analytic solution of	of IM7/977-2 and AS4/8552		de Rouen), Fabrice BARBE	developed at CIRA.	composites (CFRTP) and	
	Emiliano Bilotti (Queen Mary			non-regularized unfolding	were carried out. Fatigue	of a pultruded GFRP deck	(Institut National des		evaluated strain-rate and	
	University of London), Ton	to PEEK. The focus is set on		stresses in composite	results are analyzed with a	system was experimen-	Sciences Appliquées de		temperature-dependent	
	Peijs (Queen Mary University			beams employing a series	modified Hartman-Schijve	tally investigated through	Rouen)		characteristics.	
	of London)	mechanical properties and		approximation in the	approach for threshold	web-cantilever experiments.				
		chem. resistance.		displacements based on	estimation.		Fire exposure influence on			
				In the second			the high-temperature resid-			
				Legendre polynomials and						
				Legendre polynomials and higher-order moments			ual tensile and compressive			
							behaviors of CFRP has been			
							behaviors of CFRP has been investigated. It is more			
							behaviors of CFRP has been investigated. It is more detrimental to compressive			
							behaviors of CFRP has been investigated. It is more			

	Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
	3201-5 BONDED REPAIR OF COMPOSITE STRUCTURES Aris Khechen (Laval universi- ty), Marie-Laure Dano (Laval university), Augustin Gakwaya (Laval university), Chun Li (National Research Council Canada) This study focuses on testing and modeling of bonded scarf-stepped composite joint under tensile loading. Effects of temperature and scarf an- gle on the bonded repair per- formance were investigated.	3202-5 DISBOND MONITORING OF COMPOSITE ADHESIVE JOINTS WITH DC RESISTANCE TECHNIQUE UTILIZING ALIGNED CARBON NANOFIBRE NETWORK Raj Ladani (Sir Lawrence Wackett Aerospace Research Centre-RMIT University), Shuying Wu (Sir Lawrence Wackett Aerospace Research Centre-RMIT University), Adrian Mouritz (Sir Lawrence Wackett Aerospace Research Centre-RMIT University), Adrian Mouritz (Sir Lawrence Wackett Aerospace Research Centre-RMIT University), Anthony Kinloch (Imperial College), Kamran Ghorbani (RMIT University), Chun Wang (Sir Lawrence Wackett Aerospace Research Centre- RMIT University) This paper focuses on the ability of carbon nanofibre (CNF) networks for in-situ monitoring of fatigue induced disbond damage in carbon fibre adhesive bonded joints.	3203-5 SHAPE MEMORY COMPOSITE SANDWICH WITH SELF-HEALING PROPERTIES FOR MARINE APPLICATIONS Loredana Santo (University of Rome "Tor Vergata"), Fabrizio Quadrini (University of Rome "Tor Vergata") In this study, the feasibility of the production of a shape memory composite (SMC) sandwich with self-healing properties for marine applica- tions is discussed.	3204-4 FATIGUE TEST ON SKIN DOUBLER SPECIMENS WITH STEPPED AND PLY- DROP TAPERED DOUBLERS Chao Wu (Monash University), Andrew Gunnion (2Cooperative Research Centre for Advanced Composite Structures Ltd.), Bernard Chen (Monash University), <u>Wenyi Yan</u> (Monash University) This paper presents an exper- imental study on the damage tolerance of stepped and ply-drop tapered skin doubler repairs when subjected to fatigue loading.	3205-5 LOCAL FULL-FIELD STRESS TAILORING IN VARIABLE STIFFNESS BEAMS <i>Rainer M J Groh (University</i> of Bristol), Paul M Weaver (University of Bristol) A higher-order theory is used to tailor the full 3D stress field within laminated beams by using variable stiffness plies. An optimisation scheme is then used to minimise the chance of delaminations.	3206-5 NOVEL METHODS OF ASSESSING INTER-PLY PROPERTIES OF TOUGHENED PREPREGS IN APPLICATION TO THE ANALYSIS OF FIBRE PATH DEFECTS Dmitry Ivanov (University of Bristol), Julien Volatier (ECOLE NATIONALE SUPERIEURE DE MECANIQUE ET D'AEROTECHNIQUE), Jonathan Belnoue (University of Bristol), Stephen Hallett (University of Bristol), Kevin Potter (University of Bristol) The paper discusses a new experimental technique for measuring interply adhesion properties of uncured pre- pregs. The advantages include high resolution and a natural assessment of defect modes.		3208-5 EFFECT OF THROUGH-THE-THICKNESS STITCHING AND FIBER ARCHITECTURE ON THE INTERLAMINAR AND IMPACT FRACTURE PROPERTIES OF FLAX/EPOXY LAMINATES <u>M. Ravandi</u> (National University of Singapore), W. S. Teo (Singapore Institute of Manufacturing Technology), M. S. Yong (Singapore Institute of Manufacturing Technology), T. E. Tay (National University of Singapore) The influences of through- the-thickness stitching on the in-plane tensile properties, delamination growth as well as impact energy absorption behavior were experimentally studied.		3210-4 A FINITE ELEMENT STUDY ON THE EFFECTS OF TOUGHNESS AND PERMANENT OUT-OF-PLANI DEFORMATION ON POST- IMPACT COMPRESSIVE STRENGTH Daniel Bull (University of Southampton), Mark Spearing (University of Southampton), lan Sinclair (University of Southampton) Finite element models were used to study the role of the undamaged cone, extent of permanent indentation and toughness on residual compressive strength. Models included delamination growth using VCCT.
10.00	Lunch in the Exhibition									
	3301 Processing - Manufacturing Technology 8	3302 Nano Composites 8	3303 ONR Special Symposium on Marine Composites 3	3304 Fatigue 8	3305 Structural Analysis and Optimization 8	3306 Process Induced Effects 7	3307 Process Modelling 8	3308 Biocomposites 7	3309 Recycling of Composites and Sustainability 1	3310 Damage Tolerance of Composite Structures 3
14:00	3301-1 MICROHOLE MACHINING ON PRECISION CFRP COMPONENTS USING ELECTRICAL DISCHARGING MACHINING Soo-Hyun Park (Yonsei University), Gyuho Kim (Yonsei university), Byung-Kwon Min (Yonsei University), Seok-Woo Lee (KITECH), Tae-Gon Kim (KITECH) Micro-EDM drilling of mi- crohole with CFRP has been studied. Effects of the elec- trical discharging machining parameters on tool wear ratio and machining quality were investigated.	3302-1 STRENGTHENING BEHAVIOR OF FEW-LAYERED GRAPHENE/ALUMINUM COMPOSITES Seeun Shin (Yonsei University), Donghyun Bae (Yonsei University) Strengthening behaviour of composite containing discontinuous reinforcement is strongly related with load transfer at the reinforcement- matrix interface. Few-layer graphene (FLG) as a reinforc- ing agen	3303-1 MOISTURE DIFFUSION UNDER PRESSURE IN COMPOSITES Corentin Humeau (Ifremer), Frédéric Jacquemin (GeM) The study focuses on the influence of hydrostatic pressure on water uptake in composites, and reaveals an influence of the microstruc- ture on water diffusion under pressure.	3304-1 FATIGUE CRACK PROPAGATION MECHANISMS OF CORE-SHELL RUBBER MODIFED EPOXY RESINS Satoshi Matsuda (University of Hyogo), Yoshio Furukawa (Kaneka Corporation), Hajime Kishi (University of Hyogo) Effect of core-shell rubber particles on the fatigue threshold of the epoxy composite depended on the molecular weight between crosslinks of the epoxy matrix.	SIMULTANEOUS MULTIPLE IMPACTS IN COMPOSITES USING PERIDYNAMICS Erdogan Madenci (University of Arizona), Atila Barut (University of Arizona), Nam Phan (Naval Air Systems Command (NAVAIR)-Patuxent River-MD 20670) This study demonstrates the application of peridynamics	3306-1 A STUDY OF PROCESS INDUCED VOIDS IN RESISTANCE WELDING OF THERMOPLASTIC COMPOSITES Huajie Shi (Delft University of Technology), Irene Fernandez Villegas (Delft University of Technology), Harald Bersee (Delft University of Technology) The mechanisms of void formation in welding of woven fabric reinforced thermoplas- tic composites were investi- gated. The void fraction, void distribution and strategies for void reduction were studied.	3307-1 EFFECTS OF DISORDERED TOUGHENING PARTICLES ON UNIDIRECTIONAL FIBER REINFORCEMENT PERMEABILITY Timothy Luchini (Michigan State University), Alfred Loos (Michigan State University), Stephen Sommerlot (Michigan State University) Investigations into the effects of particles and fibers on micro-scale permeability. Particle and fiber volume frac- tions are varied to see their effects on steady state, single phase, permeability.	3308-1 LIFE CYCLE ASSESSMENT OF HIGH PERFORMANCE NANOCELLULOSE- REINFORCED ADVANCED FIBRE COMPOSITES Martin Hervy (University College London), Sara Evangelist (University College London), Paola Lettieri (University College London), Koon-Yang Lee (University College London) In the work, the environmental impacts of bacterial cellulose (BC)- and nanofibrillated cel- lulose (NFC)-reinforced epoxy composites were evaluated using life cycle assessment (LCA).		3310-1 EVALUATING THE STRUCTURAL PERFORMANCE OF MAGNESIUM OXIDE (MGO) BOARD FOR IMPLEMENTATION IN THE CONSTRUCTION INDUSTRY Haider Al Abadi (La Trobe University) This paper investigates the bending capacity of Magnesium Oxide boards in composite with Fibre Reinforced Polymers com- ponent as an attempt for the development of portable bushfire shelters.

Meeting room 5	Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8
		3213-5 INTERFACIAL	3214-5 HIERARCHICAL		3216-5 THE APPLICATION			3219-5 AN INTEGRATIVE		3221-5 DOUBLE NEGATIVE
		ADHESION AND	SIMULATION OF		OF J INTEGRAL TO			ANALYSIS OF SPACE		CHARACTERISTICS
		MECHANICAL PROPERTIES	STRENGTH AND DAMAGE		MEASURE COHESIVE			TELESCOPE COMPOSITE		OF METACOMPOSITES
		OF THERMOPLASTIC	ACCUMULATION IN FIBRE-		LAWS IN MATERIALS			STRUCTURES		COMPRISED OF
		ACRYLIC POLYMER	REINFORCED COMPOSITES		UNDERGOING LARGE			Jae-Hung Han (KAIST), Jae-		FERROMAGNETIC
		MATRIX CARBON FIBER	UNDER LONGITUDINAL		SCALE YIELDING			San Yoon (KAIST)		MICROWIRES AND
		REINFORCED COMPOSITES			Bent F. Sørensen (DTU Wind					POLYMER-BASED
		Hajime Kishi (University	Marco Nicolo Coccon		Energy), Stergios Goutianos			Measurement method for		COMPOSITES
		of Hyogo), Nozomu Nakao	(Imperial College London),		(DTU Wind Energy)			the thermal and out-gassing		Yang Luo (University
		(University of Hyogo), Shiho	Soraia Pimenta (Imperial		(DTO WING Energy)			deformation of the compos-		of Bristol), Faxiang Qin
		Kuwashiro (University of	College London), Ugo		We simulate the determi-			ite and data-based integrat-		(National Institute for
		Hyogo), Satoshi Matsuda	Galvanetto (University of		nation of cohesive laws by			ed analysis are proposed		Materials Science). Fabrizio
		(University of Hyogo)	Padova)		a J-integral approach for			for the preliminary design		Scarpa (University of Bristol)
			T autovaj		materials having non-linear			phase of space telescope		Mihail Ipatov (Universidad
		Several functional acrylic	We model the composite as		stress-strain behavior by			composite structures		del Pais Vasco), Arkady
		monomers were co-polym-	a "bundle of sub-bundles"		the use of a DCB sandwich			composite structures		Zhukov (Universidad del
		erized with the MMA. HEAA			specimen loaded with pure					Pais Vasco), Jorge Carbonell
			(grouping fibres 2-by-2 up							
		copolymer improved the	to 7-by-7) and run Monte-		bending moments.					(Universitat Politècnica de
		interfacial adhesion to CFs,	Carlo analyses based on							Valencia), Hua-Xin Peng
		which gave the two-fold	fibre-strength distribution							(Zhejiang University)
		flexural strength on the	and matrix shear-lag near							
		acrylic CFRTP.	fibre breaks							Conventional metamaterials
										are structures and their
										manufacturing costs are
										rather high. We design and
										fabricate a composite meta-
										material with multifunctional
										properties via an engineer-
										ing strategy.
3311 Textile-Based	3312 Graphene, Graphene-	3313 Matrix Materials 3	3314 Fracture and	3315 Models		3317 Ductile and Pseudo-	3318 Fire Resistance 3	3319 Applications - Civil	3320 New Structural	3321 Multifunctional
<b>Composites and Fibre</b>	3312 Graphene, Graphene- Based Composites 8	3313 Matrix Materials 3	Damage - Materials	Homogenization – Micro	Structural Lightweight -	3317 Ductile and Pseudo- ductile Composites 4	3318 Fire Resistance 3	3319 Applications - Civil Engineering 1	3320 New Structural Testing Methods 3	<b>Composites - Adaptive</b>
		3313 Matrix Materials 3					3318 Fire Resistance 3			Composites - Adaptive Response and
Composites and Fibre Architecture 8	Based Composites 8		Damage - Materials Scale 2	Homogenization – Micro to Macro 3	Structural Lightweight - Modelling and Testing 2	ductile Composites 4		Engineering 1	Testing Methods 3	Composites - Adaptive Response and Reconfiguration 2
Composites and Fibre Architecture 8 3311-1 SYMMETRIES	Based Composites 8 3312-1 DIRECT	3313-1 POLY(ETHYLENE	Damage - Materials Scale 2 3314-1 DETERMINATION	Homogenization – Micro to Macro 3 3315-1 DISTORTIONAL	Structural Lightweight - Modelling and Testing 2 3316-1 A MOLECULAR	ductile Composites 4 3317-1 PSEUDO-DUCTILE	3318-1 POLYFURFURYL	Engineering 1 3319-1 MODELLING OF	Testing Methods 3 3320-1 MECHANICAL	Composites - Adaptive Response and Reconfiguration 2 3321-1 MODELING
Composites and Fibre Architecture 8 3311-1 SYMMETRIES AND MATERIAL	Based Composites 8 3312-1 DIRECT OBSERVATION OF	3313-1 POLY(ETHYLENE 2,6-NAPHTHALATE) (PEN)	Damage - Materials Scale 2 3314-1 DETERMINATION OF THE THROUGH-	Homogenization – Micro to Macro 3 3315-1 DISTORTIONAL DEFORMATION OF	Structural Lightweight - Modelling and Testing 2 3316-1 A MOLECULAR DYNAMICS STUDY	ductile Composites 4 3317-1 PSEUDO-DUCTILE CARBON/EPOXY HYBRID	3318-1 POLYFURFURYL Alcohol Thermosets	Engineering 1 3319-1 MODELLING OF STEEL-FRP SINGLE-LAP	Testing Methods 3 3320-1 MECHANICAL TESTING OF ADHESIVELY	Composites - Adaptive Response and Reconfiguration 2 3321-1 MODELING OF LOW-FREQUENCY
Composites and Fibre Architecture 8 3311-1 SYMMETRIES AND MATERIAL CHARACTERISATION	Based Composites 8 3312-1 DIRECT OBSERVATION OF GRAPHENE OXIDE	3313-1 POLY(ETHYLENE 2,6-NAPHTHALATE) (PEN) AS THERMOPLASTIC	Damage - Materials Scale 2 3314-1 DETERMINATION OF THE THROUGH- THICKNESS STRENGTH	Homogenization – Micro to Macro 3 3315-1 DISTORTIONAL DEFORMATION OF MATRIX IN OPEN-HOLE	Structural Lightweight - Modelling and Testing 2 3316-1 A MOLECULAR DYNAMICS STUDY ON THE STRAIN RATE	ductile Composites 4 3317-1 PSEUDO-DUCTILE CARBON/EPOXY HYBRID COMPOSITES	3318-1 POLYFURFURYL ALCOHOL THERMOSETS RESINS IN FIRE RESISTANT	Engineering 1 3319-1 MODELLING OF STEEL-FRP SINGLE-LAP JOINTS UNDER FREEZE-	Testing Methods 3 3320-1 MECHANICAL TESTING OF ADHESIVELY JOINED SANDWICH	Composites - Adaptive Response and Reconfiguration 2 3321-1 MODELING OF LOW-FREQUENCY BROAD-BAND VIBRATION
Composites and Fibre Architecture 8 3311-1 SYMMETRIES AND MATERIAL CHARACTERISATION Shuguang Li (University of	Based Composites 8 3312-1 DIRECT OBSERVATION OF GRAPHENE OXIDE CONFORMATION AND	3313-1 POLY(ETHYLENE 2,6-NAPHTHALATE) (PEN) AS THERMOPLASTIC MATRIX FOR HIGH	Damage - Materials Scale 2 3314-1 DETERMINATION OF THE THROUGH- THICKNESS STRENGTH PROPERTIES TO PREDICT	Homogenization – Micro to Macro 3 3315-1 DISTORTIONAL DEFORMATION OF MATRIX IN OPEN-HOLE TENSION COMPOSITES:	Structural Lightweight - Modelling and Testing 2 3316-1 A MOLECULAR DYNAMICS STUDY ON THE STRAIN RATE DEPENDENCE FOR	ductile Composites 4 3317-1 PSEUDO-DUCTILE CARBON/EPOXY HYBRID COMPOSITES <u>Gergely Czel</u> (Budapest	3318-1 POLYFURFURYL Alcohol Thermosets Resins in Fire resistant Composite Applications	Engineering 1 3319-1 MODELLING OF STEEL-FRP SINGLE-LAP JOINTS UNDER FREEZE- THAW CYCLING	Testing Methods 3 3320-1 MECHANICAL TESTING OF ADHESIVELY JOINED SANDWICH STRUCTURES	Composites - Adaptive Response and Reconfiguration 2 3321-1 MODELING OF LOW-FREQUENCY BROAD-BAND VIBRATION MITIGATION USING ZIG-
Composites and Fibre Architecture 8 3311-1 SYMMETRIES AND MATERIAL CHARACTERISATION	Based Composites 8 3312-1 DIRECT OBSERVATION OF GRAPHENE OXIDE CONFORMATION AND POLYMER RADIUS OF	3313-1 POLY(ETHYLENE 2,6-NAPHTHALATE) (PEN) AS THERMOPLASTIC MATRIX FOR HIGH PERFORMANCE WOVEN	Damage - Materials Scale 2 3314-1 DETERMINATION OF THE THROUGH- THICKNESS STRENGTH PROPERTIES TO PREDICT THE FAILURE OF THICK-	Homogenization – Micro to Macro 3 3315-1 DISTORTIONAL DEFORMATION OF MATRIX IN OPEN-HOLE TENSION COMPOSITES: EXPERIMENTAL	Structural Lightweight - Modelling and Testing 2 3316-1 A MOLECULAR DYNAMICS STUDY ON THE STRAIN RATE DEPENDENCE FOR ELASTO-PLASTIC	ductile Composites 4 3317-1 PSEUDO-DUCTILE CARBON/EPOXY HYBRID COMPOSITES Gergely Czel (Budapest University of Technology	3318-1 POLYFURFURYL ALCOHOL THERMOSETS RESINS IN FIRE RESISTANT COMPOSITE APPLICATIONS Pietro Di Modica (Newcastle	Engineering 1 3319-1 MODELLING OF STEEL-FRP SINGLE-LAP JOINTS UNDER FREEZE- THAW CYCLING <u>Ankit Agarwal</u> (University	Testing Methods 3 3320-1 MECHANICAL TESTING OF ADHESIVELY JOINED SANDWICH STRUCTURES <u>Malte Mund</u> (Technische	Composites - Adaptive Response and Reconfiguration 2 3321-1 MODELING OF LOW-FREQUENCY BROAD-BAND VIBRATION MITIGATION USING ZIG- ZAG INSERTS AND AN
Composites and Fibre Architecture 8 3311-1 SYMMETRIES AND MATERIAL CHARACTERISATION Shuguang Li (University of Nottingham)	Based Composites 8 3312-1 DIRECT OBSERVATION OF GRAPHENE OXIDE CONFORMATION AND POLYMER RADIUS OF GYRATION WITHIN	3313-1 POLY(ETHYLENE 2,6-NAPHTHALATE) (PEN) AS THERMOPLASTIC MATRIX FOR HIGH	Damage - Materials Scale 2 3314-1 DETERMINATION OF THE THROUGH- THICKNESS STRENGTH PROPERTIES TO PREDICT THE FAILURE OF THICK-	Homogenization – Micro to Macro 3 3315-1 DISTORTIONAL DEFORMATION OF MATRIX IN OPEN-HOLE TENSION COMPOSITES:	Structural Lightweight - Modelling and Testing 2 3316-1 A MOLECULAR DYNAMICS STUDY ON THE STRAIN RATE DEPENDENCE FOR ELASTO-PLASTIC RESPONSE OF	ductile Composites 4 3317-1 PSEUDO-DUCTILE CARBON/EPOXY HYBRID COMPOSITES Gergely Czel (Budapest University of Technology and Economics), Meisam	3318-1 POLYFURFURYL Alcohol Thermosets Resins in Fire resistant Composite Applications	Engineering 1 3319-1 MODELLING OF STEEL-FRP SINGLE-LAP JOINTS UNDER FREEZE- THAW CYCLING	Testing Methods 3 3320-1 MECHANICAL TESTING OF ADHESIVELY JOINED SANDWICH STRUCTURES	Composites - Adaptive Response and Reconfiguration 2 3321-1 MODELING OF LOW-FREQUENCY BROAD-BAND VIBRATION MITIGATION USING ZIG-
Composites and Fibre Architecture 8 3311-1 SYMMETRIES AND MATERIAL CHARACTERISATION Shuguang Li (University of Nottingham)	Based Composites 8 3312-1 DIRECT OBSERVATION OF GRAPHENE OXIDE CONFORMATION AND POLYMER RADIUS OF	3313-1 POLY(ETHYLENE 2,6-NAPHTHALATE) (PEN) AS THERMOPLASTIC MATRIX FOR HIGH PERFORMANCE WOVEN	Damage - Materials Scale 2 3314-1 DETERMINATION OF THE THROUGH- THICKNESS STRENGTH PROPERTIES TO PREDICT THE FAILURE OF THICK-	Homogenization – Micro to Macro 3 3315-1 DISTORTIONAL DEFORMATION OF MATRIX IN OPEN-HOLE TENSION COMPOSITES: EXPERIMENTAL	Structural Lightweight - Modelling and Testing 2 3316-1 A MOLECULAR DYNAMICS STUDY ON THE STRAIN RATE DEPENDENCE FOR ELASTO-PLASTIC	ductile Composites 4 3317-1 PSEUDO-DUCTILE CARBON/EPOXY HYBRID COMPOSITES Gergely Czel (Budapest University of Technology	3318-1 POLYFURFURYL ALCOHOL THERMOSETS RESINS IN FIRE RESISTANT COMPOSITE APPLICATIONS Pietro Di Modica (Newcastle	Engineering 1 3319-1 MODELLING OF STEEL-FRP SINGLE-LAP JOINTS UNDER FREEZE- THAW CYCLING <u>Ankit Agarwal</u> (University	Testing Methods 3 3320-1 MECHANICAL TESTING OF ADHESIVELY JOINED SANDWICH STRUCTURES <u>Malte Mund</u> (Technische	Composites - Adaptive Response and Reconfiguration 2 3321-1 MODELING OF LOW-FREQUENCY BROAD-BAND VIBRATION MITIGATION USING ZIG- ZAG INSERTS AND AN
Composites and Fibre Architecture 8 3311-1 SYMMETRIES AND MATERIAL CHARACTERISATION Shuguang Li (University of Nottingham) Rotations are found to have the same effect as reflec-	Based Composites 8 3312-1 DIRECT OBSERVATION OF GRAPHENE OXIDE CONFORMATION AND POLYMER RADIUS OF GYRATION WITHIN NANOCOMPOSITES: A SCATTERING AND	3313-1 POLY(ETHYLENE 2,6-NAPHTHALATE) (PEN) AS THERMOPLASTIC MATRIX FOR HIGH PERFORMANCE WOVEN COMPOSITES. Davi de Vasconcellos (Institute for Polymers-	Damage - Materials Scale 2 3314-1 DETERMINATION OF THE THROUGH- THICKNESS STRENGTH PROPERTIES TO PREDICT THE FAILURE OF THICK- WALLED COMPOSITE LUGS Marco Hoffmann (Airbus Group Innovations), Kristian	Homogenization – Micro to Macro 3 3315-1 DISTORTIONAL DEFORMATION OF MATRIX IN OPEN-HOLE TENSION COMPOSITES: EXPERIMENTAL INVESTIGATION Don Lee (Toray Composites (America)), Kenichi	Structural Lightweight - Modelling and Testing 2 3316-1 A MOLECULAR DYNAMICS STUDY ON THE STRAIN RATE DEPENDENCE FOR ELASTO-PLASTIC RESPONSE OF CROSSLINKED EPOXY Hyungbum Park (Seoul	ductile Composites 4 3317-1 PSEUDO-DUCTILE CARBON/EPOXY HYBRID COMPOSITES Gergely Czel (Budapest University of Technology and Economics), Meisam Jalalvand (University of Bristol), Michael Wisnom	3318-1 POLYFURFURYL ALCOHOL THERMOSETS RESINS IN FIRE RESISTANT COMPOSITE APPLICATIONS Pietro Di Modica (Newcastle University), Geoff Gibson (Newcastle University), Geroge Kotsikos (Newcastle	Engineering 1 3319-1 MODELLING OF STEEL-FRP SINGLE-LAP JOINTS UNDER FREEZE- THAW CYCLING Ankit Agarval (University of New South Wales), Ehab Hamed (University of New South Wales), Stephen J	Testing Methods 3 3320-1 MECHANICAL TESTING OF ADHESIVELY JOINED SANDWICH STRUCTURES Matte Mund (Technische Universität Braunschweig), Michael Griese (Technische Universität Braunschweig),	Composites - Adaptive Response and Reconfiguration 2 3321-1 MODELING OF LOW-FREQUENCY BROAD-BAND VIBRATION MITIGATION USING ZIG- ZAG INSERTS AND AN E-DAMPING CONCEPT. Katherine Reichl (University of Michigan), Daniel Imman
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Composites and Fibre Architecture 8 3311-1 SYMMETRIES AND MATERIAL CHARACTERISATION Shuguang Li (University of Nottingham) Rotations are found to have the same effect as reflec-	Based Composites 8 3312-1 DIRECT OBSERVATION OF GRAPHENE OXIDE CONFORMATION AND POLYMER RADIUS OF GYRATION WITHIN NANOCOMPOSITES: A SCATTERING AND	3313-1 POLY(ETHYLENE 2,6-NAPHTHALATE) (PEN) AS THERMOPLASTIC MATRIX FOR HIGH PERFORMANCE WOVEN COMPOSITES. Davi de Vasconcellos (Institute for Polymers-	Damage - Materials Scale 2 3314-1 DETERMINATION OF THE THROUGH- THICKNESS STRENGTH PROPERTIES TO PREDICT THE FAILURE OF THICK- WALLED COMPOSITE LUGS Marco Hoffmann (Airbus Group Innovations), Kristian	Homogenization – Micro to Macro 3 3315-1 DISTORTIONAL DEFORMATION OF MATRIX IN OPEN-HOLE TENSION COMPOSITES: EXPERIMENTAL INVESTIGATION Don Lee (Toray Composites (America)), Kenichi	Structural Lightweight - Modelling and Testing 2 3316-1 A MOLECULAR DYNAMICS STUDY ON THE STRAIN RATE DEPENDENCE FOR ELASTO-PLASTIC RESPONSE OF CROSSLINKED EPOXY Hyungbum Park (Seoul	ductile Composites 4 3317-1 PSEUDO-DUCTILE CARBON/EPOXY HYBRID COMPOSITES Gergely Czel (Budapest University of Technology and Economics), Meisam Jatalvand (University of Bristol), Michael Wisnom (University of Bristol)	3318-1 POLYFURFURYL ALCOHOL THERMOSETS RESINS IN FIRE RESISTANT COMPOSITE APPLICATIONS Pietro Di Modica (Newcastle University), Geoff Gibson (Newcastle University), Geroge Kotsikos (Newcastle	Engineering 1 3319-1 MODELLING OF STEEL-FRP SINGLE-LAP JOINTS UNDER FREEZE- THAW CYCLING Ankit Agarval (University of New South Wales), Ehab Hamed (University of New South Wales), Stephen J	Testing Methods 3 3320-1 MECHANICAL TESTING OF ADHESIVELY JOINED SANDWICH STRUCTURES Matte Mund (Technische Universität Braunschweig), Michael Griese (Technische Universität Braunschweig),	Composites - Adaptive Response and Reconfiguration 2 3321-1 MODELING OF LOW-FREQUENCY BROAD-BAND VIBRATION MITIGATION USING ZIG- ZAG INSERTS AND AN E-DAMPING CONCEPT. Katherine Reichl (University of Michigan), Daniel Imman
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	Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
14:20	3301-2 ALUMINUM/	3302-2 MECHANICAL	3303-2 EFFECTS OF	3304-2 SIMULATION	3305-2 DESIGN OF A	3306-2 SIMULATION AND	3307-2 MEASUREMENT AND	3308-2 IMPROVING THE	3309-2 FUTURE DIRECTIONS	3310-2 INFLUENCE OF
	CUBIC BORON NITRIDE	PROPERTIES OF CARBON	HUMIDITY ON THE	METHODS FOR HIGH-	CARBON FIBER REINFORCED	VERIFICATION OF CURE-	NUMERICAL ANALYSIS OF	MECHANICAL PROPERTIES	IN THE RECYCLING OF	STRUCTURAL STITCHING
	FUNCTIONALLY GRADED	NANOMATERIALS	FRACTURE BEHAVIOR	CYCLE FATIGUE-DRIVEN	PLASTIC SHAFT FOR A HIGH	INDUCED DEFORMATION	THROUGH-THICKNESS RESIN	OF WOOD-PLASTICS	COMPOSITE MATERIALS	ON COMPOSITE T-JOINT
	GRINDING WHEEL FOR	BASED MACROSCOPIC	OF POLYMERIC MATRIX	DELAMINATION USING	SPEED FLYWHEEL ROTOR	FOR INTEGRATED	FLOW AND HEAT TRANSFER	COMPOSITES BY PARTICLE	Geraldine Oliveux (University	STRENGTH
	DRILLING CFRP FABRICATED	ARCHITECTURES	MATERIAL UNDER DYNAMIC	COHESIVE ZONE MODELS -	Stefan Hartl (Vienna University	COMPOSITE STRUCTURES	DURING OOA PROCESSING	SURFACE TREATMENT IN	of Birmingham), Luke Dandy	Michael Magin (Institute
	BY THE CENTRIFUGAL	Luqi Liu (National Center	LOADING	FUNDAMENTAL BEHAVIOR	of Technology), Alexander	Kai Liu (Beihang University),	OF THICK-SECTION WIND OR	SOLUTION	(University of Birmingham),	for Composite Materials),
	MIXED-POWDER METHOD	for Nanoscience and	Orlando Delpino Gonzales	AND BENCHMARK STUDIES	Schulz (Vienna University	Jinrui Ye (Beihang University),	TIDAL TURBINE BLADES	Ambre Verdaguer (Université	Gary Leeke (University of	Nicole Motsch (Institute for
	<u>Yoshimi Watanabe</u> (Nagoya	Technology-CHINA), Zhaohe	(University of Southern	Brian Bak (Aalborg University),	of Technology), Manfred	Boming Zhang (Beihang	James Maguire (University	Laval), <u>Denis Rodrigue</u>	Birmingham), Jean-Luc	Composite Materials)
	Institute of Technology), Yuta	Dai (National Center for	California), Veronica Eliasson	Esben Lindgaard (Aalborg	Kaltenbacher (Vienna	University), Lijie Jia (Shanghai	College Cork), Conchúr Ó	(Université Laval)	Bailleul (Laboratoire de	
	Suzuki (Nagoya Institute	Nanoscience and Technology-	(University of Southern	University), Erik Lund (Aalborg	University of Technology)	Aircraft Manufacuring Co)	Brádaigh (University College		Thermocinetique de Nantes)	Structural stitching of CFRP-
	of Technology), Hisashi	CHINA), Jun Kuang (National	California)	University)			Cork)	Wood-plastic composites		T-joints containing glass
	Sato (Nagoya Institute of	Center for Nanoscience and			A new flywheel rotor design	A multi-level simulation		were prepared by dry-blend-	Different technologies based	fiber gusset fillers showed
	Technology)	Technology-CHINA), Zhong	The effects of water sorption	A novel CZM based method	containing a CFRP hollow	method for cure process of	Resin characterisation	ing of linear medium density	on solvolysis were applied	improvements of the failure
		Zhang (National Center for	on the dynamic fracture of	for simulating fatigue-driven	shaft with a hoop wound in-	composite integrated struc-	of powder-epoxy for the	polyethylene and maple wood	to degrade epoxy resins. The	resistance of this design
	Al matrix cubic boron nitride	Nanoscience and Technology-	notched polymeric matrix	delamination under cyclic	ertia mass is optimized using	ture was developed to sim-	numerical modelling of	flour with and without a sur-	carbon fibres recovered after	commonly used in aerospace
	(cBN) particles dispersed	CHINA)	materials were examined.	loading and new benchmark	FE method, manufactured	plify calculation and improve	through-thickness resin flow	face treatment. The samples	the most efficient solvolysis	design.
	functionally graded grinding		The materials used were vinyl	studies with four other	and validated using a laser	accuracy of prediction.	during 00A processing of	were produced by compres-	treatment were then reused in	
	wheels for the gyro-driving	To utilize individual carbon	ester resin and poly-methyl	comparable methods are	scanning vibrometer.		thick-section wind or tidal	sion molding.	a new material.	
	grinding wheel system have	nanomaterials excellent prop-	methacrylate (PMMA).	presented.			turbine blades.			
		erties at macroscopic level,								
		graphene based paper and								
		CNT based sponge are fabri-								
		cated, and their mechanical								
		properties are investigated.								
	3301-3 BEHAVIOUR	3302-3 IMPROVEMENT OF	3303-3 INFLUENCE OF	3304-3 MODELLING FATIGUE		3306-3 CHARACTERIZING,	3307-3 A COSSERAT	3308-3 ENVIRONMENTAL	3309-3 STUDY ON	3310-3 3D FLOATING NODE
		INTERLAMINAR FRACTURE	WATER ABSORPTION ON	CRACK INITIATION IN	PRE-PRESSURE-LOADED	MODELING, AND VALIDATING		RESISTANCE OF FLAX/	RECYCLING OF CARBON	METHOD FOR MODELLING
		TOUGHNESS IN CARBON	LONG-TERM STRENGTHS IN	COMPOSITE LAMINATES IN	COMPOSITE LAMINATED	THE PROCESSING OF OUT-	PREDICTING THE ONSET	BIO-BASED EPOXY AND	FIBRE THERMOPLASTIC	PROGRESSIVE DAMAGE
	MACHINED USING A	FIBRE/EPOXY COMPOSITES	VARIOUS DIRECTIONS OF	THE PRESENCE OF MICRO-	CYLINDRICAL PANELS	OF-AUTOCLAVE ORGANIC	OF WRINKLES DURING THE	FLAX/POLYURETHANE	PREPREG WASTE	Bo-Yang Chen (National
		WITH CARBON NANOTUBES/	UNIDIRECTIONAL CFRP FOR	SIZED VOIDS	RESTING ON ELASTIC	MATRIX COMPOSITES AS A	PROCESSING OF COMPOSITE		Kawashima Masaya (Doshisha	
		POLYSULFONE (CNTS/PSF)	MARINE USE	Lucio Maragoni (University of	FOUNDATIONS SUBJECTED	FUNCTION OF CURE CYCLE	LAMINATES	MANUFACTURED BY RESIN	University), Tanaka Tatsuya	Earn Tay (National University
	( ```)	INTERLEAVES	Yasushi Miyano (Kanazawa	Padova), Paolo Andrea Carraro		Tara Storage (Materials and	<u>Richard Butler</u> (University of	TRANSFER MOULDING	(Doshisha University ), Arao	of Singapore), Silvestre Pinho
		Nan Zheng (The University	Institute of Technology),	(University of Padova), Marino	THERMAL ENVIRONMENTS	Manufacturing Directorate),	Bath), Tim Dodwell (University	<u>Nils Cuinat-Guerraz</u> (McGill	Yoshihiko (Doshisha University	
		of Sydney), Jiefeng Gao	Masayuki Nakada (Kanazawa	Quaresimin (University of	Hai Wang (Shanghai Jiao	Brent L. Volk (Materials and	of Bath), Samuel Erland	Univeristy), Pascal Hubert	), Okuyama kento (Doshisha	Nelson Carvalho (National
		(The University of Sydney),	Institute of Technology)	Padova)	Tong University), Hui-Shen	Manufacturing Directorate),	(University of Bath)	(McGill Univeristy), Marie-	University), Ishikawa Takeshi	Institute of Aerospace),
		Hong-Yuan Liu (The	The influence of such as	The influence of miner sized	Shen (Shanghai Jiao Tong	C.w. Lee (University of Dayton		Josée Dumont (McGill	(MITSUBISHI RAYON), Tomioka	
		University of Sydney), Yudong	The influence of water	The influence of micro-sized	University)	Research Institute), Ray	A Cosserat continuum for	Univeristy)	Masao (MITSUBISHI RAYON)	London), Vincent Tan (Nation
		Huang (Harbin Institute of	absorption on the long-term	voids on crack initiation and	A nesthusking enclusis is	Coomer (University of Dayton	uncured composite laminates	This study composes the	We seen as the seconding	University of Singapore)
		Technology), Yiu-Wing Mai	strengths in various directions	evolution under fatigue is	A postbuckling analysis is presented for shear-deforma-	Research Institute), Robert	is presented, demonstrating	This study compares the	We propose the recycling	This sense develops a 2D
	specimens with holes	(The University of Sydney)	of unidirectional CFRP for marine use which consists of	studied, and a model based on a RVE is proposed to pre-	ble laminated cylindrical pan-	Brockman (University of Dayton Research Institute)	application to layer-wise mechanics on the macroscale.	evolution of the physical properties two biocomposites	method of prepreg wastes and characterize the recycled	This paper develops a 3D Floating Node Method to
	machined using a Thermally-	A vacuum filtration method	vinylester resin as a matrix	dict crack initiation in absence		Dayton Research institute)	Effective modelling of wrinkle	aged at 90%RH and 30°C: (1)	material. Furthermore, the	model explicitly the matrix
	Assisted Piercing process as	was used to fabricate carbon	was cleared.	and presence of voids.	tions subjected to combined	Experimental (angle bracket	defects is highlighted.	a flax/bio-based epoxy and (2)		crack, delamination and thei
	opposed to a drilling process.	nanotube/polysulfone (CNT/	was cleared.	and presence of volus.	uniform lateral pressure and	spring-in) and computa-	derects is nightighted.	a flax/polyurethane.	tigated the potency.	intersection, such that the
	opposed to a unimity process.	PSF) paper as an interleaf			compressive edge loads.	tional (mechanical, unit cell			ligated the potency.	matrix crack/delamination
		to improve the interlaminar			compressive euge loaus.	composite, and constituent				interaction can be captured
		fracture toughness of CF/EP				property model) efforts toward				accurately.
		composite laminates.				property model) enorts toward				accuratery.
		composite iaminates.				OMCs are presented.				
						owos are presenteu.				

Meeting room 5	Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8
3311-2 CUTTING	3312-2 FRACTURE	3313-2 THE ROLE OF	3314-2 AN INVESTIGATION	3315-2	3316-2 NANO-SCALE	3317-2 PSEUD0-	3318-2 BIO-RESIN FOR	3319-2 PLASTIC HINGE	3320-2 COMPRESSION	3321-2 3D PRINTING OF
STRATEGIES OF LONG	MECHANICS SIMULATIONS	MATRIX RESIN MICRO-	OF IN-PLANE	CHARACTERISATION	REINFORCEMENT	DUCTILITY IN MULTI-	NEW BIO-COMPOSITE	RELOCATION OF DAMAGED	AFTER IMPACT TEST	METASTRUCTURES FOR
FIBER PATCH PREFORMS	OF GRAPHENE	SCALE PROPERTIES	PERFORMANCE OF ULTRA-	OF MICRO-SCALE	FOR HIERARCHICAL	DIRECTIONAL HYBRID	PASSIVE FIRE PROTECTION		METHOD FOR THIN	PASSIVE BROADBAND
FOR STRUCTURES	COMPOSITES USING A 3D	ON THE AXIAL TENSILE	HIGH MOLECULAR WEIGHT	MECHANICAL BEHAVIOUR	AEROSPACE COMPOSITE	LAMINATES	FOR OFF-SHORE	USING CFRP SHELLS	LAMINATES	VIBRATION SUPPRESSION
WITH COMPLEX FIBER		STRENGTH OF CFRP	POLYETHYLENE FIBRE	OF COMPOSITES USING	LAMINATES	Meisam Jalalvand	APPLICATION	Dylan Brown (University of	Marina Remacha (FIDAMC),	Jared D. Hobeck (University
ARCHITECTURE	MODEL	Jun Misumi (Toray	COMPOSITES	STOCHASTIC BOUNDARY	Richard Li (Massachusetts	(University of Bristol),	Pietro Di Modica (Newcastle		Sonia Sánchez-Sáez (Carlos	of Michigan), Charles M. V.
Bernhard Horn (Technische	Lucas Brely (università di to-	Industries Inc.), Raja Ganesh	Mark Hazzard (University	VALUE PROBLEM	Institute of Technology),	Gergely Czel (University of	University), Geoff Gibson	of Utah), Mohammad Ameli	III University of Madrid),	Laurent (Catholic Institute
Universität München).	rino), Federico Bosia (univer-	(University of Delaware),	of Bristol), Paul Curtis	SOLUTIONS	Mark Payne (Massachusetts		(Newcastle University),	(University of Utah), Chris	Enrique Barbero (Carlos	of Arts and Crafts), Daniel
Christoph Ebel (Technische	sità di torino), Nicola pugno	Subramani Sockalingam	(University of Bristol),	Mikhail Tashkinov (Perm	Institute of Technology).	(University of Bristol)	George Kotsikos (Newcastle	Pantelides (University of	III University of Madrid),	J. Inman (University of
Universität München). Klaus	(University of Trento)	(University of Delaware),	Lorenzo lannucci (Imperial	National Research	Brian Wardle	(	University), Hans Hoydonckx		Bernardo López (FIDAMC)	Michigan)
Drechsler (Technische	, , ,	John W. Gillespie, Jr.	College London), Stephen	Polytechnic University),	(Massachusetts Institute of	The tensile behaviour of	(TransFurans Chemicals	,		, , , , , , , , , , , , , , , , , , ,
Universität München)	Here, we develop a multi-	(University of Delaware)	Hallett (University of Bristol),	Natalia Mikhailova	Technology)	multi-directional hybrid	bvba (TFC))	A repair technique has been	Application thickness	This research presents
,	scale numerical model to	, , ,	Richard Trask (University	(Perm National Research		laminates made with UD		developed to relocate the	range of a developed CAI	experimentally validated
Load path optimized layup	simulate the mechanisms	Preparation method of micro	of Bristol)	Polytechnic University)	Carbon nanotubes were	hybrid sub-laminates is	A small propane burner was	column plastic hinge of	(Compression After Impact)	analytical and finite element
design using fiber patches	involved in damage progres-	scale epoxy fiber specimen	, ,		radially grown on carbon	studied. The final goal is to	used to compare fire protec-	severely damaged precast	device to test thin compos-	models focused on sup-
requires special patch	sion and energy dissipation	for tensile test was devel-	In-plane mechanical proper-	This work offers a mathe-	fibers without degrading	introduce pseudo-ductility to	tion performance of a new	reinforced concrete bridge	ite laminates was analysed.	pressing axial vibration of
shapes to avoid gaps and	at different size scales in	oped to evaluate matrix res-	ties of Ultra-High Molecular	matical model that combine	in-plane strengths, thus	layups with wider industrial	furan resin against a phe-	columns, using a combina-	Intact and undamaged	a 3D-printed metastructure
overlaps. A study on the	hierarchical graphene nano-	in mechanical properties at	Weight Polyethylene fibre	several approaches of the	enabling hierarchical com-	applications.	nolic composite and simple	tion of a CFRP shell, epoxy	specimens were tested and	rod with 10 internal res-
influence of different patch	composites.	length scales representative	Dyneema® composites,	stochastic mechanics to	posites with the potential for		Kaowool. The bio composite	anchored headed st	simulated.	onators.
geometries on mechanical		of matrix resin in CFRP.	typically used for impact ap-	create an analytical tool for	improved inter- and intrala-		performed as good as the			
properties is shown.			plications, were investigated	assessment of micro-scale	minar properties.		phenolic one.			
			at low strain rates.	stress and strain in mul-						
				tiphase composites						
3311-3 INFLUENCE OF	3312-3 INVESTIGATION	3313-3 FRACTURE	3314-3 INVESTIGATION	3315-3 DETERMINATION	3316-3 MECHANICAL	3317-3 THE EFFECT OF	3318-3 MODELLING	3319-3 SHEAR	3320-3 BUCKLING TEST OF	3321-3 PORO-VASCULAR
TEST RIG CONFIGURATION	OF THE EFFECT OF	BEHAVIOR OF ACRYLIC	ABOUT TEMPERATURE	OF STRAIN AMPLIFICATION	PROPERTIES	FIBER CUTS ON THE	THE THERMO-	AND BUCKLING	A THIN-WALLED SLENDER	COMPOSITES WITH
AND EVALUATION	MULTI-WALLED	THERMOPLASTIC	DEPENDENCE OF	FACTORS FOR SIFT	OF GRAPHENE	TENSILE BEHAVIOR OF	MECHANICAL BEHAVIOR	STRENGTHENING OF STEEL	COMPOSITE SLIT TUBE	SURFACE ROUGHNESS
	CARBON NANOTUBES	POLYMER / CARBON FIBER	UNIDIRECTIONAL	THEORY BASED ON RVE	NANOPLATELET/CARBON	HYBRID CARBON FIBER/	OF AERONAUTICAL	BRIDGE GIRDERS USING	Gregory Sanford (LoadPath),	CONTROL
2D PERMEABILITY	AND GRAPHENE	COMPOSITES IN RELATION	COMPRESSIVE	MODELS CONSIDERING	FIBER/EPOXY HYBRID	SELF-REINFORCED	COMPOSITE MATERIALS	SMALL DIAMETER CFRP	Jeremy Banik (AFRL)	James Thomas (US Naval
MEASUREMENT: A	NANO-PLATELETS ON	TO MATRIX TOUGHNESS	STRENGTH OF CARBON	PERIODICAL BOUNDARY	COMPOSITES: MULTI-	POLYPROPYLENE	EXPOSED TO FIRE.	STRANDS		Research Laboratory),
BENCHMARK EXERCISE	INTERLAMINAR FRACTURE			CONDITIONS	SCALE MODELING AND	COMPOSITES	Denis BERTHEAU (Pprime	Hamid Kazem (Construction	Testing and evaluation of	Marriner Merrill (US Naval
David Christian Berg	TOUGHNESS OF CFRP	Milano), Francesco Briatico-	THERMOPLASTIC	<u>Jian Zhao</u> (Shanghai	EXPERIMENTS	<u>Yannick Meerten</u> (KU	Institute), Eric LAINE	and Environmental	Storable Tubular Extendible	Research Laboratory),
(Clausthal University	<u>Christina</u>	Vangosa (Politecnico di	COMPOSITES	Jiaotong University), Hai	Cameron Hadden (Michigan	Leuven), Yentl Swolfs (KU	(Pprime Institute), Damien	Engineering), Lucas	Members (STEMs) made	Raymond Auyeung (US
of Technology), Ewald	Kostagiannakopoulou	Milano), Roberto Frassine	Tsuyoshi Matsuo (The	Wang (Shanghai Jiaotong	Technological University),	Leuven), Mengdie Yang	MARCHAND (Pprime	Guaderrama (Construction	from thin composite lami-	Naval Research Laboratory),
Fauster (Montanuniversität	(University of Patras), Xenia	(Politecnico di Milano),	University of Tokyo), Kazuro	University), Xinying Lv	Danielle Klimek-McDonald	(KU Leuven), Jan Ivens (KU	Institute), Rocio DE VICENTE		nates. The research focuses	Alberto Pique (US Naval
Leoben), Harald Grössing	Tsilimigkra (University of	Marta Rink (Politecnico di	Kageyama (The University	(Shanghai Jiaotong	(Michigan Technological	Leuven), Larissa Gorbatikh	SUGUE (University of Sevilla)		on STEMs to be used in	Research Laboratory)
(Montanuniversität Leoben),	Patras), George Sotiriadis	Milano)	of Tokyo)	University), Xiuhua Chen	University), Julia King	(KU Leuven)		Rizkalla (Construction and	numerous spacecraft ap-	
Dieter Meiners (Clausthal	(University of Patras),			(Shanghai Jiaotong	(Michigan Technological		Composite structures are	Environmental Engineering),	plications.	Report on current Naval
University of Technology),	Vassilis Kostopoulos	Interlaminar fracture	A novel test method and	University)	University), Alex	Partial fibre cuts were	subjected simultaneously	Akira Kobayashi (Nippon		Research Laboratory R&D of
Ralf Schledjewski	(University of Patras)	toughness of an acrylic	kink band failure model for		Reichanadter (Michigan	introduced into the carbon	to flame (75 to 200kW/	Steel & Sumikin Material		multifunctional "poro-vascu-
(Montanuniversität		thermoplastic resin / carbon	compressive strength of	Efforts are taken to improve	Technological University),	fibre layers of carbon fibre/	m <sup>2</sup> ) and mechanical stress	Со.)		lar composites" (PVCs) with
Leoben), Gerhard Ziegmann	The aim of this article is to	fibre composite produced by		the precision of strain	Ibrahim Miskioglu (Michigan	self-reinforced polypropyl-	(bending). The correlation			the capability for both struc-
(Clausthal University of	investigate the toughening	infusion molding in relation	CFRP were proposed and	amplification factors and	Technological University),	ene hybrids. Their effect on	results testing / numerical	This paper presents the		ture and active-addressable
Technology)	mechanisms of MWCNTs	to matrix toughness and	verified its temperature	thermal strain vectors for	<u>Gregory Odegard</u> (Michigan	the tensile behaviour was	simulations with Abaqus®	results of a comprehensive		surface roughness control.
This should be also also at	and GNPs in CFRP lami-	viscoelastic behaviour	dependence influenced by	SIFT by introducing period-	Technological University)	analysed.	will be presented.	research programme un-		
This study investigates the	nates. Mode I & mode II		shear property.	ical boundary conditions to				dertaken to investigate the		
influence of experimental	tests were performed in			RVE models	An experimentally validated			use of small-diameter CFRP		
setup as well as evaluation	order to study the fracture				multiscale modeling strate-			strands for strengthening		
algorithms on radial-flow	behavior of composites.				gy (molecular dynamics and			steel structures and bridges.		
permeability experiments by					micromechanics) is used to			The proposed CFRP s		
benchmarking the tests rigs					predict the bulk behavior of					
of the involved institutions.					graphene nanoplatelet/car-					
					bon fiber/epoxy composites.					

	Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
		3302-4 ULTRASONICATION		3304-4 MULTI-SCALE	3305-4 OPTIMAL DESIGN		3307-4 DEVELOPMENT OF		3309-4 RECYCLING OF	3310-4 DAMAGE
15.00	ANALYSIS OF LAMINATED	AND MECHANICAL	IN CARBON FIBER	MODELING OF THE FATIGUE	OF POLYMERIC LAMINATES	ANALYSIS OF COMPOSITE	SIMULATION MODEL FOR	AND MECHANICAL ANALYSIS		ESTIMATION IN NONLINEAR
	COMPOSITES IN DRILLING	PROPERTIES OF NANOCLAY/	VINYL ESTER MARINE	BEHAVIOR OF SHORT	FOR MAXIMUM ENERGY	BULKHEAD CONSIDERING	REPRODUCIBLE 3D MULTI-			LAMINATES SUBJECTED
	AND QUASI-STATIC	POLY(ETHYLENE	COMPOSITES AND SEA	GLASS FIBER REINFORCED	DISSIPATION UNDER LOW-		LAYERED WOVEN FABRICS		CFRP BY MEANS OF	TO A TRANSVERSE
	PENETRATION	TEREPHTHALATE)	WATER EFFECTS	POLYAMIDE NOTCHED	VELOCITY IMPACT				INDUCTION HEATING	CONCENTRATED LOAD
	Navid Zarif Karimi (University	COMPOSITES	Akawut Siriruk (University	SPECIMENS	Romesh Batra (Virginia		ENGINEERING		Anna Schneller (University	Hiroshi Suemasu (Sophia
	of Bologna), Parnian Kianfar	Kazuaki Sanada (Toyama	of Tennessee), Dayakar	Enrico Belmonte (University of	Polytechnic Institute and				of Augsburg), Wolfgang	University), Michael Wisnom
	(University of Bologna),	Prefectural University).	Penumadu (University of	Padova ), <u>Matthias De Monte</u>	State University), G. O. Antoine	Yutaka Iwahori (JAXA),	IWM), Michael Löser (TU		M. Mueller (University of	(University of Bristol), Stephen
	Giangiacomo Minak	Makoto Kawagoe (Toyama	Tennessee), Kenneth Thomas	(Robert Bosch GmbH), Marino	(Virginia Polytechnic Institute	Hirotaka Igawa (JAXA),	Dresden-IWM), Chokri Cherif	Nobphadon Suksangpanya	Augsburg), Simone Richler	Hallett (University of Bristol),
	(University of Bologna)	Prefectural University), Wataru		Quaresimin (University of	and State University)	Naoyuki Watanabe (Tokyo	(TU Dresden-ITM). Gerald	(Purdue University),	(University of Augsburg),	Xiao Sun (University of Bristol)
	(entreferty of beloging)	Mizuno (Tovama Industrial		Padova)			1 · · · · · · // · · · · ·		Siegfried Horn (University of	
	In this paper, the effect of	Technology Center)	This paper presents a funda-				Adil Mountasir (TU Dresden-	of California-Riverside).	Auasbura)	An analytical study on
	machining parameters, feed		mental study on the damage	This paper presents a		A bulkhead for aircraft	ITM)	Christopher Salinas (University		damage growth of nonlinear
	J	Mechanical properties of	evolution of composite	multi-scale strategy for the		structure was fabricated with			Selective heating of CFs in a	laminated plates subjected
	lamination in drilling process	nanoclay/poly(ethylene tere-	materials being considered	lifetime prediction, in terms of			A simulation model of weav-			to a transverse concentrated
	and quasi-static penetration	phthalate) (PET) composites	by US Navy made of T700	crack initiation, of short fiber		the manufacturing process on	ing spacer preforms for com-	Institute for Colloids and	heating to affect the fiber	load is conducted to give an
	were investigated.	produced via ultrasonication	based carbon fiber fabric and	reinforced polyamide notched		structural characteristics were	posites is used to optimize	Interfaces), Isaias Gallana	matrix interface and recycle	expression for a rough esti-
	Ū.	and melt processing have	vinyl ester resin using VARTM	specimens.		experimentally and numeri-	machine parameters with the	(Purdue University), Kenneth	well-defined patches of CF	mate of the damage.
		been investigated experimen-	process.			cally investigated.	aim to limit maximum forces	Evans-Lutterodt (Brookhaven	fabric while preserving the	-
		tally and analytically.					acting on reinforcing fibres	National Lab), Elaine DiMasi	mechanical properties.	
							during the weaving process.	(Brookhaven National Lab),		
								Steven Nutt (University of		
								Southern California), Pablo		
								Zavattieri (Purdue University),		
								David Kisailus (University of		
								California-Riverside)		
								We investigate the multi-scale		
								structural and compositional		
								features as well as the		
								mechanical properties of an		
								impact-resistant biological		
								composite material		
15:20	Coffee in the Exhibition									

Meeting room 5	Meeting room 6	Meeting room 7	M1		M3	M4	M5	M6	M7	M8
		3313-4 MODELLING	3314-4		3316-4 3D TRANSMISSION		3318-4 USE OF	3319-4 FIRE EXPERIMENTS		3321-4 BIO-INSPIRED
	POLYAMIDE/GRAPHENE	CHARACTERISATION OF	CHARACTERISATION OF		ELECTRON MICROSCOPY	UNIDIRECTIONAL PLA/	EXPANDABLE MULTI-	OF THIN-WALLED CFRP	ROLLER AND BALL TEST	REVERSIBLE
	NANOCOMPOSITES :	A FAST CURING SILICA	FAILURE PROCESSES OF	DISCONTINUOUS LONG	TO QUANTIFY	BACTERIAL CELLULOSE		PRETENSIONED HIGH	FOR COMPOSITE PLATES	CROSSLINKING, USING
LATERAL COMPRESSIONAL		NANOPARTICLE MODIFIED			MORPHOLOGY OF	NANOCOMPOSITE FIBRE		STRENGTH CONCRETE	<u>Ivonne Bartsch</u> (German	CHELATING POLYMERS
	GRAPHITE SURFACE	EPOXY	TRANSVERSE LOADING				ALUMINIUM AND CFRP	SLABS UNDER SERVICE	Aerspace Center (DLR))	AND METAL ION
	TREATMENT ON THE	<u>Andre Keller</u> (FHNW	Christian Marotzke (BAM),			COMPOSITES VIA MELT		LOAD		BINDING, FOR USE AS
Takeshi Saito (Kyoto Institute		University of Applied	Titus Feldmann (BAM)	IDENTIFICATION OF	Brian L. Wardle	AND SOLUTION BLOW	Geoff Gibson (Newcastle	<u>Giovanni Pietro Terrasi</u>	An indention test for two dif-	SOFT ACTUATION AND
of Technology), AKIO OHTANI		Sciences and Arts		BIAXIAL TENSILE TESTS	(Massachusetts Institute	SPINNING	University), Sandra Christke	(Empa), Jing Gao (Xiamen	ferent test bodies (roller and	
	(University of Mons), Alexis	Northwestern Switzerland),			of Technology), Bharath	Jonny Blaker (University of	(Newcastle University),	University), Cristiàn Maluk	ball) based on the IATA ULD	Anna Baker (University
	Bobenrieth (University of	Kunal Masania (FHNW	the second se	MODELING	Natarajan (National	Manchseter), Koon-Yang Lee		(University of Edinburgh),	Regulations has been de-	of Bristol), Duncan Wass
	Mons), Philippe Dubois	University of Applied	length and the off axis angle		Institute of Standards and	(University College London),	(Newcastle University),	Luke Bisby (University of	rived. These tests are nece-	(University of Bristol),
	(University of Mons)	Sciences and Arts		Barthel Brylka (KIT),	Technology), Noa Lachman	Alexander Bismarck	George Kotsikos (Newcastle	Edinburgh)	assary to find new materials	Richard Trask (University
braided composite tube and		Northwestern Switzerland),	axis tests is studied experi-	Loredana Kehrer (KIT),	(Massachusetts Institute	(University of Vienna)	University), Adrian Mouritz	Quality of the second second	fir Unit Load Devices.	of Bristol)
its properties . The influence of lateral compression on		Ambrose Taylor (Imperial College London), Clemens	mentally as well as by finite	Viktor Müller (KIT), Thomas Böhlke (KIT)	of Technology), Thomas Lam (National Institute of		(RMIT University)	Sustainable precast con- crete elements are emerg-		lonoprinting has been used
load and stress caused by		Dransfeld (FHNW University	element analyses.		Standards and Technology),		Experimental study about a	ing utilizing high-perfor-		to create 3D polygons and
grinding was clarified .		of Applied Sciences and Arts		Biaxial tensile test of dis-	Douglas Jacobs		novel method of expandable	mance, self-consolidating,		origami shapes from flat
grinning was claimed .		Northwestern Switzerland)		continous fiber reinforced	(Massachusetts Institute		polymer-metal laminates	fibre-reinforced concrete		homogeneous hydrogels;
		Northwestern Switzenand)		polymers, inverse parameter	of Technology), Christian		for effective fire protection	(HPSCC) reinforced with		morphing trianglar based
		The rheology and kinetics		identification with a Gauss-	Long (National Institute of		of temperature-sensitive	high-strength, lightweight,		pyramid, a cube, an octa-
		of a fast-curing epoxy were		Newton procedure, com-	Standards and Technology),		and mechanically loaded	and non-corroding prest		hedron and an "umbrella"
		modelled. The temperature		parison with homogenized	Minhua Zhao (National		aerospace structures	and non correcting proor		have all been created.
		overshoot due to exotherm		material parameters based	Institute of Standards and					
		and variation in the To		on CT analysis	Technology), Renu Sharma					
		over the thickness were			(National Institute of					
		predicted and validated with			Standards and Technology),					
		experiments			J. Alexander Liddle (National					
					Institute of Standards and					
					Technology)					
					We present three-dimen-					
					sional transmission electron					
					microscopy quantification of					
					the nanoscale morphology					
					of polymer nanocomposites					
					containing up to 20%					
					volume fraction of aligned					
					carbon nanotubes.					

	Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
15:40	3401 Processing - Manufacturing Technology 9	3402 Nano Composites 9	3403 ONR Special Symposium on Marine Composites 4	3404 Fatigue 9	3405 Structural Analysis and Optimization 9	3406 Experimental Methods for Process Characterisation 1	3407 Short Fibre Composites 1	3408 Biocomposites 8	3409 Recycling of Composites and Sustainability 2	3410 Damage Tolerance of Composite Structures 4
15:40	(ETH Zürich) A novel manufacturing pro- cess for a continuous fiber lattice fabrication (CFLF), inspired by 3D-printing, pro- vides continuously extruded free form structures of rein-	3402-1 PREPARATION AND PROPERTIES OF MOS2 NANOSHEETS AND MOS2 NANOSHEETS AND MOS2 NANOSHEETS/EPOXY COMPOSITES Rongguo Wang (Harbin Institute of Technology), Yafei He (Harbin Institute of Technology), Chengqin Dai (Harbin Institute of Technology), Ning Ding (Harbin Institute of Technology), Lifeng Hao (Harbin Institute of Technology), Lifeng Hao (Harbin Institute of Technology), Wang (Harbin Institute of Technology), Ping Peng (Harbin Institute of Technology), Xiaolong Lu (Harbin Institute of Technology), Wano Technology), Waicheng Jiao (Harbin Institute of Technology), Weicheng Jiao (Harbin Institute of Technology), Fan Yang (Harbin Institute of Technology) Prepare MoS2 nanosheets suspension and MoS2 na- nosheets reinforced epoxy composites and study the absorbance, photolumines- cence, morphology, annealing property and tensile property	KEYNOTE 3403-1 CHARACTERIZATION OF SINGLE CARBON FIBER MECHANICAL BEHAVIOR BY NANO-TENSILE TESTING Matthew Kant (University of Tennessee), <u>Dayakar</u> <u>Penumadu</u> (University of Tennessee) This work demonstrates a novel approach to single fiber tensile testing for measuring axial, elastic properties with high fidelity using small am- plitude harmonic loading.	3404-1 FATIGUE BEHAVIOR OF WOOD FILLED POLYPROPYLENE COMPOSITE MATERIALS Mohd Nur Azmi Nordin (Yamaguchi University), Yuki Matsuda (Yamaguchi University), Koichi Goda (Yamaguchi University), Hirokazu Ito (Toclas Corporation ) This work includes the devel- opment of woods as reinforc- ing fillers for polymeric matrix to form an environmentally friendly composite material, i.e. wood-plastic composites (WPCs).	3405-1 BUCKLING AND FIRST-PLY FAILURE OPTIMIZATION OF STIFFENED VARIABLE ANGLE TOW PANELS Momchil Jeliazkov (IMDEA Materials Institute), Claudio Lopes (IMDEA Materials Institute), Mostafa Abdalla (Delft University of Technology), Daniel Peeters (Delft University of Technology) The current work presents a computationally efficient two-level design methodol- ogy for the optimization of stiffened compression loaded panels having variable stiff- ness panels as their skin.	3406-1 THE COMPACTION BEHAVIOUR OF PREPREGS UNDER PROCESSING CONDITIONS Oliver Nixon-Pearson (University of Bristol), Jonathan Belnoue (University of Bristol), Dmitry Ivanov (University of Bristol), Stephen Hallett (University of Bristol) Characterisation of compac- tion behaviour of toughened prepregs was undertaken to aid the understanding of man- ufacturing processes covering AFP deposition, hot debulking, and autoclave conditions.	3407-1 A VALIDATION METHODOLOGY FOR QUANTITATIVE PREDICTION OF ANISOTROPIC MECHANICAL BEHAVIOR IN FIBER REINFORCED THERMOPLASTICS Amin Sedighiamiri (SABIC Innovative Plastics), Tim van Erp (SABIC Innovative Plastics), Julien Cathelin (SABIC Innovative Plastics), Dave Brands (SABIC Innovative Plastics) Fiber reinforced thermoplas- tics offer potential for weight reduction and cost out but show anisotropic mechanical behavior. This has to be accounted for during the de- velopment of such part.	3408-1 THE EFFECT OF PHYSICAL ADHESION PROMOTION TREATMENTS ON INTERFACIAL ADHESION IN CELLULOSE-EPOXY COMPOSITE Sanna Siljander (Tampere University of Technology), Jani Lehmonen (VTT), Essi Sarlin (Tampere University of Technology), Jyrki Vuorinen (Tampere University of Technology) In this study we treated foam formed cellulose fibre sheets with plasma and atomic layer deposition (ALD) treatments to achieve better adhesion between cellulose fibres and epoxy matrix.	3409-1 RECYCLABILITY OF RANDOMLY-ORIENTED STRAND THERMOPLASTIC COMPOSITES Dominic Leblanc (McGill University), Benoit Landry (McCill University), Marek Jancik (McGill University), Pascal Hubert (McGill University) This paper compares two recycling approaches for carbon/PEEK randomly-ori- ented strand composites manufactured by compression moulding and their impact on flexural properties.	3410-1 TRACTION SEPARATION RESPONSE OF A UNIDIRECTIONAL CARBON/EPOXY COMPOSITE IN INTRALAMINAR MODE I FRACTURE; EXPERIMENTAL AND NUMERICAL RESULTS. <i>Georgios Pappas (ÉCOLE</i> <i>POLYTECHNIQUE FÉDÉRALE</i> <i>DE LAUSANNE-EPFL)</i> , <i>John Botsis (ÉCOLE</i> <i>POLYTECHNIQUE FÉDÉRALE</i> <i>DE LAUSANNE-EPFL)</i> Studies in intralaminar Mode I fracture & bridging mech- anisms of a unidirectional CFRP composite. A semi-ex- perimental method uses FBG strains to optimize FE models with an objective bridging profile.
16:00	3401-2 ADDITIVE MANUFACTURING OF HIGH TEMPERATURE GLASS AND CARBON REINFORCED PEEK (COMPOSITES Yuan Wang (University of Exeter), Oana Ghita (University of Exeter), Richard Davies (University of Exeter) This study presents recent developments in high tem- perature laser sintering of composites with focus on glass filled PEK (PEK/GB) and graphite platelet filled PEEK (PEEK/GP) materials.	3402-2 EPOXY NANOCOMPOSITES WITH TWO-DIMENSIONAL TUNGSTEN DISULFIDE ADDITIVES Yukun Wang (Beihang		3404-2 MEAN-FIELD BASED FATIGUE DAMAGE MODELING OF COMPOSITES REINFORCED WITH SHORT STRAIGHT AND WAVY FIBERS Yasmine Abdin (KU Leuven), Ignace Verpoest (KU Leuven), Stepan V. Lomov (KU Leuven), Stepan V. Lomov (KU Leuven) In this paper modelling approach is proposed for predicting the quasi-static and fatigue behavior of short random fiber reinforced composites in the framework of mean-field homogenization techniques.	3405-2 DESIGN OF PASSIVE MORPHING WING STRUCTURES USING ELASTIC INSTABILITIES Falk Runkel (ETH Zurich), Andres Felipe Arrieta Diaz (ETH Zurich), Paolo Ermanni (ETH Zurich), Paolo Ermanni (ETH Zurich) This investigation presents a concept of utilising local elastic instabilities for passive bending-twisting shape adaptation of compliant wing structures.	3406-2 OPTICAL PERMEABILITY MEASUREMENT ON TUBULAR BRAIDED REINFORCING TEXTILES Christian Schillfahrt (Montanuniversität Leoben), Ewald Fauster (Montanuniversität Leoben), Ralf Schledjewski (Montanuniversität Leoben) A novel approach for measur- ing the unsaturated 1D per- meability of braided textiles is introduced. Furthermore, the influence of the compaction pressure on the impregnation behavior is investigated.	3407-2 DAMAGE TOLERANT TOW-BASED DISCONTINUOUS COMPOSITES Soraia Pimenta (Imperial College London), Akshaya Ahuja (Imperial College London), Aik Yong Lau (Imperial College London) The properties and failure mechanisms of several high-performance discon- tinuous composites are analysed, revealing higher fracture toughnesses than in continuous CFRP and a notch insensitive response.	3408-2 BENDING FATIGUE AND CREEP PROPERTIES OF KENAF- FIBER MAT REINFORCED THERMOSETTING PLASTIC COMPOSITE Yugiu Yang (Donghua University), Bing Xiao (Donghua University), Toshihiko Hojo (Kyoto Institute of Technology)	3409-2 REGENERATION OF THERMALLY RECYCLED GLASS FIBRE FOR COST- EFFECTIVE COMPOSITE RECYCLING : THE EFFECT OF FIBRE REGENERATION AND MATRIX MODIFICATION UII Nagel (University of Strathclyde), Eduardo Saez Rodriguez (University of Strathclyde), Chih-Chuan Kao (University of Strathclyde), Liu Yang (University of Strathclyde), James Thomason (University of Strathclyde) Different approaches to maximise the reinforcement potential of thermally recycled glass fibres were compared. The fibre regeneration was found to be more effective than matrix modification.	3410-2 NUMERICAL MODELING OF FRACTURE IN TEXTILE COMPOSITES BY VTMS/BSAM X-FEM David Mollenhauer (AFRL), <u>Eric Zhou</u> (University Of Dayton Reserach Institute), Endel larve (University Of Dayton Reserach Institute) Textile PMC models were gen- erated by VTMS.Stress analy- sis was accomplished through the BSAM. Delamination and cracks were modeled via an Rx-FEM method

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Meeting room 5	Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8
3411 Textile-Based	3412 Foams, Cellular and	3413 Matrix Materials 4	3414 Fracture and	3415 Models	3416 Nanocomposites for	3417 Manufacturing Up-	3418 Sensors in	3419 Applications - Civil	3420 New Structural	3421 Multifunctional
Composites and Fibre	Lattice Materials 4		Damage - Materials	Homogenization – Micro	Structural Lightweight -	Scaling and Automation 1	Experimental Mechanics 1	Engineering 2	Testing Methods 4	Composites - Smart
Architecture 9			Scale 3	to Macro 4	Modelling and Testing 3					Structures 1
3411-1 DENSITY DEPENDENT MATERIAL	3412-1 DIRECTLY MASS- PRODUCTION GROWING	3413-1 EXPLORATORY STUDY ON THE BEHAVIOUR	3414-1 PREDICTION OF TENSILE STRENGTH OF	3415-1 A MICROMECHANICS BASED	3416-1 MODELLING AND TESTING OF THE SNAP-	3417-1 TACK Characterization of	3418-1 ULTRASONIC STRUCTURAL HEALTH	3419-1 COMPRESSION BEHAVIOR OF CONCRETE	3420-1 APPLICABILITY OF THE SINGLE CANTILEVER	3421-1 DESIGN, FABRICATION, AND
PROPERTIES OF	METHOD OF CNT AEROGEL	OF GLASS/PDCPD	UNIDIRECTIONAL CARBON	CONSTITUTIVE MODEL FOR		OUT-OF-AUTOCLAVE	MONITORING OF CFRP BY	CYLINDERS EXTERNALLY	BEAM TEST FOR	CHARACTERIZATION OF
GLASSFIBRE REINFORCED	WITH SUPERB LIQUID-	COMPOSITES	FIBER COMPOSITES	PROGRESSIVE DAMAGE	CROSS-PLY COMPOSITES	PREPREGS FOR AFP	USING NOVEL OPTICAL	CONFINED BY FLAX FIBER	CHARACTERIZATION OF	MULTIFUNCTIONAL WINGS
COMPOSITES MADE OF	ABSORPTION CAPABILITY	Katleen Vallons (KULeuven),	CONSIDERING THE	ANALYSIS OF COMPOSITE	Faustino Mujika (UNIVERSITY	APPLICATIONS	FIBER SENSING SYSTEMS	REINFORCED POLYMER	SANDWICH MATERIALS	TO HARVEST SOLAR
NON-WOVEN FABRICS	<u>Han Wang</u> (Beihang	Renata Drozdzak (Telene	INTERFACIAL SHEAR	MATERIALS	OF THE BASQUE COUNTRY),	<u>Sanjeev Rao</u> (Khalifa	<u>Qi Wu</u> (the University of	COMPOSITES	WITH VERY THIN	ENERGY IN ROBOTIC
Matthias Klaerner	University), Min Li (Beihang	SAS), Mathieu Charret	STRENGTH	Van Vu (The University of	M.asuncion CANTERA	University), Rehan Umer	Tokyo), Yoji Okabe (the	Guijun Xian (Harbin Institute	FACESHEETS - FRACTURE	BIRDS
(Technische Universität	University), Weibang Lv	(Telene SAS), Stepan V.	Wonjin Na (Seoul National	Adelaide), Abdul Hamid	(UNIVERSITY OF THE	(Khalifa University), Wesley	University of Tokyo)	of Technology), Yuanyuan	MECHANICAL ANALYSIS	Hugh Bruck (university of
Chemnitz), Sebastian Iwan (Technische Universität	(Suzhou Institute of Nano- Tech and Nano-Bionics),	Lomov (KULeuven)	University), Geunsung Lee (Seoul National University),	Sheikh (The University of Adelaide), Giang Nguyen	BASQUE COUNTRY), Itziar ADARRAGA (UNIVERSITY OF	Cantwell (Khalifa University)	We proposed three novel	Xia (Harbin Institute of Technology), Hui Li (Harbin	AND TEST IMPROVEMENT Ralf Schaeuble (Fraunhofer	maryland), Satyandra K. Gupta (university of mary-
Chemnitz), Lothar Kroll	Yizhou Gu (Beihang	Properties of glass fibre	Minchang Sung (Seoul	(The University of Adelaide)	THE BASQUE COUNTRY),	In this study, the peel	ultrasonic optical fiber sen-	Institute of Technology)	Institute for Mechanics	land), Ariel Perez-Rosado
(Technische Universität	University), Shaokai Wang	composites based on a	National University), Mi-	(	Jesús M. ROMERA	resistance of unidirectional	sors based on fiber Bragg		of Materials IWM), Anne	(university of maryland)
Chemnitz)	(Beihang University),	tough thermoset PDCPD	Young Kim (Seoul National	A new micromechan-	(UNIVERSITY OF THE	out-of-autoclave (00A)	grating and erbium fiber	Concrete cylinders were	Geyer (Fraunhofer Institute	,
	Qingwen Li (Suzhou Institute		University), Heung Nam Han	ics-based constitutive model	BASQUE COUNTRY)	prepregs tapes has been	laser, and demonstrated	confined by FRP tubes	for Mechanics of Materials	We developed multifunc-
	of Nano-Tech and Nano-	compared. Glc, tensile and	(Seoul National University),	is developed for fibre rein-	The lead displacement	evaluated using floating	their performances in struc-	wound with flax or hybrid	IWM), Marianne John	tional compliant wings with
based on non-woven fabrics offer a wide range for the	Bionics), Zuoguang Zhang (Beihang University)	compressive properties and impact and CAI were	Woong-Ryeol Yu (Seoul National University)	forced polymer matrix com- posites having unidirectional	The load-displacement curve of bi-stable unsym-	roller peel tests and Design of Experiments.	tural health monitoring of composites.	of flax and basalt fibers. A remarkable enhancement of	(Fraunhofer Institute for Mechanics of Materials	solar cells for flapping wing air vehicles (FWAVs) to
modification of elastic/	(Demang Oniversity)	investigated,		fibre orientations which	metric cross-ply square	or Experimenta.	compositos.	the compressive stress and	IWM), Ralf Schlimper	harvest energy, to increase
dynamic properties like	A kind of CNT aerogel,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	In this research the tensile	can incorporate elastic and	composite plates supported			strain was realized.	(Fraunhofer Institute for	flight time, and to enable
stiffness, strength and	grown by floating catalyst		strength of unidirectional	inelastic responses	at four points and loaded by				Mechanics of Materials	recharging without external
damping by varying level of	chemical vapor deposition		fiber composites was		a central concentrated force				IWM)	sources.
consolidation.	method, has great capability		predicted considering its interfacial shear strength.		are analyzed experimentally				A simple and robust SCB	
	of oil-absorption, which can absorb more than 90 times		The composite strength		and numerically.				test procedure for frac-	
	of its own weight of oil.		was calculated considering						ture-mechanical charac-	
	g		the IFSS.						terization of facesheet/core	
									disbonding of honeycomb	
									core sandwich material is	
									numerically and experimen-	
									tally analysed.	
3411-2 MECHANICAL CHARACTERIZATION OF A	3412-2 THE INFLUENCE OF		3414-2 APPLICATION OF ONSET THEORY TO	3415-2 DETERMINATION OF EFFECTIVE THERMAL	3416-2 MECHANICAL EFFECTS OF THE	3417-2 CURE DEGREE MONITORING OF AN	3418-2 CARBON FIBER EPOXY ATHERMAL	3419-2 SMART COMPOSITE	3420-2 FROM MEASUREMENTS ERRORS	3421-2 ON MECHANICALLY COUPLED TAPERED
THERMOPLASTIC CROSS-	NANOFIBER MATS ON THE		ONSET OF TRANSVERSE	AND THERMO-ELASTIC	INJECTION-CVD	INFUSION PROCESS BY	STRUCTURES FOR	DEMONSTRATOR DECID2 -	TO A NEW STRAIN GAUGE	LAMINATES WITH
PLY PREPREG FOR HELMET			CRACKING IN FABRIC	PROPERTIES OF WOVEN	NANOSTRUCTURATION	DEFORMABLE ELECTRONIC		CONCEPT & RESULTS	DESIGN FOR COMPOSITE	BALANCED PLAIN WEAVE
PREFORM MANUFACTURE	AT CRYOGENIC	OF DIAMOND AND CBN	COMPOSITES	TEXTILE COMPOSITES	OF CARBON-FIBRE	CIRCUIT WITH INTEGRATED		Monssef Drissi-Habti	MATERIALS	AND NON-CRIMP FABRICS
Lisa Dangora (University	ENVIRONMENTS	IMPREGNATED TOOLS	Shen Hin Lim (UNSW	USING VOXEL	COMPOSITES	CAPACITIVE SENSORS	STABILIZATION	(IFSTTAR)	Lars Pilgaard Mikkelsen	Christopher York (University
of Massachusetts), James	Seung A Song (Chonbuk	El bieta B czek (The Institute	Australia), <u>Garth Pearce</u>	BASED VARIATIONAL	INVESTIGATED BY BUNDLE		<u>C S Shin</u> (National Taiwan		(Technical University of	of Glasgow), <u>Mohd</u>
Sherwood (University of	national university), Seong	of Advanced Manufacturing	(UNSW Australia), Don	ASYMPTOTIC UNIT	TENSILE TEST AND DMA	Microsystems Technology),	University), Yen-Chang	A large smart composite	Denmark), Sanita Zike	Shamsudin (University of
Massachusetts)	Su Kim (Chonbuk national	Technology), Barbara Staniewicz-Brudnik (The	Kelly (UNSW Australia), Gangadhara Prusty (UNSW	CELL HOMOGENIZATION	Ludovic Chevallier (Institut Clément Ader),	Gabriele Chiesura (Ghent University), Thomas Vervust	Huang (National Taiwan University), Shien-Kuei Liaw	platform prototype was modeled numerically and	(Technical University of Denmark), Jacopo Gili	Kuala Lumpur)
Characterization of tempera-	university), <u>Seung Yoon</u> <u>On</u> (Chonbuk National	Institute of Advanced	Australia), Alan Crosky	Rajeev G Nair	Quentin Govignon (Institut	(Center for Microsystems	(National Taiwan Univ of	simulations run for three-	(Technical University of	Tapered designs for
ture-dependent mechanical	University)	Manufacturing Technology)	(UNSW Australia)	(Indian Institute of	Clément Ader), <u>Philippe</u>	Technology), Frederick	Science and Technology)	point bending loads in static	P 2	Balanced Plain Weave and
behaviors of a thermoplastic	<i>,</i> ,	5		Technology Bombay), B.	Olivier (Institut Clément	Bossuyt (Center for		conditions to determine a	,	Non-Crimp Fabric laminates
cross-ply to investigate the	the influence of the	The work presents the	A failure theory based on	Sivasubramonian (Vikram	Ader), Gérard Bernhart	Microsystems Technology),	Stable wavelength is		Strain gauges is found to	is presented which has con-
material for use in fabricat-	meta-aramid/epoxy nano-	possibility of application of	critical strain invariants	Sarabhai Space Centre), <u>P. J.</u>	(Institut Clément Ader),	Geert Luyckx (Ghent	required of fiber Bragg grat-	future experiments.	over-estimate the material	sistent mechanical coupling
ing helmet preforms.	fiber mats on the adhesion	hybrid of CuSn-base with	(Onset Theory) is applied to	Guruprasad (Indian Institute	Martine Mayne-L'Hermite	University), Markus	ings. Carbon fiber reinforced		stiffness with 1-10% for fib-	characteristics and immu-
	strength at cryogenic environment. Residual strain	glass-crystalline materials	predict damage locations and failure strain for plain	of Technology Bombay)	(Laboratoire Francis Perrin (CNRS URA 2453))	Kaufmann (Sirris Leuven Gent Composites Application	laminate structure is pro-		er rienforced polymers. An over-estimation depending	nity to thermal warping distortion are preserved.
	was measured by FBG sen-		weave fabric specimens	Development of voxel based		Lab), Joris Degrieck (Ghent			significantly on the present	distortion are preserveu.
	sor with OFDR and FEA was		manufactured from two	variational asymptotic	The purpose of this paper is	University), Jan Vanfleteren	to offset their thermally		of a soft gelcoat or biax.	
	performed	tools.	material systems.	method (VAM) homogeni-	to investigate the effects of	(Center for Microsystems	induced drift.			
				zation technique as applied	the injection-CVD synthesis	Technology)				
				to woven composites to	on the mechanical strength					
				determine their thermal/	and more specifically the in-					
				thermo-elastic properties.	terlaminar shear strength of nanostructured composites.	latest progress in applying deformable electronic circuit				
					nanostructureu composites.	for the in situ cure degree				
						monitoring of a resin infu-				
						sion process.				
						monitoring of a resin infu-				

## Scientific programme · Wednesday 22 July

(	Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
1 	3401-3 HIGH TEMPERATURE ADDITIVE MANUFACTURING FOR FOR RAPID MANUFACTURE, MODIFICATION AND ADAPTATION OF BESPOKE MILITARY EQUIPMENT <i>Richard Davies</i> (University of Exeter) This paper presents an inves- tigation into the use of net- shaped reinforced PEEK/CNT composites in additive man- ufacturing technologies, also known as Fused Deposition modelling (FDM).		3403-2 FABRICATION AND PERFORMANCE OF CARBON/ EPOXY COMPOSITES WITH HYBRID OF NANOCLAY AND MWCNTS Mahesh Hosur (Tuskegee University), Tanjheel Mahdi (Tuskegee University), Md. Ekramul Islam (Tuskegee University), Alfred Tcerbi- Narteh (Tuskegee University), Shaik Jeelani (Tuskegee University) This paper presents results of experimental investigations on the inclusion of nanoclay/ MWCNTs hybrids in enhanc- ing the performance of car- bon/epoxy composites.	3404-3 DAMAGE AND FRACTURE OF LAMINATES UNDER VARIOUS LOADS Christian Hochard (CNRS), Juliette Payan (CNRS), Noel Lahellec (CNRS), Aurore Girardot (CEA), Sandrine Le Roch (CEA) The paper presents a fracture model for UD and woven ply laminates under static and fatigue loads, based on the reduction of strength in the fibre direction depending on the transverse damage.	3405-3 COMPOSITE TUBES WITH NOVEL BEND-TWIST COUPLING Sean Rohde (University of Florida), Avinash Jonnalagadda (University of Florida), Aniruddha Savant (University of Florida), Peter Ifju (University of Florida), Bhavani Sankar (University of Florida) A novel composite tube with bend-twist coupling is discussed. A formula for the distance of the shear center from the tube axis in terms of material properties and tube length is derived.	3406-3 EXPERIMENTALLY VALIDATED MANUFACTURING RELIABILITY FOR COMPOSITE STRUCTURES Douglas Cairns (Montana State University), Michael Bauer (Montana State University)	3407-3 A NOVEL HIGH TEMPERATURE SINGLE POLYMER COMPOSITE Mingming Yu (Shanghai university), Bin Feng (Shanghai university), Wang Xie (Shanghai university), Ling Fang (Shanghai university), Ling i liu (Shanghai university), Musu ren (Shanghai university), Musu ren (Shanghai university), Juniversity), Xiaofeng wang (Shanghai Tanlon Fiber CoLtd.) The SPC based on polysul- fonamide was prepared, and the experiments results indicated that the SPC had good thermal properties since its Tg was over 300oC and decomposition temperature was over 400oc	3408-3 STRONG AND TOUGH FUNGAL BASED CHITIN- GLUCAN THIN FILM Wan Mohd Fazli Wan Nawawi (Imperial College London), Koon Yang Lee (Imperial College London), Eero Kontturi (Imperial College London), Alexander Bismarck (University of Vienna) This study investigate the chemical, morphological, and mechanical properties of thin film made from fungi chitin- ous extract. The extract were from common mushroom and tree bracket fungi.	3409-3 RECOVER: REGENERATING THE STRENGTH OF GLASS FIBRES THERMALLY RECYCLED FROM END-OF- LIFE COMPOSITES James Thomason (University of Strathclyde), Eduardo Saez-Rodriguez (University of Strathclyde), Chih Chuan Kao (University of Strathclyde), Liu Yang (University of Strathclyde) Cost-effective treatments to restore the massive loss in strength of glass fibres thermally recycled from end- of-life composites have been developed and investigated.	3410-3 IMPROVING THE DAMAGE TOLERANCE OF COMPOSITE JOINTS WITH TUFTING James Kratz (University of Bristol ), Harry Clegg (The National Composites Centri Vana Partridge (University of Bristol) Tufting was used to increase the delamination resistance T-stiffened panels by inseri to delamination resistance the delamination seistance the delamination seistance the delamination seistance the delamination seistance T-stiffened panels by inseri to hreads at the string tip. The failure mode change from skin-stringer separation to web splitting.
5:40		3402-4 MODELLING NANOSCALE GRAPHENE STRUCTURES USING A MULTI-PHYSICS MOLECULAR-DYNAMICS FINITE-ELEMENT METHOD Silvestre Pinho (Imperial College London), Andre Wilmes (Imperial College London) A new MDFEM with reactive/ charge force fields is pro- posed, including rotational BCs, bending properties of pillared graphene, graphene fracture toughness, virtual- ly-designed porous graphene sensor.	3403-3 IMPLOSION OF CYLINDRIGAL COMPOSITE STRUCTURES SUBJECTED TO UNDERWATER IMPULSIVE LOADS Sid Avachat (Georgia Institute of Technology), Min Zhou (Georgia Institute of Technology) The response of filament cylindrical carbon-fiber/epoxy composite structures subject- ed to underwater impulsive loads is analyzed experimen- tally and computationally.	3404-4 ASSESSMENT OF FATIGUE DAMAGE ONSET AND GROWTH IN PLAIN WEAVE COMPOSITES WITH EMBEDDED FLAWS Ahmed Maslouhi (Université de sherbrooke), Braisaz Paul (Université de sherbrooke), Nassim Kanouni (Université de sherbrooke) The paper proposes an experimental approach using acoustic emission to generate lifetimes curves and to predict the onset of fatigue damage and the propagation of an embedded artificial flaw in CFRP.	small satellite applications. This paper examines how these structures can be de- signed and fabricated along with the deployment mecha-	3406-4 NON-CONTACT HOLISTIC MEASUREMENT OF AEROSPACE FASTENER HOLES WITH RING LASER ADAPTIVE OPTICS George Bullen (Northrop Grumman-Ret.) This paper will describe, illustrate, and define new non-contact laser inspection methods for assessing the acceptability of countersinks and holes in aerospace parts made from composite materials.	3407-4 FORMULATION ABOUT TIME- AND TEMPERATURE- DEPENDENT FLEXURAL MODULUS OF DISCONTINUOUS CARBON FIBER MAT REINFORCED THERMOPLASTICS Wataru NAGATSUKA (The University of Tokyo), Tsuyoshi MATSUO (The University of Tokyo), Fumiaki YANO (Shimadzu Corporation), Kenichi FURUKAWA (Suzuki Motor Corporation), Jun TAKAHASHI (The University of Tokyo) It was clarified that the time- and temperature-dependence of flexural modulus of CFRTP is caused by Young's modulus and out-of-plane modulus influenced from viscoelastic property of matrix resin.	3408-4 AN INVESTIGATION ON COMPOSITE CONSTITUTED OF PAPER AND RESIN BY VENT-TYPE INJECTION MOLDING MACHINE Keisuke Kitai (Kitai Seisakusyo CoLtd.), Satoshi Harada (Kitai Seisakusyo CoLtd.), Takanori Kitamura (Daiwa Itagami CoLtd.), Mitsunori Suda (Daisankogyo CoLtd.), Zhiyuan Zhang (Daiwa Itagami CoLtd.), Hiroyuki Hamada (Kyoto Institute of Technology) The objective of this research is using composite combining with plastic and paper mate- rials to relieve the depending on timber from ecological thinning.	Povl Brøndsted (DTU), Helga Nørgaard Petersen (DTU) Four different recycling pro- cesses, mechanical, burn off,	Engineered Composites), David Ehrlich (Albany Engineered Composites), Jd Goering (Albany Engineered Composites), Michael McClain (Albany Engineered Composites) This study shows that under

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eeting room 5	Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8
411-3 A DISCRETE	3412-3 ARCHITECTURE	3413-3 CRACK ONSET	3414-3 FAILURE	3415-3 IMPACT OF THE	3416-3 OUT-OF-OVEN	3417-3 ASSESSING THE	3418-3 HEALTH	3419-3 IN-PLANE		3421-3 NUMERICAL
ESOSCOPIC FINITE	AND PROPERTIES OF	IN A POLYMER MATRIX	PREDICTION MODEL FOR	NUMERICAL MODEL	CURING OF COMPOSITE	STRUCTURAL RESPONSE	MONITORING OF WOVEN	STRUCTURAL BEHAVIOR		AND EXPERIMENTAL
LEMENT MODEL	STOCHASTIC FOAM	WITH OPEN-HOLE	NCF LAMINATES LOADED	ASSUMPTIONS ON THE	LAMINATES VIA RESISTIVE	OF AFP COMPOSITE	COMPOSITE STRUCTURES	OF MASONRY WALLS		INVESTIGATIONS OF
SED TO LINK THE	MODELS	CONFIGURATION AND	IN COMPRESSION AND	WATER DIFFUSION	MICROHEATERS	STRUCTURES WITH	BY STRAIN FIELD	STRENGTHENED WITH AN		THIN-WALLED NEUTRALLY
ANUFACTURING	Stefan Hallström (Royal	VISCOELASTIC BEHAVIOR.	THE EFFECT OF OFF-AXIS	KINETICS OF A UD	COMPRISED OF ALIGNED	GAPS AND OVERLAPS BY	METHODS: COMPARISON	INNOVATIVE HEMP-BASED		STABLE DEPLOYABLE
ROCESS TO THE FINAL	Institute of Technology	APPLICATION OF THE	LOADING	COMPOSITES	CARBON NANOTUBE	MEANS OF NUMERICAL	BETWEEN FIBRE BRAGG	COMPOSITE SYSTEM		COMPOSITE BOOMS
RT STIFFNESS	(KTH)), Joonas Köll (Royal	FINITE FRACTURE	Anton Shipsha (KTH Royal	Yoann JOLIFF (MAPIEM -	NETWORKS.	APPROACHES	GRATING SENSORS	Costantino Menna		Yang Liuyi (Harbin Institute
ynthia Mitchell (University	Institute of Technology	MECHANICS COUPLED	Institute of Technology),	SeaTech - Université de	Jeonyoon Lee	Falk Heinecke (German	ARRAYS AND DIGITAL	(University of Naples		of Technology), Tan
Massachusetts Lowell).	(KTH))	CRITERION.	Magnus Burman (KTH Royal	Toulon), Lénaïk BELEC	(Massachusetts Institute	Aerospace Center (DLR)),	IMAGE CORRELATION.	Federico II), Domenico		Huifeng (Harbin Institute
mes Sherwood (University		Afonso Leite (Escuela	Institute of Technology),	(MAPIEM - SeaTech -	of Technology), Itai Stein	Wouter van den Brink	Md Kharshiduzzaman	Asprone (University of		of Technology), Cao
Massachusetts Lowell)	Recent results from a	Técnica Superior de	Johan Ekh (KTH Royal	Université de Toulon), Jean-	(Massachusetts Institute	(National Aerospace	(Politecnico di Milano),	Naples Federico II), Massimo		Zongsheng (Harbin Institute
, í	numerical study of the mi-	Ingeniería-University of	Institute of Technology)	Francois CHAILAN (MAPIEM	of Technology), Seth	Laboratory (NLR)), Tobias	Andrea Bernasconi	Durante (University of		of Technology)
is paper presents a	crostructure and constitutive	Seville), Vladislav Manti		- SeaTech - Université de	Kessler (Metis Design	Wille (German Aerospace	(Politecnico di Milano),	Naples Federico II), Alberto		
ethodology to link the	properties of equilibrium	(Escuela Técnica Superior	Compressive strength of	Toulon)	Corporation), Brian Wardle	Center (DLR))		Zinno (Stress S.c.a r.l.),		A neutrally stbale boom
ructural properties of a	foams are presented and	de Ingeniería-University	NCF laminates at various		(Massachusetts Institute of		di Milano)	Anna Bozza (University of		was investigated trhough
xtile-reinforced composite	discussed focussing on	of Seville), Federico París	off-axis angles was studied	This work deals with the	Technology)	Focusing on the automated		Naples Federico II), Andrea		an analytical model and
mponents and structures	relations between topology	(Escuela Técnica Superior	experimentally for different	impact of the numerical		dry fibre placement tech-	In this work the response	Prota (University of Naples		numerical method. The coil
deformations seen in the	and properties.	de Ingeniería-University of	lay-ups. Effect of stacking	models assumptions on	An in siu curing technique	nique (AFP) the effect on	of fiber Bragg grating	Federico II)		ing process was simulated,
xtile during forming.		Seville)	sequence was studied as		for polymer matrix compos-	stiffness and strength of	(FBG) sensors is studied			the strain enervoy of two
kalo danng forming.		000000)	well. Strength criterion was	unidirectional composite.	ite using a resistive heating	manufacturing induced gaps		The in-plane structural		methods agree well with
		Fracture of stretched open-	proposed.	Numerical results are	film comprised of an aligned		present in woven compos-	behavior of masonry		each other.
		hole PMMA plates is made	proposedi		carbon nanotube network	to enable a so called "as-	ites for strain based SHM	panels strengthened with		
		by Finite Fracture Mechanics		values (from µ-TA).	enables highly efficient	built" analysis.		an innovative hemp-based		
		using Finite Elements with a			curing while adding multi-	built unaryoio.		composite system was		
		linear viscoelastic material			functionality.		mar bio roouto.	assessed by means of		
		model. Predictions of the			lanotonality			diagonal compression tests.		
		size effect are made and						A good performance was		
		compared.						achieved.		
		comparou	3414-4 EVALUATION OF	3415-4 PREDICTION OF	3416-4 INTERFACIAL	3417-4 STRUCTURAL		3419-4 MECHANICAL		
			CORRELATION BETWEEN	CRACK TORTUOSITY	DECOHESION IN FIBER	HEALTH MONITORING		BEHAVIOR OF BFRP-STEEL		
			IMPACT-INDUCED CRACK	IN FIBER REINFORCED	RICE HUSK POWDER	AND PROCESSING OF		COMPOSITE PLATE UNDER		
			GROWTH BEHAVER AND	COMPOSITE	FAILURE EPOXY	COMPOSITE STRUCTURES		AXIAL TENSION		
				MICROSTRUCTURES	COMPOSITE	USING PHOTONIC SENSING		Yanlei Wang (Dalian		
			TOUGHNESS IN CFRP	Timothy Breitzman (US Air	Anil Saigal (Tufts University),	TECHNOLOGY		University of Technology),		
			LAMINATES		Alvaro Del Solar (Tufts	Gangadhara Prustv (UNSW		Yunvu Li (Dalian University		
			Yasuhiro KOICHI (Kanazawa	Eric Zhou (University of	University)	Australia), Ginu Rajan		of Technology)		
			Institute of Technology),	Dayton Research Institute)	University)	(UNSW Australia), Ebrahim		or recrimology)		
			Hiroshi SAITO (Kanazawa		The paper deals with 2D	Oromiehie (UNSW Australia),		A novel BFRP-steel compos-		
			Institute of Technology),	This paper considers the	analysis of a biocomposite	Paul Compston (Australian		ite plate (BSP) is proposed,		
			Isao KIMPARA (Kanazawa	tortuosity of a minimal	consisting of 30 vol. percent	National University)		where a steel plate is sand-		
			Institute of Technology)		of rice husk powder in an	National Oniversity)		wiched between two outer		
			Institute of Technology)	through a fiber reinforced	epoxy resin matrix in which	Utilizing FBG sensors for		BFRP laminates. The perfor-		
			In this study, we compound		the interfacial decohesion	structural health monitoring		mance of the proposed BSP		
			In this study, we compared			J		under uniaxial tension was		
			mapping of fracture mode in CFRP laminates after impact	fiber volume fractions and material fracture properties.	failure initiates between 1-2% strain.	of composite laminates and demonstrate their		investigated.		
				material macture properties.	1-2% Suam.			investigateu.		
			and the result of numerical			capabilities for for on-line				
			simulation, and identified			monitoring of lay-up process				
			consistency between these.			in the advanced robotic				
						composites.				

	Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
8:30	From fibres to tapes, from sy									
	4101 Processing - Manufacturing Technology 10		4103 ONR Special Symposium on Marine Composites 5	4104 Multifunctional Composites - Self-Healing and Bio-inspired Designs 1	4105 Structural Analysis and Optimization 10	4106 Experimental Methods for Process Characterisation 2	4107 Fibres 1	4108 Biocomposites 9	4109 Liquid Composites Moulding 1	4110 Sandwich Structures and Materials 1
9:30	FOR HOT DRAPE FORMING OF OUT-OF-AUTOCLAVE PREPREG OVER COMPLEX SHAPE USING DOUBLE DIAPHRAGM TECHNIQUE Hassan Alshahrani (Concordia Center for Composites- Concordia University-), Mehdi Hojjati (Concordia Center for Composites-Concordia University-) A double-diaphragm set-up for forming flat prepreg into complex shapes was developed. Formability of out-of-autoclave (00A) prepregs and the effects of	NANOTUBE BUCKYPAPER REINFORCED EPOXY COMPOSITE Jinhua Han (National	4103-1 WATER ENTRY OF ASYMMETRIC WEDGES THROUGH PARTICLE IMAGE VELOCIMETRY Adel Shams (New York University Polytechnic School of Engineering), Mohammad Jalalisendi (New York University Polytechnic School of Engineering), <u>Maurizio Polytechnic School of Engineering</u> ) PIV is used to experimentally investigate the asymmetric water impact of a rigid wedge. The effect of a geometric asymmetry on the flow physics and pressure field is studied.	of Bristol), Richard S. Trask (University of Bristol), Ian P. Bond (University of Bristol) Intralaminar damage within cross-ply laminates and skin-stiffener debond speci- mens is addressed via a vas- cular self-healing approach.	4105-1 OPTIMAL DESIGN OF VARIABLE THICKNESS COMPOSITE STRUCTURES MADE BY PATCHES USING STACKING SEQUENCE TABLES François-Xavier Irisarri (ONERA), Cédric Julien (ONERA), Dimitri Bettebghor (ONERA) A bi-level optimization strat- egy is presented in which stacking sequence tables are used to link thickness variations to stiffness vari- ations within a continuous optimization.	4106-1 INFLUENCE OF PROCESS PARAMETERS ON THE EFFICIENCY OF TRANSVERSE IMPREGNATION OF TEXTILES David Becker (Institut fuer Verbundwerkstoffe GmbH), Jeachim Broser (Institut fuer Verbundwerkstoffe GmbH) Peter Mitschang (Institut fuer Verbundwerkstoffe GmbH) By combining transverse permeability measurement with online-compaction monitoring, the influence of pressure drop, flow rate & flow acceleration on the textile impregnation behavior was investigated.	4107-1 VISCOELASTIC BEHAVIOUR OF SINGLE HEMP FIBRE UNDER CONSTANT AND CYCLIC HUMIDITY ENVIRONMENT - EXPERIMENT AND MODELLING. Vincent Placet (FEMTO- 57), Ousseynou CISSE (FEMTO-ST), Violaine GUICHERET-RETLE (FEMTO- ST), Frédérique TRIVAUDEY (FEMTO-ST), Lamine BOUBAKAR (FEMTO-ST) The aim of this study is to investigate and model the time-dependent tensile be- haviour of single hemp fibres in view of their integration in composite materials.	4108-1 DEGRADATION OF NFC SANDWICH PANELS DUE TO ACCELERATED WEATHERING Benjamin Hornblow (FORCE Technology) Epoxy/flax-fibre sandwich panels were shown to be a suitable alternative to birch plywood for the carrying box of a cargo bicycle. UV resist- ant coating proved effective at preventing colour change.	4109-1 VACUUM INFUSION PROCESSING OF CELLULOSE NANOFIBRE NETWORKS Yonne Altomäki (Luleå University of Technology), Sergio Moreno Rodríguez (Luleå University of Technology), Staffan Lundström (Luleå University of Technology), Kristiina Oksman (Luleå University of Technology) Cellulose nanofibre networks of different porosity are made from fibrillated pulp with the aim of allowing vacuum infusion to be used to manu- facture nanocomposites from these networks.	4110-1 COMPARING UNREINFORCED AND PIN- REINFORCED CFRP/PMI FOAM CORE SANDWICH STRUCTURES REGARDING THEIR DAMAGE TOLERANCE BEHAVIOUR Marianne John (Fraunhofer IWM), Anne Geyer (Fraunhofer IWM), Ralf Schlimper (Fraunhofer IWM), Ralf Schäuble (Fraunhofer IWM) The SCB-test is used to deter mine the Energy Release Ratt (ERR) as a characteristic valu of the Damage Tolerance behavior of unreinforced and pin-reinforced CFRP/PMI foan core sandwich structures.
9:50	CONTINUOUS FIBER REINFORCEMENT Florian Gortner (Institut für Verbundwerkstoffe), Luisa Medina (Institut für Verbundwerkstoffe) / Peter Mitschang (Institut für Verbundwerkstoffe) The combination of textile reinforcement with a con- ventional short fiber Sheet Molding Compound (SMC) en- ables the production of com- plex component geometries with increased mechanical properties.	4102-2 ENCAPSULATION OF MULTIWALL CARBON NANOTUBE VIA SELF-POLYMERIZED POLYDOPAMINE: THE IMPROVEMENT ON PROPERTIES OF ELASTOMERIC POLYURETHANE NANOCOMPOSITES WITH ULTRALOW NANOTUBE LOADINGS Chenzhong Mu (Nanyang Technological University), Liying Zhang (Nanyang Technological University), Yujie Song (Nanyang Technological University), Ming Liu (Nanyang Technological University), Xiao Hu (Nanyang Technological University), Ming Liu (Nanyang Technological University), Xiao Hu (Nanyang Technological University) A facile and eco-friendly method employing polydo- pamine (PDA) as a surface treatment agent was used to modify the CNTs surfaces and the influences of PDA-CNTs on nanocomposites were studied as well.	4103-2 FAILURE MECHANICS OF SANDWICH PANELS SUBJECTED TO WATER SLAMMING Mark Battley (University of Auckland), Tom Allen (University of Auckland) Failure mechanics of foam core sandwich panels sub- jected to water slamming are characterised demonstrating significant differences in damage evolution and strength depending on the type of material.	MANUFACTURING OF VASCULAR NETWORKS FOR REPEATED SELF-HEALING FUNCTIONALITY Isabel Qamar (University of Bristol), Richard Trask (University of Bristol) Additive Manufacturing tech- niques are used to develop porous vascular networks for self-healing applications, permitting multiple healing	4105-2 STRUCTURAL OPTIMIZATION TO PREVENT CRACK PROPAGATION FOR CFRP CRYOGENIC TANK Hayato Fukui (Tokyo University of Science), Akinori Yoshimura (Japan Aerospace Exploration Agency), Ryosuke Matsuzaki (Tokyo University of Science) We conducted structural opti- mizations for CFRP cryogenic propellant tank by using ge- netic algorithm, and proposed the structure, which can pre- vent crack propagation.	4106-2 INFLUENCE OF COMPACTION BEHAVIOR OF CARBON NCF ON PREFORM MECHANICS / FOR CONTINUOUS PROFILE PREFORMING <i>Timo Grieser (Institute fuer Verbundwerkstoffe GmbH)</i> Peter Mitschang (Institute fuer Verbundwerkstoffe GmbH) The influence of process and material parameters on com- paction behavior of singly-ply and multi-ply carbon fiber NCF preforms was investigat- ed to improve stationary and continuous preforming.	4107-2 DEVELOPING MULTIFILAMENT DRAWING FACILITIES FOR PHOSPHATE GLASSES Andrew Parsons (University of Nottingham), Nusrat Sharmin (University of Nottingham), Sharifah Shaharuddin (International Islamic University Malaysia), Ifty Ahmed (University of Nottingham), Martyn Marshall (Glass Technology Services), Tim Kermeen (Valmiera Glass UK Ltd.), Chris Rudd (University of Nottingham) A prototype multi-filament fibre drawing system was developed to produce bound threads of resorbable phosphate glass fibre. These threads were then used to produce a phosphate glass woven textile.	4108-2 WASTE SILK/WOOL HYBRID BIOCOMPOSITES WITH PBS MATRIX: PROCESSING, PROPERTIES AND ELECTRON BEAM TREATMENT EFFECT Donghwan Cho (Kumoh National Institute of Technology), Hwi Yong Lee (Kumoh National Institute of Technology) The study is focusing on pro- cessing hybrid biocomposites with waste silk/wool fibers and PBS and on characteris- ing the electron beame treat- ment effect on the thermal and mechanical properties.	4109-2 PERMEABILITY ENHANCEMENT WITH DIFFERENT GLASS FIBER QUASI-UD STRUCTURE ARRANGEMENTS FOR RTM- TP PROCESS Guillaume Cazaux (Laboratoire Ondes et Milieux Complexes - Université du Havre), Laurent Bizet (Laboratoire Ondes et Milieux Complexes - Université du Havre), Joël Bréard (Laboratoire Ondes et Milieux Complexes - Université du Havre), Moussa Gomina (Centre National de Recherche Technologique Materiaux - ENSICAEN), Elena Syerko (Ecole Centrale de Nantes), Sebastien Comas- Cardona (Ecole Centrale de Nantes), Sebastien Comas- Cardona (Ecole Centrale de Nantes), Christophe Binetruy (Ecole Centrale de Nantes), Gilles Orange (Solvay) The common work of TAPAS project members propose an in-plane permeability compar- ison of three different glass fiber fabrics structures, char- acterized by experiments and analytical/numerical models.	4110-2 STRAIN VISUALISATION OF COMPOSITE SANDWICH STRUCTURES WITH DIFFERENT CORE MATERIALS FOR WIND TURBINE BLADES <i>Cithan Kaboglu (Imperial College London), Soraia</i> <i>Pimenta (Imperial College London), Andy Morris (EDF Energy), John P. Dear (Imperia College London)</i> This work studies the effect of grading the density of the core material of sandwich structures. It is shown that a uniform core maximises flexural strength, but a graded core may delay final failure.

Meeting room 5	Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8
4111 Multifunctional	4112 Composites with	4113 Ductile and Pseudo-	4114 Models	4115 Identification using	4116 Dynamic Fracture 2	4117 Manufacturing Up-	4118 Multiscale Modelling	4119 Applications - Wind,	4120 Sensors in	4121 Multifunctional
Composites - Adaptive	Metallic Components 1	ductile Composites 5	Homogenization – Micro	Full-Field Measurements		Scaling and Automation 2	of Structures 1	Wave and Tidal Energy 1	Experimental Mechanics 2	Composites - Smart
Response and Reconfiguration 3			to Macro 5							Structures 2
4111-1 COMPARING	4112-1 SYNERGISTIC	4113-1 ALIGNED SHORT	4114-1 NON-CONFORMAL	4115-1 ULTRA-HIGH SPEED		4117-1 AUTOMATION	4118-1 INTEGRATED	4119-1 STATIC AND	4120-1 MANUFACTURING	4121-1 DAMAGE
DIFFERENT NANOPARTICLE	STRENGTHENING EFFECT	FIBRE COMPOSITES WITH	FINITE ELEMENT	FULL-FIELD DEFORMATION MEASUREMENTS TO	ASSESSMENT AND MODEL DEVELOPMENT OF FIBRE	OF COMPOSITE	MULTI-SCALE MODELLING OF 3D WOVEN	DYNAMIC THROUGH	OF HIGH PRESSURE	MONITORING OF Sandwich Panels
EMBEDDING IN A POLYMERIC MATRIX	CARBON NANOTUBE	DUCTILE BEHAVIOUR Hana Yu (University of	HOMOGENIZATION APPLIED TO WOVEN	IDENTIFY THE HIGH	REINFORCED COMPOSITE	MANUFACTURING USING OFF-THE-SHELF	STRUCTURES	THICKNESS LAMINA PROPERTIES OF THICK	COMPOSITE VESSEL WITH INTEGRATED	BASED ON IMPACT FORCE
TOWARD MULTI-	HYBRID-REINFORCED	Bristol), Marco Longana	COMPOSITES WITH	STRAIN RATE BEHAVIOUR	SANDWICH PANELS	SOLUTIONS; THREE	Bassam El Said (University	LAMINATES	OPTICAL FIBER SENSORS.	IDENTIFICATION USING
FUNCTIONALITY Biswajit Basu (Trinity	ALUMINUM MATRIX COMPOSITES	(University of Bristol), Gael Grail (Imperial College	COMPLEX TEXTILE ARCHITECTURES	OF COMPOSITES Haibin Zhu (University of	SUBJECTED TO OUT-OF- PLANE IMPACT LOADING	INDUSTRIAL CASES FROM THE AEROSPACE	of Bristol), Dmitry Ivanov (University of Bristol),	Francisco Lahuerta (Knowledge Centre WMC),	LIMITATIONS AND BENEFITS	RADIATED SOUNDS Satoshi Atobe (Tohoku
College), Fabio Casciati	Genlian Fan (Shanghai	London), Soraia Pimenta	Benoit Wucher (Cenaero),	Technology of Troyes),	Ingrid Schipperen (TNO)	INDUSTRY	Andrew Long (University of	Rogier Nijssen (Knowledge	Pawel Gasior (Wroclaw	University), Masato
(University of Pavia), Sara	Jiao Tong University),	(Imperial College London),	Stefan Hallström (Royal	Fabrice Pierron (University of		<u>Andreas Björnsson</u>		Centre WMC ), Frans van der		Muramoto (Tohoku
Casciati (University of Catania), Bigiong Chen	Zan Li (Shanghai Jiao Tong University), Zhanqiu	Paul Robinson (Imperial College London), Michael	Institute of Technology (KTH)), David Dumas	Southampton), Clive Siviour (University of Oxford)	The behaviour of FRP sand- wich panels under impact	(Linköping University), Marie Jonsson (Swerea Sicomp).	(University of Bristol)	Meer (TU Delft (CITG)), Bert Sluys (TU Delft (CITG))	Jerzy Kaleta (Wroclaw University of Technology),	University), Hisao Fukunaga (Tohoku University)
(University of Sheffield),	Tan (Shanghai Jiao Tong	Wisnom (University of	(Cenaero), Thomas Pardoen		was studied both experi-	Kerstin Johansen (Linköping	A novel integrated	Sidys (TO Delit (GTD))	Radosław Rybczy ski	
Andrea Spagnoli (University	University), Zhiqiang	Bristol), Kevin Potter	(Université catholique de	This communication pre-	mentally and numerically.	University)	multi-scale modelling	In order to study the through	(Wroclaw University of	This paper presents a meth-
of Parma)	Li (Shanghai Jiao Tong University), Qiang Guo	(University of Bristol)	Louvain), Christian Bailly (Université catholique de	sents a new methodology to obtain composite stiffness	It was shown that design for impact and analysis of	The paper explores how	framework that allows the designer to virtually weave,	thickness variation of lamina properties in thick	Technology)	od for identifying impact forces acting on sandwich
Graphene Nanoparticles	(Shanghai Jiao Tong	Highly aligned short fibre	Louvain), Philippe Martiny	components at high strain	impact loaded panels is	off-the-shelf solutions, de-	compact and simulate the	laminates, 60-70mm thick		panels, and also detecting
Embedded in a Polymeric	University), Di Zhang	composites with fibre length	(e-Xstream engineering),	rate, based on ultra-high	possible.	veloped for other purposes	mechanical performance	unidirectional GFRP infused		the impact-induced damage
Matrix for Added/value Multifunctionality. This paper	(Shanghai Jiao Tong University)	close to the critical value, which can bring a nonlinear	Frédéric Lani (Université catholique de Louvain)	speed imaging, full-field measurements and inverse		than composite manufac- turing, can be used to build	of 3D woven composites structures.	panels were divided in sub-laminates and tested		using the information ob- tained by the impact force
reports some aspects of a	Oniversity)	behaviour, are manufactured		identification.		systems for automated	30 0000 03.	(static & fatigue).		identification.
work-in-progress. Scenarios		and the results are com-	A simple finite element			composite manufacturing.				
of extreme environmental conditions.		pared with the analytical solution.	procedure is developed for the homogenization of high-							
conditione.			ly-compacted woven tex-							
			tiles, using non-conformal							
			meshing and penetration compensation.							
4111-2 SHAPE	4112-2 ON THE	4113-2 EFFECT OF	4114-2 MULTISCALE	4115-2 IDENTIFICATION	4116-2 SOFT IMPACT	4117-2 IN-LINE QUALITY	4118-2 MULTISCALE	4119-2 DESIGN	4120-2 REAL-TIME	4121-2 EXPERIMENTAL
MEMORY POLYMER NANOCOMPOSITES: NANO-	BEHAVIOUR OF FIBRE	FIBER LENGTH ON THE TENSILE STRENGTH	ANALYSIS FOR NEGATIVE THROUGH-THE-THICKNESS	OF FAILURE MECHANISMS	RESPONSE OF LAMINATED GLASS PLATES	CONTROL SYSTEM FOR THE INDUSTRIAL	ANALYSES OF WOVEN POLYMER MATRIX	AND TESTING OF THREE-DIMENSIONAL	PROCESS MONITORING OF 3D PRINTED	AND NUMERICAL STUDY ON INFLUENCE
REINFORCEMENT AND	MATRIX COMPOSITES	OF UNIDIRECTIONALLY	POISSON'S RATIO OF	USING 3D DIGITAL IMAGE	Iman Mohagheghian	PRODUCTION OF	COMPOSITES: DAMAGE	COMPOSITES FOR	MULTILAYERED	OF EMBEDDED
	UNDER LOADING AND	ARRAYED CHOPPED	ELASTIC-VISCOPLASTIC	CORRELATION	(Imperial College London),	MULTIAXIAL NON-CRIMP	MODELING.	FLYWHEEL ROTOR	STRUCTURES USING	INTERROGATOR
<u>Haibao Lu</u> (Harbin Institute of Technology), Jinsong	THERMAL CYCLING CONDITIONS	STRANDS Ichiro Taketa (Toray	ANGLE-PLY CFRP LAMINATES	<u>Nora Schorer</u> (University of Augsburg), Markus G.	Yi Wang (Imperial College London), Jie Zhou (Imperial	FABRICS Marcel Haeske (Institut	<u>Christian Fagiano</u> (ONERA), Aurelien Doitrand (ONERA),	Noboru Hiroshima (The Graduate University for	OPTICAL FIBER BRAGG GRATING SENSORS	GEOMETRY ON STRUCTURAL
Leng (Harbin Institute	Haofeng Chen (University of	Industries-Inc.)	Tetsuya Matsuda (University	R. Sause (University of	College London), Xintao	fuer Textiltechnik (ITA) of	Martin Hirsekorn (ONERA),	Advanced Studies School	Charoula Kousiatza	PERFORMANCE OF FIBER
of Technology), Shanyi	Strathclyde)	•	of Tsukuba), <u>Keita Goto</u>	Augsburg)	Guo (Beijing Institute of Aeronautical Materials).	RWTH Aachen University),	Vincent Chiaruttini (ONERA)	of Physical Sciences),	(University of Piraeus),	REINFORCED COMPOSITES
Du (Harbin Institute of Technology)	The paper investigates the	A newly-proposed equa- tion closely reflects the	(University of Tsukuba), Nobutada Ohno (Nagoya	The local strain concentra-	Maria Charalambides	Bahoz Abbas (Institut fuer Unternehmenskybernetik	A finite element strategy	Masashi Koyama (MEISEI University), <u>Hiroshi</u>	Dimitrios Karalekas (University of Piraeus)	<u>Nicolas Lammens</u> (UGent), Geert Luyckx (UGent), Wim
	shakedown and ratchetting	relation between tensile	University), Yusuke	tion of artificially introduced	(Imperial College London),	e.V. (IfU)), Tobias Fuertjes	is proposed to evaluate	Hatta (Japan Aerospace		Van Paepegem (UGent),
Research and development	behaviour of an idealised fiber-reinforced MMC that	strength and fiber length on	Kawasaki (Marubeni Information Systems Co	defects in unidirectional	John Dear (Imperial College	(Werkzeugmaschinenlabor (WZL) of RWTH Aachen	the effects of mesoscale	Exploration Agency), Yuichi Nagura (Tokyo University of	The present work investi- gates the incorporation of	Joris Degrieck (UGent)
of shape memory polymer nanocomposites from	consists of a square array	unidirectional composites with a stagger-structure of	Ltd.), Shintaro Miyashita	composites is investigated experimentally and com-	London)	University), Thomas Gries	mechanical properties of	Science), Ken Goto (Japan	optical fiber Bragg grating	This work presents a F.E.
nano-reinforcement and	of fibers in an aluminium	chopped strands (UACS).	(Marubeni Information	pared to a validated finite	Damage development in	(Institut fuer Textiltechnik	woven polymer matrix	Aerospace Exploration	sensors for real-time moni-	technique to model the resin
multi-functional will be reviewed and discussed in	matrix.		Systems CoLtd.)	element modelling.	laminated glass plates with different types of polymer	(ITA) of RWTH Aachen University)	composites.	Agency), Yasuo Kogo (Tokyo University of Science)	toring of strain build up dur- ing the fabrication process	pocket surrounding any inclusion in composites, and
this work.			A multiscale analysis for		inter-layer is investigated	University)			of 3D printed multilayered	the effect on structural per-
			the negative through-the-		under low and high velocity	A new approach is present-		Carbon fiber reinforced	structures.	formance of the composite
			thickness Poisson's ratio of angle-ply CFRP laminates		soft impact.	ed, in which a real-time system for error detection is		three-dimensional compos- ites were applied to a high		host, and is validated by experiments.
			in the viscoplastic region			developed in order to enable		speed rotation disk. Based		oxportitionto.
			is performed based on a			the inline quality control		on its optimum design, three		
			homogenization theory.			during the production pro- cess of NCF.		types of prototype rotor were made and evaluated		
								by spin test.		

	Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
		4102-3 CARBON NANOTUBE-	4103-3 BLAST MITIGATION	4104-3 THERMAL	4105-3 IN-PLANE MATERIAL	4106-3 A COMPARISON	4107-3 DEVELOPMENTS	4108-3 NOVEL BIOPOLYMER	4109-3 CAPILLARY	4110-3 VIRTUAL TESTING
	CHALLENGES OF PREPREG	BASED CONDUCTIVE FILMS	USING ELASTIC	REGULATION OF	CONTINUITY FOR THE	OF TWO MEASUREMENT	IN HOLLOW	COMPOSITES BASED	WICKING IN FLAX FIBERS	OF NOMEX HONEYCOMB
	FORMING TECHNOLOGIES IN	FOR INDUCTION WELDING	METAMATERIALS WITH	VASCULARIZED POLYMER	DISCRETE MATERIAL	TECHNIQUES FOR	POLYACRYLONITRILE	ON WS2 INORGANIC	REINFORCEMENTS;	SANDWICH PANEL INSERTS
		OF THERMOPLASTIC	DESIGNABLE MULTI-	MATRIX COMPOSITES	OPTIMIZATION METHOD	DETERMINING THE	(PAN) AND PAN/CARBON-	NANOTUBES	ORTHOTROPIC ISSUES AND	Ralf Seemann (Institute of
	·	POLYMERS AND	DAMPERS	FOR ENHANCED	<u>René Sørensen</u> (Aalborg	2D PERMEABILITY	NANOTUBE- (CNT-) BASED	Mohammed Naffakh	COMPARISON WITH CARBON	· · · · · · · · · · · · · · · · · · ·
	Operations GmbH)	COMPOSITES		THERMOMECHANICAL	University), Erik Lund (Aalborg	CHARACTERISTICS OF	CARBON FIBERS	(Escuela Técnica Superior	REINFORCEMENTS	Mechanical Engineering
		Rouhollah Dermanaki	Missouri)	PERFORMANCE	University)	REINFORCING TEXTILES	Thomas Tsotsis (The	de Ingenieros Industriales-	Monica Francesca Pucci	Design-Technische Universität
		Farahani (École de technol-	Elevella an eleverate de la terra	Anthony M Coppola	In this count, our count in	Ewald Fauster	Boeing Company), Satish	Universidad Politécnica de	(Ecole des Mines de Saint-	Hamburg-Harburg (TUHH)),
		ogie supérieure), Martine Dube (École de technologie	Elastic metamaterials have been intensively studied in re-	(University of Illinois at	In this work, we present in- plane material filters for mul-	(Montanuniversität	Kumar (Georgia Institute of Technology), Han Gi	Madrid (ETSII-UPM)), Tyler	Etienne), Pierre-Jacques Liotier (Ecole des Mines de	Dieter Krause (Institute of Product Development and
		supérieure)	cent years due to their unusu-	Urbana-Champaign), Nancy R Sottos (University of Illinois at	ti-material topology optimi-	Leoben), Harald Grössing (Montanuniversität	Chae (Georgia Insititute of	Silverman (Escuela Técnica Superior de Ingenieros	Saint-Etienne), Sylvain Drapier	
	was made on understanding	Superieure	al properties in manipulating	Urbana-Champaign), Scott R	zation. The filters can impose	Leoben), Ralf Schledjewski	Technology), Prabhakar	Industriales-Universidad	(Ecole des Mines de Saint-	Design-Technische Universität
	and description of the pro-	In this work, two conductive	elastic waves which are not	White (University of Illinois at	a minimum length scale onto	(Montanuniversität Leoben)	Gulgunje (Georgia Institute	Politécnica de Madrid	Etienne)	Hamburg-Harburg (TUHH))
		nanotube-based films are	readily available in nature. In	Urbana-Champaign)	the optimized design without	(	of Technology), Bradley	(ETSII-UPM)), Ana M. García		
		fabricated and tested as new	the paper, an elastic me		the use of a patch approach	Two well-known techniques	Newcomb (Georgia Institute	(Escuela Técnica Superior	Capillary wicking in treated	The study develops a detailed
		types of heating elements for		Results from thermomechan-		for 2D permeability charac-	of Technology), Kishor	de Ingenieros Industriales-	and untreated flax fibers	progressive failure model
		welding of thermoplastic pol-		ical testing of actively cooled		terization based on radial flow	Gupta (Georgia Insititute of	Universidad Politécnica de	reinforcements. Orthotropic	based on the Finite Element
		ymers using microwave and		vascularized polymer matrix		experiments are investigated	Technology)	Madrid (ETSII-UPM)), Diego	issues in capillary pressure	Method (FEM) for the widely
		induction welding processes.		composites are presented		in terms of sources for sys-		A. Moreno (Escuela Técnica	characterization and compar-	used fully potted threaded
				and compared to non-cooled		tematic deviations inherent to	Hollow polyacrylonitrile	Superior de Ingenieros	ison with carbon reinforce-	sandwich insert under pull-
				composites. Performance is		the results obtained.	(PAN) and PAN/carbon nano-	Industriales-Universidad	ments.	out loading.
				greatly enhanced by active			tube- (CNT-) based carbon	Politécnica de Madrid (ETSII-		
				cooling.			fibers were processed using bi-component fiber spinning	UPM)), Carlos Marco (Instituto de Ciencia y Tecnología de		
							yielding fibers with moduli	Polímeros (ICTP-CSIC)), Gary		
							exceeding standard-modulus	Elllis (Instituto de Ciencia		
							fibers.	y Tecnología de Polímeros		
								(ICTP-CSIC)), Alla Zak (Holon		
								Institute of Technology)		
								The aim of this investigation		
								is to highlight the latest find-		
								ings on the use of tungsten		
								disulphide (WS2) inorganic		
								nanotubes in the development		
								of novel biopolymer compos- ite materials.		
10.30	4101-4 INTRODUCTION OF A	4102-4 SELF-ASSEMBLED	4103-4 FUNCTIONALLY	4104-4 INTERLAMINAR	4105-4 CONCURRENT	4106-4 IMPROVED	4107-4 EFFECTS OF	4108-4 DEVELOPMENT	4109-4 MANUFACTURING	4110-4 STATIC RESPONSE
10.30	PRODUCTION TECHNOLOGY	"BRICK-AND-MORTAR"	GRADED COMPOSITES	FRACTURE OF CF/EP	MULTI-SCALE OPTIMIZATION		COMBINED TREATMENT ON	OF HIGH PERFORMANCES	AND TESTING OF CURVED	OF SANDWICH BEAMS
		NANOSTRUCTURE	WITH VERTICALLY ALIGNED	COMPOSITE CONTAINING	DESIGN OF COMPOSITE	PERMEABILITY	THE PROPERTIES OF PBO	AND MULTI-FUNCTIONAL	FIBER COMPOSITES USING	USING A VARIABLE
		INSPIRED BY NATURE:	CARBON NANO-TUBE	A DUAL-COMPONENT	FRAME STRUCTURES USING	CHARACTERIZATION		PLANT FIBER REINFORCED	VACUUM ASSISTED RESIN	STIFFNESS HONEYCOMB
		A ROUTE TOWARDS	(VACNT) EMBEDDED LAYERS		HEAVISIDE PENALIZATION	IN UNIDIRECTIONAL	Shi Gang (National University	COMPOSITES	TRANSFER MOULDING	CORE
	LARGE SCALE PRODUCTION	HIGH MECHANICAL	FOR ENERGY ABSORPTION	SELF-HEALING SYSTEM	DISCRETE MATERIAL	INJECTIONS BASED ON	of Defense Technology), Zhang	Yan Li (Tongji University)	(VARTM) AND FDM-	Qing Ai (Univeristy of Bristol),
	Raphael Schnurr (Technische	PERFORMANCE	Prabhakar Mantena	Habibah Ghazali (University	OPTIMIZATION	FLOW FRONT ANGLE	Jianwei (National University		TECHNOLOGY	Paul Weaver (Univeristy of
		NANOCOMPOSITES	(UNIVERSITY OF MISSISSIPPI),	of Sydney), Lin Ye (University	Zunyi Duan (Dalian	MEASUREMENTS	of Defense Technology), <u>Jiang</u>		Jens Schuster (University	Bristol), Mahdi Azarpeyvand
		<u>Francois De Luca</u> (Imperial	Veera Boddu (ERDC)	of Sydney), Ming Qiu Zhang	University of Technology),	Claudio Di Fratta (ETH Zürich),	<u>Dazhi</u> (Changsha)		of Applied Sciences),	(Univeristy of Bristol)
		College London), Robert	<b>.</b> . <b>.</b>	(Zhongshan University)	Jun Yan (Dalian University	François Trochu (École			Monis Kazmi (University	
		Menzel (Imperial College	Dynamic Mechanical Analysis		of Technology), Guozhong	Polytechnique de Montréal),	Combined treatment of -ray		of Auckland), Johannes	A novel sandwich beam
		London), Jonny Blaker	and high strain-rate SHPB	An experimental study on	Zhao (Dalian University of	Paolo Ermanni (ETH Zürich)	radiation, PPA etching and		Lutz (University of Applied	model is proposed and the
	Klaus Dröder (Technische Universität Braunschweig),	(Imperial College London), Milo Shaffer (Imperial College	compression response of wo- ven fiber-glass polyester/pol-	self-healing ability of car- bon fibre/epoxy composite	Technology)	The work illustrates simple	coupling agent coating to PBO fibers was proposed		Sciences Kaiserslautern)	effect of stiffness variation in the core on static response of
	Kristian Lippky (Technische	London), Alexander Bismarck	yurethane matrix composites	(Vf=65%) with microencap-	With considering specific	and cost-effective strategies	and effects on mechanical		3D-printing is used to produce	
	Universität Braunschweig).	(Imperial College London)	with embedded VACNT forest	sulated epoxy and mercaptan	manufacturing constraints	to accurately characterize	properties of the PBO and		single and double curved	investigated parametrically
	Fabian Fischer (Technische		layers, is presented.	as healant. Recovery of 80%	representative actual indus-	in-plane permeability by 1D	PBO/epoxy composites were		molds for vacuum assisted	using the present formulation.
		A hybrid nanostructure was	ing ing ing procention.	original fracture toughness	trial requirement, the paper	injections along only one or	investigated.		resin transfer molding	and procont formalation.
	Klaus Dilger (Technische	assembled via Layer-by-Layer		was achieved.	realizes the concurrent mul-	two textile directions, instead			(VARTM). The produced parts	
		assembly to produce a "brick-			ti-scale design optimization of				were evaluated in terms of	
		and-mortar" (LDH/PSS)n coat-			composite frame structure.				thickness variations and shear	
	Automated pre-assembly ap-	ing similar to nacre, but with							strength.	
	proach for hybrid preforms in	all dimensions scaled down to								
		the newspapers lengthcools								
		the nanometre lengthscale.								
	production. Development	the hanometre lengthscale.								
	production. Development of a first demonstration	the hanometre lenguiscale.								
	production. Development	the hanometre lenguiscale.								

## Thursday 23 July · Scientific programme

Meeting room 5	Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8
4111-3 MAGNETO-	4112-3 HIGH STRENGTH	4113-3 EXPERIMENTAL	4114-3 ACCOUNTING FOR	4115-3 MULTI-SCALE	4116-3 IMPACT DAMAGE	4117-3 ADDITIVE	4118-3 A NEW METHOD	4119-3 EVALUATION OF	4120-3 DYNAMIC	4121-3 RIGIDITY TUNABLE
ACTUATION	AND SUPERIOR OXIDATION		FIBER BENDING EFFECTS	IDENTIFICATION USING	RESPONSE OF CARBON	MANUFACTURE OF	OF SHEAR STIFFNESS	SIMPLIFIED LOADING	DEFORMATION	MULTIFUNCTIONAL
OF FERROMAGNETIC	RESISTANCE OF HYBRID	STRESS TRANSFER	IN HOMOGENIZATION OF	M-CRE BASED ON FULL-	FIBRE-REINFORCED	MULTIFUNCTIONAL	PREDICTION OF PERIODIC	MODELS FOR FINITE	MONITORING OF GFRP	COMPOSITES FOR SOFT
SHAPE MEMORY ALLOY	(TIC+TIB)/TI6AL4V	IN DISCONTINUOUS	LONG FIBER REINFORCED	FIELD MEASUREMENTS	AEROSPACE COMPOSITE	COMPOSITE STRUCTURES	TIMOSHENKO BEAMS	ELEMENT ANALYSIS	BEAM USING OPTICAL	ROBOTICS
COMPOSITES	COMPOSITES WITH NOVEL	COMPOSITES ON THE	COMPOSITES		PANELS		Liang Xu (Dalian University	OF COMPOSITE WIND	FIBER DISTRIBUTED	Wanliang Shan (University
	NETWORK ARCHITECTURE			Shaojuan Huang		Konstantine Fetfatsidis			SENSING SYSTEM BASED	of Nevada-Reno), Carmel
Susanne Glock (EPFL), Luis		BASIS OF A UNIT CELL	Konstantinos Poulios	(Laboratoire Roberval-	Hamed Yazdani Nezhad	(Aurora Flight Sciences),	of Technology), Gengdong	TURBINE BLADES		
Canal (EPFL), <u>Veronique</u>	Lujun Huang (Harbin	MODEL	(Technical University	Université de Technologie de	· ·	Christopher Hansen	Cheng (Dalian University of	Rosemary Barnes (UNSW),	ON OPTICAL FREQUENCY	Majidi (Carnegie Mellon
<u>Michaud</u> (EPFL)	Institute of Technology),	Benjamin Bachmann	of Denmark), Christian	Compiègne), Pierre Feissel	Research-Materials and	(University of Massachusetts	Technology), Sinan Yi (Dalian	Evgeny Morozov (UNSW),	DOMAIN REFLECTOMETRY	University)
	Shaolou Wei (Harbin	(University of Applied	Niordson (Technical	(Laboratoire Roberval-	Surface Science Institute-	Lowell), Andrew Burke	University of Technology)	Krishna Shankar (UNSW)	Daichi Wada (The University	
We investigated the mag-	Institute of Technology),	Sciences and Arts	University of Denmark)	Université de Technologie de		(University of Massachusetts			of Tokyo), <u>Hideaki</u>	Methods for rigidity tuning
neto-mechanical actuation	Wei Ren (Harbin Institute	Northwestern Switzerland),		Compiègne), Pierre VILLON	Anthony Auffray (Limerick),	Lowell), Bradford Olson	This paper presents a	3 loading approximations	Murayama (The University of	
behaviour of composites	of Technology), Lin	Jeremias Blum (University	A homogenized finite-ele-	(Laboratoire Roberval-	Conor McCarthy (Irish	(University of Massachusetts	presents a new method of	used in wind turbine blade	Tokyo), Tetsuo Tamaoki (The	
made with Ni-Mn-Ga single	Geng (Harbin Institute of	of Applied Sciences and Arts		Université de Technologie de		Lowell), Harshal Tarar	shear stiffness prediction	analysis were compared:	University of Tokyo), Daichi	that is directly powered
crystalline rods embedded	Technology)	Northwestern Switzerland),	which captures the mi-	Compiègne)	Research-Materials and	(University of Massachusetts		CFD load, uniform pres-	Ogawa (The University of	with electrical current;
into epoxy, and compared		Lian Giger (University of	cro-mechanical behavior of		Surface Science Institute-	Lowell)	beams based on the new	sure and tip force. An FEA	Tokyo)	Potential applications are
with a FE analysis.		Applied Sciences and Arts	long fiber reinforced com-	A two-scale identification	University of Limerick),		numerical implementation	model was analysed and		demonstrated with a soft
		Northwestern Switzerland),	posites accurately, including	strategy based on the mod-	Ronan O'Higgins (Irish	Automated Fiber Placement	of AH method which the au-	topological optimisation was	This paper demonstrates	pneumatic finger
		Kunal Masania (University	the contribution of the fiber	ified constitutive relation	Centre for Composites	and 3D Printing are used	thors developed earlier.	performed for each.	the dynamic identification of	
		of Applied Sciences	bending stiffness.	error is proposed to find	Research-Materials and	to fabricate multifunctional			the deformation of GFRP in	
		and Arts Northwestern	5	heterogeneous properties at	Surface Science Institute-	composites using aero-			the state of vibration using	
		Switzerland), Clemens		the measurement level and	University of Limerick)	space-grade carbon fiber			an optical fiber distributed	
		Dransfeld (University of		homogeneous ones at the		prepreg with autoclave and			sensing system. A measure-	
		Applied Sciences and Arts		specimen level.	This research looks into	out-of-autoclave thermoset			ment rate was more than	
		Northwestern Switzerland).			the damage response and	epoxy resin systems.			800S/s.	
		Jesus Maldonado (ETH			energy absorption behaviour	cpoxy reall systems.			0000/3.	
		Zürich)			of carbon fibre-reinforced					
		Zunony			thermoplastic and thermoset					
		The stress-strain response								
					polymer composite panels					
		of thermoplastic composites			subjected to low-velocity					
		with a discontinuous 'brick-			impact events.					
		and-mortar' archi-tecture								
		was determined experi-								
		mentally and compared to								
		shear-lag stress transfer								
		model predictions.								
				4445 4 400500000 00						
4111-4 EMERGENT	4112-4 MICROSTRUCTURE		4114-4 MODELING CHAIN	4115-4 ASSESSING 3D	4116-4 DELAMINATIONS	4117-4 IN-SITU	4118-4 MULTISCALE	4119-4 BRIDGING THE GAP		4121-4 ACTIVE WING
	AND PROPERTIES OF		FOR HOMOGENISATION	MECHANICAL PROPERTIES	AND ULTRASOUND	CONSOLIDATION OF	MODELLING APPROACH	BETWEEN COUPON TESTS		SHAPE RECONFIGURATION
	IN-SITU TIB2 PARTICLE		AT MESOSCOPIC SCALE:	OF COMPOSITES BASED	ASSISTED REPAIR OF	PEEK COMPOSITES BY	FOR FLEXIBLE RISERS	AND FULL-SCALE BLADE		USING A VARIABLE
AND LOCOMOTION	REINFORCED AL-4.5CU		APPLICATION FOR	ON DIGITAL IMAGE	BALLISTICALLY LOADED	AUTOMATED PLACEMENT	<u>Sridhar Narayanaswamy</u>	TESTS		CAMBER COMPLIANT
THROUGH GEOMETRY-	COMPOSITES		COMPOSITE MATERIALS	CORRELATION	GFRP	TECHNOLOGIES	(Institute of High	Arno Van Wingerde		WING SYSTEM
COMPOSITION-GRADIENT	Qi Gao (Huazhong University		WITH 3D WOVEN FABRICS	Guillaume Seon (University	Mikhail Zhikharev (South	Fernando Rodriguez-Lence	Performance Computing),	(Fraunhofer IWES), Simon		James Joo (US Air Force
CORRELATIONS IN	of Science and Technology),		Julien SCHNEIDER	of Texas Arlington), Andrew	Ural State University),	(FIDAMC AIRBUS GROUP	Tianfu Guo (Institute of High	Pansart (DNV-GL), Florian		Research Laboratory
COMPOSITE MATERIAL	Shusen Wu (Huazhong		(SNECMA), Yanneck	Makeev (University of	Sergei Vaulin (South Ural	INNOVATION)	Performance Computing),	Sayer (Fraunhofer IWES),		), Christopher Marks
SYSTEMS	University of Science and		WIELHORSKI (SNECMA),	Texas Arlington), Julia	State University), Sergei	,	Zhiqian Zhang (Institute	Eric Putnam (Fraunhofer		(University of Dayton
Richard A. Vaia (Air Force	Technology), Shulin LÜ		Gaëtan HELLO (LMEE),	Cline (University of Texas	Sapozhnikov (South Ural	FIDAMC has developed a	of High Performance	IWES)		Research Institute), Lauren
Research Laboratory), Phil	(Huazhong University of		Damien DURVILLE (LSSMAT	Arlington), Erian Armanios	State University)	thermoplastic fibre place-	Computing), Pham Dinh			Zientarski (University of
Buskohl (Air Force Research	Science and Technology).		(ECP))	(University of Texas	- into contrology	ment technology based on	Chi (Institute of High	The rotor blade industry		Dayton Research Institute)
Laboratory), David Wang (Air			(207))	Arlington)	There were studied the	laser beam heating that will	Performance Computing),	lacks subcomponent tests		bayton noscaron institute)
Force Research Laboratory),	University of Science and			, unigion,	factors influenced on the	enable in-situ consolidation	Ben Edmans (Lloyd's	in its development cycle,		US Air Force Research Lab
	Technology)			Simultaneous accoment	rheological properties of the	of the thermoplastic materi-	Register GTC), Graham	needed to lower develop-		designed and fabricated a
Loon-Seng Tan (Air Force	recriticiogy)			Simultaneous assessment		al out of the autoclave.	<b>o</b> ,,			
Research Laboratory)				of stress-strain curves in	matrix in terms of capillary	ai out of the autoclave.	Stewart (Lloyd's Register	ment costs and improve		Variable Camber Compliant
The design of some output	5vol% TiB2/Al-4.5Cu com-			all principal material planes	effects for repair of delami-		Energy)	overall reliability. DNV-GL		Wing and demonstrated a
	posites were prepared by			using a unidirectional small-	nation at the length up to 20		We present doubter and	and Fraunhofer IWES are		new capability and technol-
	the salt-metal reactions .				mm for 1.5 min.		We present developments	establishing such tests.		ogy for an active wing cam-
	The size of TiB2 particles			a full-field strain optimiza-			in the linking of small scale			ber change without discrete
	is under 0.4µm. extremely			tion method based on DIC			local nonlinear structural			control surfaces.
using polyimides that exhibit				and FEM			behavior with large scale			
	formed. mechnical proper-						global dynamic analysis and			
ing from a vapour gradient.	ties have improved.						demonstrate its application			
							for unbonded flexible riser			
							pipes.			

	Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
	4201 Processing -	4202 Nano Composites 11	4203 ONR Special	4204 Multifunctional	4205 Structural Analysis	4206 Experimental	4207 Short Fibre	4208 Biocomposites 10	4209 Liquid Composites	4210 Sandwich Structures
	Manufacturing Technology 11		Symposium on Marine Composites 6	Composites - Self-Healing and Bio-inspired Designs 2	and Optimization 11	Methods for Process Characterisation 3	Composites 2		Moulding 2	and Materials 2
	AG), Luisa Medina (Institut für Verbundwerkstoffe GmbH) Scope of the paper is to introduce a process model, which is capable to predict the impregnation performance for non-isobaric process	4202-1 DENSIFYING EFFECT ON THE PROPERTIES OF CARBON NANOTUBE FILM Yanjie Wang (Beihang University), Min Li (Beihang University), Yizhuo Gu (Beihang University), Xiaohua Zhang (Suzhou Institute of Nano-Tech and Nano-Bionics), Shaokai Wang (Beihang University), Qingwen Li (Suzhou Institute of Nano- Tech and Nano-Bionics), Zuoguang Zhang (Beihang University) The effects of densifying process parameters and densifying methods on the mechanical properties of CNT film fabricated from spinnable array were studied.	4203-1 EXTENDED HIGH ORDER THEORY FOR SANDWICH PANELS AND COMPARISON WITH ELASTICITY George Kardomateas (Georgia Institute of Technology), Yeoshua Frostig (Technion-Israel Institute of Technology), Nunthadech Rodcheuy (Georgia Institute pf Technology) The paper presents the re- sponse of a curved sandwich panels, within the framework of the EHSAPT model, i.e. where with the circumfer- ential rigidity of the core is considered.	4204-1 LIGHT WEIGHT AND IMPACT RESISTANT BIOMIMETIC COMPOSITES David Kisailus (University of California)	4205-1 COMPOSITE AIRCRAFT FUSELAGE STRUCTURE BLINT IMPACT DAMAGE PREDICTION METHODOLOGY <i>Hyonny Kim</i> (University of California San Diego), Zhi Ming Chen (University of California San Diego) This paper presents modeling development for predicting progressive damage to com- posite aircraft fuselage-type panels subject to wide area blunt impact.	KEYNOTE 4206-1 MULTI-SCALE MATERIAL AND PROCESS CHARACTERIZATION FOR RESIN TRANSFER MOLDING: CASE STUDY FOR A BLENDED EPOXY/PHENOLIC RESIN Jonathan Lo (University of Southern California), Mark Anders (University of Southern California), <u>Timotei Centea</u> (University of Southern California), <u>Steven</u> <u>Nutt</u> (University of Southern California) We describe and demonstrate a comprehensive methodolo- gy for characterizing the prop- erties and complex in-mold behavior of a thermoset RTM resin in various temperature and pressure conditions.	4207-1 MULTI-SCALE ANALYSIS OF THE AGEING OF A REINFORCED POLYAMIDE 66 IN ETHANOL- BASED FUELS Camilo Cruz (Robert Bosch GmbH), Enrico Belmonte (Robert Bosch GmbH), Marino Quaresimin (University of Padova) Softening by fuel diffusion and polymer hydrolysis have been found as the most relevant degradation mechanisms triggered by an ethanol-based fuel on injection-moulded fibre reinforced PA66 com- posites	4208-1 RAYLEIGH-TAYLOR SPIKES IN HARD AND SOFT NATURAL FIBER COMPOSITES Katharina Resch (University of Delaware), Xintian Su (University of Delaware), Shijin Gong (University of Delaware), Shijin Gong (University of Delaware), Richard P. Wool (University of Delaware) Morphology and properties of eco-leather, a highly innova- tive soft composite based on natural fibers and bio-based liquid molding resins are discussed.	OF FLOW KINETICS AND VOID MIGRATION IN RFI PROCESS Simon B. Gosselin (University of Ottawa), François Robitaille	4210-1 RESIN FILLET FORMATION IN HONEYCOMB SANDWICH STRUCTURES Matt Jennings (Deakin University), Mandy de Souza (Deakin University), Claudia Creighton (Deakin University), Anthony Pierlot (CSIRO), Steven Agius (Deakin University), Bronwyn Fox (Deakin University) This study discusses the effect of heating rate during cure on the size and shape of resin fillets in honeycomb sandwich structures using null hypothesis significance testing.
11:40		4202-2 STRUCTURE AND PERFORMANCE OF SILICON-CONTAINING POLYARYLACETYLENE- ATTAPULGITE NANOCOMPOSITES Jiadong Zhan (East China University of Science and Technology), Qiaolong Yuan (East China University of Science and Technology), Farong Huang (East China University of Science and Technology), Lei Du (East China University of Science and Technology) Rod-like attapulgite particles (ATT) were used to reinforce the silicon-containing polyar- ylacetylene resin (PSA). The particle networks constructed in ATT/PSA affect the property of the nanocomposite	4203-2 ANALYSIS OF FINITE DEFORMATIONS OF THICK PLATES WITH THIRD ORDER SHEAR AND NORMAL DEFORMABLE THEORY (TSNDT) Romesh Batra (Virginia Polytechnic Institute and State University), Arka Chattopadhyay (Virginia Polytechnic Institute and State University)	COMPOSITES: IN-SITU REPAIR SOLUTIONS? <i>Tim Coope</i> (University of Bristol), Rafael Luterbacher (University of Bristol), Daniel Turkenburg (TNO Materials), Amirhossein Hajdaei (Element Materials Technology), Stefanos Giannis (Element Materials Technology), Konstantinos Kitsianos (GMI Aero), Hartmut Fischer (TNO Materials), Ian Bond (University of Bristol)	4205-2 CONSIDERATION OF ADHESIVE JOINTS FOR A MULTI-MATERIAL TOPOLOGY OPTIMIZATION APPROACH Paul Falkenberg (Technische Universität Braunschweig), Thilo Franke (Volkswagen AG), Sierk Fiebig (Volkswagen AG), Sierk Fiebig (Volkswagen AG), Thomas Vietor (Technische Universität Braunschweig) The challenge lies in integrat- ing the design of adhesive joints in the multi-material topology optimization process. Two modelling and a mechan- ical stress-based optimization approach are shown.		4207-2 DEFORMATION AND FRACTURE BEHAVIOR OF INJECTION-MOLDED GLASS FIBER/POLYAMIDE 66 COMPOSITES WITH HIGH VOLUME FRACTION OF GLASS FIBER Kazuya Mizumoto (YKK Corporation), Kazuaki Sanada (Toyama Prefectural University), Makoto Kawagoe (Toyama Prefectural University), Mai Mizubayashi (YKK Corporation) The effects of the fiber orientation and fiber volume fracture properties of glass fiber/polyamide 66 compos- ites produced via injection molding were investigated.	4208-2 PREDICTION OF LINEAR DISSIPATIVE PROPERTIES OF FLAX FIBRES REINFORCED LAMINATES WITH VIBRATION ANALYSIS Marouane Belaïd (ISAT - Université de Bourgogne), Ali El Hafidi (ISAT - Université de Bourgogne), Stéphane Fontaine (ISAT - Université de Bourgogne), Papa-Birame Gning (ISAT - Université de Bourgogne), Benoît Piezel (ISAT - Université de Bourgogne) Experimental and numerical approaches to identify the viscoelastic properties of flax fibre reinforced epoxy com- posite laminates are proposed in this study.	LEVEL SETS APPROACH FOR THE DISTANCE FIELD COMPUTATION AND ITS APPLICATION IN LIQUID COMPOSITE MOLDING PROCESS PERFORMANCE INDICATORS Luis Domenech (University CEU Cardenal Herrera), Fernando Sanchez (University CEU Cardenal Herrera), Victor Garcia (University CEU Cardenal Herrera), Enrique Cortes (Aerox Advanced Polymers), Elias Cueto (University of Zaragoza), Francisco Chinesta (Ecole Centrale Nantes) A technique that computes	4210-2 CREEP BEHAVIOUR OF GEOMETRICALLY NONLINEAR SOFT CORE SADNWICH PANELS Enab Hamed (University of New South Wales), Yeoshua Frostig (Technion – Israel Institute of Technology) The paper investigates the effects of creep of the core material on the global ge- ometrically nonlinear behavior of sandwich panels under axial and lateral loading conditions.

Meeting room 5	Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8
4211 Multifunctional Composites - Coupled Properties and Multi-	4212 Composites with Metallic Components 2	4213 Hybrid Composites 1	4214 Fracture and Damage - Materials Scale 4	4215 Digital Image Correlation 1	4216 Durability, Creep and Agressive Environment 1	4217 Manufacturing Up- Scaling and Automation 3	4218 Multiscale Modelling of Structures 2	4219 Applications - Wind, Wave and Tidal Energy 2	4220 Sensors in Experimental Mechanics 3	4221 Multifunctional Composites - Smart Structures 3
Properdues and multi- physics Models 1 KEYNOTE 4211-1 MULTI-SCALE COMPUTATIONAL MODELING FRAMEWORK FOR COUPLED ELECTROMAGNETICS AND MECHANICAL SIMULATIONS IN MULTIFUNCTIONAL MATERIALS Somnath Ghosh (Johns Hopkins University)	4212-1 NANO TITANIUM CARBIDE PARTICLE REINFORCED ALUMINUM COMPOSITE MATERIALS PREPARED BY BALL MILLING FOLLOWED BY REACTIVE SINTERING <i>Hiroki Kurita (CEA Saclay),</i> Nassim Samer (University of Claude Bernard Lyon 1), Jérôme Andrieux (University of Claude Bernard Lyon 1), Jöröne Bernard Lyon 1), Sophie Gourdet (Airbus Group Innovations), Takamichi Miyazaki (Tohoku University), Olivier Martin (Mecachrome), Laurent Chaffron (CEA Saclay) The ultimate tensile strength of Al–34 vol% nano TiC composite fabricated with- out the use of nanometric powders as a starting ma- terial was 628 MPa with a failure elongation of 4.2 %.	4213-1 TENSILE PROPERTIES OF CARBON NANOTUBES-SHEETS/ CARBON FIBERS/ EPOXY AND CARBON NANOTUBES-GRAFTED CARBON FIBERS/EPOXY HYBRID COMPOSITES Kimiyoshi Naito (National Institute for Materials Science), Vikum Premalal (Shizuoka University), Hiroyuki Oguma (National Institute for Materials Science), Yoshinobu Shimamura (Shizuoka University), Yoku Inoue (Shizuoka University) The tensile properties of carbon fiber reinforced polymer matrix composites incorporating CNT-sheets (CNT-sheets/carbon fibers) and CNT-grafted carbon fibers were investigated.	Scale 4 4214-1 DAMAGE EVOLUTION OF CARBON EPOXY LAMINATES FOR TIDAL BLADES APPLICATION <u>Nicolas Carrere</u> (LBMS/ Ensta-Bretagne), Nicolas Tual (LBMS/Ensta-Bretagne), Peter Davies (IFREMER)	4215-1 INVESTIGATION OF THICKNESS EFFECTS ON SHEAR CHARACTERISATION OF COMPOSITES MATERIALS FOR AIRCRAFT STRUCTURES Kuangyi Zhang (Imperial college London), Long Yu (Imperial College London), Yuming Jia (Aviation Industry Corporation of China), Bamber Blackman (Imperial College London), John Dear (Imperial College London), Gordon Williams (Imperial College London) This paper reviews the state of the art in composite shear testing. The main focus of this research is the effect of thickness and out-of- plane properties on shear strength.	4216-1 ON THE ADHESIVE PROPERTIES OF NANO- SILICA/EPOXY BONDED SINGLE-LAP JOINTS Helezi Zhou (University of Sydney) This study investigated the effects of nano-silica on the adhesive properties of epoxy by lap-shear test under qua- si-static and cyclic loading, including the influence of hygrothermal treatment.	4217-1 MECHANICAL PROPERTIES OF THERMOPLASTIC COMPOSITES MADE BY AUTOMATED FIBER PLACEMENT Sung Haa (Concordia University), Minh Duc Hoang (Concordia University), Jeffrey Fortin Simpson (Concordia University) This paper presents the results of an investigation to determine the mechanical properties of flat coupons made of carbon/PEEK and using Automated Fiber Placement.	KEYNOTE 4218-1 STOCHASTIC VIRTUAL TESTS FOR FIBER COMPOSITES Brian Cox (Teledyne) We review micron-scale 3D imaging of a microstructure, statistical analysis of imag- es, a generator of stochastic virtual specimens, and a computational model that tracks discrete damage events	4219-1 A CRITICAL EVALUATION OF STRUCTURAL ANALYSIS TOOLS USED FOR THE DESIGN OF LARGE COMPOSITE WIND TURBINE ROTOR BLADES UNDER ULTIMATE AND CYCLE LOADING D. J. Lekou (Centre for Renewable Energy Sources (CRES)), K. C. Bacharoudis (Centre for Renewable Energy Sources (CRES)), A. B. Farinas (National Renewable Energy Center (CENER)), K. Branner (DTU Wind Energy), P. Berring (DTU Wind Energy), A. Croce (Politecnico di Milano), T. P. Philippidis (University of Patras), G. de Winkel (Knowledge Centre Wind turbine Materials and Constructions (WMC)) Comparison of stiffness and strength predictions under ultimate and cycling load of structural analysis tools for 10-20MW rotor blades	4220-1 STRUCTURAL HEALTH MONITORING METHOD FOR WIND TURBINE TRAILING EDGE: CRACK GROWTH DETECTION USING FIBRE BRAGG GRATING SENSOR EMBEDDED IN COMPOSITE MATERIALS <i>Gilmar Pereira</i> (Technical University of Denmark), Lars Mikkelsen (Technical University of Denmark), Malcolm McGugan (Technical University of Denmark) Novel method to assess a crack growing/damage event in composite mate- rial using embedded Fibre Bragg Grating (FBG) sensors and application into a com- posite material structure.	4221-1 EFFECT OF NICKEL COATED CARBON FIBER AND NICKEL COATED GRAPHITE PARTICLES ON INDUCTION HEATING Muhammad Mudadssir (Institut für Verbundsvwerkstoffe) Martin Curka (Institut für Verbundsvwerkstoffe) Induction heating is a con- tact less joining technique that can be used to join non-conductive thermoplas- tic composite sheets with the help of susceptor sheet. The susceptor sheet not only gives better
	4212-2 MECHANICAL PROPERTIES OF CAST ALUMINIUM MATRIX COMPOSITES REINFORCED WITH SIC AND AL203 PARTICLES <u>Kim-Niklas Antin</u> (Aalto University) Cast aluminium alloys can be particle reinforced, but the processing route is dif- ficult. We report mechanical properties of different die cast MMCs and the effect of heat treatment on them.	4213-2 RATIONAL DESIGN OF HYBRID COMPOSITES: A GLOBAL LOAD SHARING ANALYSIS Varun Rajan (Ecole Polytechnique Federale de Lausanne), William Curtin (Ecole Polytechnique Federale de Lausanne)	4214-2 MEASUREMENT OF TENSILE PROPERTIES OF FIBRES USING A DCB- SPECIMEN Anders Biel (Technical University of Denmark), Ulf Stigh (University of Skövde) A novel method is proposed to perform tensile tests using a double cantilever beam specimen. Similar results are achieved with the present method as with more standardized methods.	4215-2 NUMERICAL MODELLING AND FULL- FIELD MEASUREMENT OF COMPOSITE LAMINATES UNDER BLAST LOADS Mohamed Abderaout Louar (Royal Military Academy), Bachir Belkassem (Royal Military Academy), Lincy Pyl (Vrije Universiteit Brussel), John Vantomme (Royal Military Academy) The results of a series of blast tests on fully clamped square glass fibre reinforced epoxy panels using an explosive driven shock tube are presented and com- pared to FE simulations.	(GeM-Université de Nantes- Centrale Nantes-UMR CNRS	4217-2 LASER-VISION INSPECTION SYSTEM FOR AUTOMATED FIBER PLACEMENT (AFP) PROCESS Fariad Shadmehri (Bombardier), Octavian Ioachim (Bombardier), Olivier Pahud (Bombardier), Jean-Evrard Brunel (Bombardier), Alain Landry (Bombardier), Suong V Hoa (Concordia University), Mehdi Hojjati (Concordia University) A new inspection technique, Laser-Vision inspection system, is presented for inspection of a composite ply manufactured using automated fiber placement (AFP) process.		from 6 organizations and estimation of modelling uncertainty. 4219-2 COMPARING FATIGUE LIFE ESTIMATIONS OF COMPOSITE WIND TURBINE BLADES UNDER VARIOUS LOAD CASES AND FATIGUE METHODS Oscar Castro (Technical University of Denmark), Matthew Lennie (TU Berlin), Kim Branner (Technical University of Denmark), George Pechlivanoglou (Smart-Blade), Povl Brøndsted (Technical University of Denmark), Christian Oliver Paschereit (TU Berlin) In this paper, fatigue lifetime prediction of NREL SMW reference wind turbine is presented. The fatigue response of selected blade cross sections was obtained by applying macroscopic fatigue models.	4220-2 COMPOSITE PATCH STRENGTHENED I-BEAM – LONG-TERM PERFORMANCE AND CONDITION MONITORING Jon Harald Lambert Grave (Norwegian University of Science and Technology (NTNU)), Andreas T. Echtermeyer (Norwegian University of Science and Technology (NTNU)) The paper describes dam- age development under cyclic fatigue in metal I-beams strengthened with composite patches. Damage is monitored with embedded optical fibers.	4221-2 ELECTRO- INDUCED SHAPE MEMORY POLYMER COMPOSITES INCORPORATED WITH CARBON FIBER FELT Xiaobo Gong (Harbin Institute of Technology), Yanju Liu (Harbin Institute of Technology), Liwu Liu (Harbin Institute of Technology), Jinsong Leng (Harbin Institute of Technology)

Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
12:00 4201-2 OVERJACKETING	4202-3 VOLUMETRIC	4203-3 WAVE PROPAGATION		4205-3 ANISOTROPIC	4206-2 IN-LINE	4207-3 FATIGUE OF GLASS	4208-3 A CHECKLIST FOR	4209-3 AUTOCLAVE	4210-3 DISTINGUISHING
EXTRUSION OF UHMWPE	COMPOSITION OF	IN MULTILAYER	REINFORCED POLYMER	COUPLING EFFECTS USED	MONITORING AND	FIBERS REINFORCED	THE DESCRIPTION OF		BETWEEN STRAIN
MULTI-FILAMENT FIBER	NANOCOMPOSITES	STRUCTURES AND	WITH A DISCRETE AND	IN AN ALL-NEW SHAFT/	NUMERICAL VERIFICATION	POLYAMIDES: MEAN STRESS		RIBS BASED ON PROCESS	MEASUREMENT
FOR THE DEVELOPMENT	Bo Madsen (Technical	ADVANCED STRUCTURAL	INTEGRATED SELF-HEALING		OF RESIN TRANSFER	EFFECTS AS A FUNCTION OF		MONITORING AND CONTROL	
OF ULTRA-LIGHT,	University of Denmark), Hans	THEORIES	FUNCTION	APPLICATIONS MADE OF	MOULDING PROCESS WITH	<b>GLASS FIBERS ORIENTATION</b>	John Summerscales	BY ULTRASOUND SENSORS	COMPRESSIVE TESTING OF
FULLY-THERMOPLASTIC	Lilholt (Technical University of	Serge Abrate (Southern Illinois	Patryk Jarzynka (University of	REINFORCED PLASTICS	CYCOM® 890 RTM RESIN	Gilles Robert (Solvay	(University of Plymouth),	Nico Liebers (DLR), Markus	FOAM MATERIALS
COMPOSITES	Denmark), Juha Mannila (VTT	University), Roberta Massabo	Bristol ), lan Bond (University	Joerg Kaufmann (Technische	SYSTEM	Engineering Plastics),	Antoine Le Duigou (University	Kleineberg (DLR)	Moeen S Rajput (Kungliga
A. Andres Leal (Empa-Swis	s Technical Research Centre	(Unversity of Genova)	of Bristol ), Duncan Wass	Universität Chemnitz), Lothar	Cristian Lira (The National	Olivier Moulinjeune (Solvay	of South Brittany), Christophe		Tekniska Högskolan), Magnus
Federal Laboratories for	of Finland), Rangika Thilan		(University of Bristol ), Richard		Composites Centre), Miroslav	Engineering Plastics), Michel	Baley (University of South	Ultrasonic process monitoring	
Materials Science and	De Silva (Monash University),	The dynamics laminated	Trask (University of Bristol)	Chemnitz), Lutz Engisch	Stojkovic (The National	Houba (Solvay R&I center	Brittany)	of an autoclave based infusion	
Technolgy), Kathrin Häflige		structures with relative motion		(HTWK Leipzig)	Composites Centre), Josh	Brussels)		with a network of 24 low cost	(Kungliga Tekniska Högskolan)
(Empa-Swiss Federal	University)	in the tangential and normal	A fully integrated microcap-		Simpson (The National			sensors. Resin flow, laminate	
Laboratories for Materials		directions at the interfaces is	sule - catalyst self-healing	Based on analytical analysis,	Composites Centre), Kevin	This study is focused on mean			The out-of-plane compressive
Science and Technology),	A methodology for the deter-	studied using a wave propa-	systems is demonstrated and	a complex FE-analysis and	Potter (University of Bristol),	stress effects observed on	be included in any future	were monitored and fed into	properties of foam materials
Joshi Veeramachaneni (Em Swiss Federal Laboratories		gation approach.	evaluated for mode I recovery in a high performance CFRP	comprehensive experimental studies an all-new FRP gra-	George Maistros (ADVISE)	short glass fibers reinforced PA6.6. They have been stud-	bio-composites publications, albeit with the recognition that	the process control.	are investigated using dif- ferent test methodologies. A
for Materials Science and	nanocomposites is presented,		composite.	vure printing system was de-	The paper describes and	ied on several glass fibers ori-	it may not always be possible		recommendation on strain
Technology), Rudolf Hufen			composite.	veloped that is now available	demonstrates the effective-	entation with great attention	to provide every item.		measurements for foam
(Empa-Swiss Federal	aluminosilicate/polylactate			in the printing market.	ness of simulation technology	paid to thermal effects.	to provide every item.		core compression testing is
Laboratories for Materials	nanocomposites as case			in the printing market.	applied to the Resin Transfer	paid to thermal cheeta.			proposed.
Science and Technology)	materials.				Moulding (RTM) manufactur-				proposou.
	indicidici				ing process using in-line die-				
A novel approach for the					lectric sensors for validation.				
development of ultra-light,									
fully-thermoplastic fiber re	n-								
forced composites is prese									
ed. The composite has a fil									
volume fraction of 0.54 and	la								
density of 0.93 g/c^cm3.									

## Thursday 23 July · Scientific programme

Meeting room 5	Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8
4211-2 HARNESSING	4212-3 ON THE THERMO	4213-3 EFFECT OF BASALT	4214-3 MANUFACTURING	4215-3 INTER- AND	4216-3 EXPRESS	4217-3 VISCOELASTIC	4218-2	4219-3 EFFECT OF	4220-3 MONITORING	4221-3 FABRICATION AND
BIOMIMETIC CATCH	CYCLING OF FIBER METAL	FIBRE HYBRIDIZATION ON	AND TESTING OF A	INTRA-LAMINAR DYNAMIC	PROCEDURE FOR	ANALYSIS OF PROCESS-	MICROSTRUCTURE-	TRAILING EDGE DAMAGE	THE MANUFACTURING	FINITE ELEMENT ANALYSIS
BONDS TO CREATE	LAMINATES	HIGH VELOCITY IMPACT	CRUCIFORM SPECIMEN	FRACTURE OF CFRPS	EVALUATION OF	INDUCED STRESSES	SENSITIVE ENVIRO-	ON FULL-SCALE WIND	PROCESS AND	OF SMART MANDREL
	<u>Bernhard Müller</u> (Delft	BEHAVIOUR OF CARBON/	FOR BIAXIAL TRANSVERSE			IN MANUFACTURING	MECHANICAL RESPONSE	TURBINE BLADE FAILURE	THE MECHANICAL	BASED ON SHAPE
ROBUST NANOPARTICLE	University of Technology),	EPOXY COMPOSITES	TESTS		SHAPE PULTRUDED	OF THERMOPLASTIC	CHARACTERIZATION	Philipp Ulrich Haselbach	PERFORMANCE OF A	MEMORY POLYMER
NETWORKS	Sofia Teixeira De Freitas	<u>Jacopo Tirillò</u> (La Sapienza	Federico París (University		COMPOSITE PROFILES	COMPOSITES BY	AND SIMULATION IN SIC/	(Technical University of	FULL-SIZED AIRCRAFT	Liwu Liu (Harbin Institute
Anna Balazs (University of	(Delft University of		of Seville), Elena Correa	<u>Hareesh Tippur</u> (Auburn		AUTOMATED FIBER	SIC CERAMIC MATRIX			of Technology), Haiyang
Pittsburgh)	Technology), Jos Sinke (Delft		(University of Seville),	University), Robert Bedsole	of Polymer Mechanics-				MADE FROM ALL-	Du (Harbin Institute of
Helen and the storade	University of Technology)	University of Rome), Luca	Alberto Barroso (University	(Auburn University)	University of Latvia),	Hossein Ghayoor (Concordia		Denmark)	COMPOSITE MATERIAL	Technology), Fanlong
Using computer simula-	The decise of a discussed		of Seville), Serafín Sánchez	Maria Links, and inter law	Vladimir Kulakov (Institute	University), Suong V. Hoa	Research Laboratory),	Numeral allocations that for allow		Chen (Harbin Institute
, ,	The design of a thermal	University of Rome), Teodoro	(University of Seville)	Mode-I inter- and intra-lam-	of Polymer Mechanics-	(Concordia University)	Stephan Bricker (University		OPTIC SENSORS	of Technology), Yanju
mechanical properties of a	cycling setup is presented and discussed which allows	Valente (La Sapienza University of Rome), Luca	This study deals with the	inar dynamic fracture behaviors of carbon fiber	University of Latvia)	A model for the develop	of Dayton), Jeff Simmons (Air Force Research	mechanics approaches were used to investigate the	Edmon Chehura (Cranfield University), Stephen James	Liu (Harbin Institute of Technology), Jinsong
network of polymer-grafted		Lampani (La Sapienza	This study deals with the manufacturing of cruciform	reinforced plastics (CFRPs)	Analytical express procedure	A model for the develop-		effect of trailing edge failure	(Cranfield University),	Leng (Harbin Institute of
nanoparticles (PGNs) that are interlinked by labile	the thermal cycling of fiber metal laminates with and	University of Rome), Enrique		have been studied. Thick	for evaluation of durability	ing both stress generation	(University of Dayton),	on full-scale wind turbine	Stephen Staines (Cranfield	Technology)
"catch" bonds. Unlike "slip"	without embedded heater	Barbero (Universidad	tensile biaxial transverse	unidirectional composites		and relaxation) arising dur-	Michael Uchic (Air Force	blade failure under com-	University), Chris	rechnology)
bonds, the life ti	elements. First results are		loads. The manufacturing	were processed using neat	composite profiles and	ing the processing of ther-		bined loading condition.	Groenendijk (National	
	presented.	Sanchez (Universidad	process and the results of	and carbon nanotube	reinforcing rods subjected	moplastic composites using	Ramanathan Krishnamurthy	billou louding condition.	Aerospace Laboratory	
	procented.		checking transverse tests		to aggressive environmental	automated fiber placement	(UES-Inc.), Pavel Mogilevsky		(NLR)), Denis Cartie (Coriolis	
		Gaudenzi (La Sapienza	are presented.		factors is development.	is presented.	(UES-Inc.), Michael		Composites Technologies	
		University of Rome)					Braginsky (University of		SAS), Stephanie Portet	
		,					Dayton Research Institute),		(DAHER Aerospace), Michael	
		The positive role of basalt fi-					Travis Whitlow (Universal		Hugon (DAHER Aerospace),	
		bre hybridization on carbon/					Technology Corporation),		Ralph Tatam (Cranfield	
		epoxy laminates subjected					Triplicane Parthasarathy		University)	
		to high velocity impacts is					(UES-Inc.), Nick Engel			
		confirmed by experimental					(Southwest Ohio Council		Monitoring the manufac-	
		data and analytical method.					for Higher Education		turing process and the	
							(SOCHE)), Eric Jones (Air		mechanical performance of	
							Force Research Laboratory),		a full-sized all carbon fibre	
							Randy Hay (Air Force		composite aircraft tailcone	
							Research Laboratory),		assembly using embedded	
							Jennifer Pierce (University of		fibre optic sensors	
							Dayton Research Institute),			
							Larry Zawada (Air Force Research Laboratory)			
							nesearch Laboratory)			
							This study seeks to un-			
							derstand the influence			
							of microstructure on the			
							response in SiC/SiC ceramic			
							matrix composites through			
							various enviro-mechanical			
							damage models with experi-			
							mental validation.			

Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
12:20 4201-3 INVESTIGATION OF		4203-4 DETERMINE	4204-4 BIOINSPIRED	4205-4 ANALYSIS	4206-3 CHARACTERISATION	4207-4 INFLUENCE OF THE	4208-4 HIGH PERFORMANCE	4209-4 SIMULATION OF	4210-4 BONDED REPAIRS
DEFORMATION BEHAVIOUR		INTERIOR STRAIN FIELDS	MICROVASCULAR	OF CARBON FIBER	OF PREPREG TACK ON	SERVICE ENVIRONMENT ON	COMPOSITES BASED ON	MOLD FILLING IN RESIN	OF HONEYCOMB SANDWICH
IN PRESS FORMING OF		IN COMPOSITES USING	NETWORKS FOR	COMPOSITE COIL/RINGS	DIFFERENT SURFACES TO	THE MATERIAL PROPERTIES	NANOPAPERS	TRANSFER MOLDING	STRUCTURES: IN SITU
SADDLE SHAPE U BEAM		A 3D DIGITAL SPECKLE	MULTIFUNCTIONAL	FOR OFFLOADING HOSES		OF SHORT- AND ENDLESS-	Andreas Mautner (University		PROCESS MONITORING AND
USING CFRTP LAMINATE		PHOTOGRAPHY TECHNIQUE	COMPOSITES	SUBJECTED TO CRUSHING	PLACEMENT	FIBER REINFORCED	of Vienna), Jessica Lucenius	FIBER ARCHITECTURE	QUALITY ASSESSMENT
AND SHEAR CUTTING		Fu-Pen Chiang (Stony Brook	Jason Patrick (University of	LOAD		THERMOPLASTICS	(Aalto University), Monika		Mathieu Préau (McGill
BEHAVIOUR		University), Lingtao Mao	Illinois at Urbana-Champaign),	Maikson Luiz Passaia	of Nottingham), Davide	Constantin Bauer (Institute	Österberg (Aalto University),		University), Pascal Hubert
Daichi Tatsuno (Kanazawa		(China University of Mining &	Brett Krull (University of	Tonatto (Federal University	De Focatiis (University of	for Composite Materials),	Alexander Bismarck	Dino Magagnato (Karlsruhe	(McGill University)
University), Takeshi Yoneyama		Technology( Beijing))	Illinois at Urbana-Champaign),	of Rio Grande do Sul), Maria	Nottingham), Sayata Ghose	Magin Michael (Institute for	(University of Vienna)	Institute of Technology), Frank	(wcan onversity)
(Kanazawa University), Shoji		Technology( Beljing))	Mayank Garg (University of	Madalena de Camargo Forte	(The Boeing Company),	Composite Materials), Thomas		Henning (Karlsruhe Institute of	A modified adhesive is used
		The 3D deformation field of		(Federal University of Rio					for bonded scarf repairs of
Hineno (Kanazawa University),			Illinois at Urbana-Champaign),	1	Brice Johnson (The Boeing	Schalk (ZF Friedrichshafen	A new type of nanopapers	Technology)	
Masaki Kimura (Kanazawa		a composite beam under	Jeffrey Moore (University of	Grande do Sul), Ricardo Araújo		AG)	was developed by introducing	A	sandwich panels. Air channels
University), Keisuke Shiozaki		three-point bending has been	Illinois at Urbana-Champaign),	Teles (PETROBRAS), Sandro	(The Boeing Company),		polysaccharides into the		in the adhesive is found to
(Kanazawa University),		mapped using the newly	Nancy Sottos (University of	Campos Amico (Federal		The influence of different	matrix of a CNF film. These		significantly reduce repair
Kiichirou Kawamoto (Komatsu		developed technique called		University of Rio Grande	Nottingham)	thawing salt solutions on the	nanopapers were processed	filling simulation is developed	patch and bondline poros-
Industries Corp.), Masaya		Digital Volumetric Speckle	Scott White (University of	do Sul)		static and fatigue properties	into high-loading compos-	to improve the modelling of	ity under vacuum bag only
Nakagawa (Komatsu		Photography combined with	Illinois at Urbana-Champaign)		1	of SFRP and the effect of dif-	ites via lamination with an	resin transfer molding. The	pressure
Industries Corp.), Masayuki		X-ray CT		This study aims to investigate	preg and FEP surfaces was	ferent conditioning methods	epoxy-resin.	interface is designated for	
Okamoto (Komatsu Industries			Advancements in a vas-	the substitution of the coil		on the tensile strength of		unidirectional fabrics.	
Corp.)			cularization technique for	steel of offloading hoses		EFRP is investigated.			
			fiber-composites are provided		superposition allowed the				
The continuous CFRTP sheet			as a pathway to imbue these	The composite coil showed	feed rates for maximum tack				
was press-formed into a U			synthetic, structural materials	specific stiffness and strength	at any temperature to be				
beam shape and the fibre			with multifunctional attributes	higher than that of the steel.	predicted.				
deformation was analysed.			found in biological systems.	-					
In addition, shear cutting of									
CFRTP was preformed, and									
shear cutting behaviour was									
analysed.									
12:40 4201-4 MANUFACTURING		4203-5 INFLUENCE OF	4204-5 THERMALLY		4206-4 DETECTION AND	4207-5 EFFECT OF FIBRE			4210-5 THE MECHANICAL
METHOD OF A		MONTMORILLONITE	ACTIVATED HEALING IN HIGH		MODELLING OF THERMAL	ORIENTATION AND NOTCH			PROPERTIES OF SANDWICH
THERMOPLASTIC SEMI-		NANOCLAY, GRAPHENE	PERFORMANCE CARBON		AND RHEOLOGICAL	RADIUS ON THE IMPACT			STRUCTURES BASED WITH
FINISHED PRODUCT AS		NANOPLATELETS AND	FIBRE/EPOXY COMPOSITES						COMPOSITE COLUMN CORES
REINFORCEMENT IN		COMBINED NANOCLAY/	Khomkrit Pingkarawat (RMIT		THERMOSET USING	GLASS FIBRE REINFORCED			H. Z. Jishi (Khalifa University
LAMINATE THICKNESS		GRAPHENE HYBRID ON	University), Mel Dell'olio			POLYPROPYLENE			of Science-Technology and
DIRECTION		PROPERTIES OF EPOXY	(Commonwealth Scientific		MEASURING TECHNIQUES	Michael Jerabek (Borealis			Research (KUSTAR)), R. Umer
		COMPOSITE	and Industrial Research		Alexander Chaloupka	Polyolefine GmbH), Anna Hartl			(Khalifa University of Science-
Andreas Mierzwa (Technische			Organisation (CSIRO)).		(Fraunhofer Institute for				
Universität München-Faculty of Mechanical Engineering).		Alfred Tcherbi-Narteh	Adrian Mouritz (RMIT		· · · · · · · · · ·	(Johannes Kepler University			Technology and Research
		(Tuskegee University),			Chemical Technology ICT),	Linz), Reinhold Lang			(KUSTAR)), Z. Barsoum
Christoph Ebel (Technische Universität München-Faculty		Md. Nuruddin (Tuskegee	University), Russell Varley		Renato Bezerra (Fraunhofer	(Johannes Kepler University			(Khalifa University of Science-
Universitat Munchen_Faculty		University), Mahesh Hosur	(Commonwealth Scientific		Institute for Chemical	Linz)			Technology and Research
		Trusteeners University 5 D	and had saturated at Deserved						(KUSTAR)), W. J. Cantwell
of Mechanical Engineering),		(Tuskegee University), Raju	and Industrial Research		Technology ICT), André Wedel				
of Mechanical Engineering), Michael Brand (Technische		Gupta (Tuskegee University),	and Industrial Research Organisation (CSIRO))		(Fraunhofer Institute for				(Khalifa University of Science-
of Mechanical Engineering), Michael Brand (Technische Universität München-Faculty		Gupta (Tuskegee University), Allyson Lattimore (Tuskegee	Organisation (CSIRO))		(Fraunhofer Institute for Chemical Technology ICT),				Technology and Research
of Mechanical Engineering), Michael Brand (Technische Universität München-Faculty of Mechanical Engineering),		Gupta (Tuskegee University), Allyson Lattimore (Tuskegee University), Shaik Jeelani	Organisation (CSIRO)) Investigation of thermally		(Fraunhofer Institute for Chemical Technology ICT), Vinay Madaksira (Fraunhofer				
of Mechanical Engineering), Michael Brand (Technische Universität München-Faculty of Mechanical Engineering), Klaus Drechsler (Technische		Gupta (Tuskegee University), Allyson Lattimore (Tuskegee	Organisation (CSIRO)) Investigation of thermally activated healing in high per-		(Fraunhofer Institute for Chemical Technology ICT), Vinay Madaksira (Fraunhofer Institute for Chemical				Technology and Research (KUSTAR))
of Mechanical Engineering), Michael Brand (Technische Universität München-Faculty of Mechanical Engineering), Klaus Drechsler (Technische Universität München-Faculty		Gupta (Tuskegee University), Allyson Lattimore (Tuskegee University), Shaik Jeelani (Tuskegee University)	Organisation (CSIRO)) Investigation of thermally activated healing in high per- formance carbon fibre/epoxy		(Fraunhofer Institute for Chemical Technology ICT), Vinay Madaksira (Fraunhofer				Technology and Research (KUSTAR)) Composite sandwich struc-
of Mechanical Engineering), Michael Brand (Technische Universität München-Faculty of Mechanical Engineering), Klaus Drechsler (Technische		Gupta (Tuskegee University), Allyson Lattimore (Tuskegee University), Shaik Jeelani (Tuskegee University) Influence of montmorillonite	Organisation (CSIRO)) Investigation of thermally activated healing in high per- formance carbon fibre/epoxy composites using poly(eth-		(Fraunhofer Institute for Chemical Technology ICT), Vinay Madaksira (Fraunhofer Institute for Chemical				Technology and Research (KUSTAR)) Composite sandwich struc- tures containing high-perfor-
of Mechanical Engineering), Michael Brand (Technische Universität München-Faculty of Mechanical Engineering), Klaus Drechsler (Technische Universität München-Faculty		Gupta (Tuskegee University), Allyson Lattimore (Tuskegee University), Shaik Jeelani (Tuskegee University)	Organisation (CSIRO)) Investigation of thermally activated healing in high per- formance carbon fibre/epoxy		(Fraunhofer Institute for Chemical Technology ICT), Vinay Madaksira (Fraunhofer Institute for Chemical				Technology and Research (KUSTAR)) Composite sandwich struc-
of Mechanical Engineering), Michael Brand (Technische Universität München-Faculty of Mechanical Engineering), Klaus Drechsler (Technische Universität München-Faculty		Gupta (Tuskegee University), Allyson Lattimore (Tuskegee University), Shaik Jeelani (Tuskegee University) Influence of montmorillonite	Organisation (CSIRO)) Investigation of thermally activated healing in high per- formance carbon fibre/epoxy composites using poly(eth-		(Fraunhofer Institute for Chemical Technology ICT), Vinay Madaksira (Fraunhofer Institute for Chemical Technology ICT)				Technology and Research (KUSTAR)) Composite sandwich struc- tures containing high-perfor- mance core materials based
of Mechanical Engineering), Michael Brand (Technische Universität München-Faculty of Mechanical Engineering), Klaus Drechsler (Technische Universität München-Faculty of Mechanical Engineering)		Gupta (Tuskegee University), Allyson Lattimore (Tuskegee University), Shaik Jeelani (Tuskegee University) Influence of montmorillonite nanoclay, graphene nan-	Organisation (CSIRO)) Investigation of thermally activated healing in high per- formance carbon fibre/epoxy composites using poly(eth- ylene-co-methacylic acid)		(Fraunhofer Institute for Chemical Technology ICT), Vinay Madaksira (Fraunhofer Institute for Chemical Technology ICT) Dielectric measurement				Technology and Research (KUSTAR)) Composite sandwich struc- tures containing high-perfor-
of Mechanical Engineering), Michael Brand (Technische Universität München-Faculty of Mechanical Engineering), Klaus Drechsler (Technische Universität München-Faculty of Mechanical Engineering) The paper presents a man-		Gupta (Tuskegee University), Allyson Lattimore (Tuskegee University), Shaik Jeelani (Tuskegee University) Influence of montmorillonite nanoclay, graphene nan- oplatelets and combined	Organisation (CSIRO)) Investigation of thermally activated healing in high per- formance carbon fibre/epoxy composites using poly(eth- ylene-co-methacylic acid) (EMAA) as a thermoplastic		(Fraunhofer Institute for Chemical Technology ICT), Vinay Madaksira (Fraunhofer Institute for Chemical Technology ICT) Dielectric measurement results show a strong corre-				Technology and Research (KUSTAR)) Composite sandwich struc- tures containing high-perfor- mance core materials based on vertical composite columns
of Mechanical Engineering), Michael Brand (Technische Universität München-Faculty of Mechanical Engineering), Klaus Drechsler (Technische Universität München-Faculty of Mechanical Engineering) The paper presents a man- ufacturing method for a sta-		Gupta (Tuskegee University), Aliyson Lattimore (Tuskegee University), Shaik Jeelani (Tuskegee University) Influence of montmorillonite nanoclay, graphene nan- oplatelets and combined binary nanoparticles of the	Organisation (CSIRO)) Investigation of thermally activated healing in high per- formance carbon fibre/epoxy composites using poly(eth- ylene-co-methacylic acid) (EMAA) as a thermoplastic		(Fraunholer Institute for Chemical Technology ICT), Vinay Madaksira (Fraunhofer Institute for Chemical Technology ICT) Dielectric measurement results show a strong corre- lation to differential scanning				Technology and Research (KUSTAR)) Composite sandwich struc- tures containing high-perfor- mance core materials based on vertical composite columns have been manufactured us-
of Mechanical Engineering), Michael Brand (Technische Universität München-Faculty of Mechanical Engineering), Klaus Drechsler (Technische Universität München-Faculty of Mechanical Engineering) The paper presents a man- ufacturing method for a sta- ple-like pin made of carbon		Gupta (Tuskegee University), Allyson Lattimore (Tuskegee University), Shaik Jeelani (Tuskegee University) Influence of montmorillonite nanoclay, graphene nan- oplatelets and combined binary nanoparticles of the two on flexural, viscoelastic and thermal properties of	Organisation (CSIRO)) Investigation of thermally activated healing in high per- formance carbon fibre/epoxy composites using poly(eth- ylene-co-methacylic acid) (EMAA) as a thermoplastic		(Fraunholer Institute for Chemical Technology ICT), Vinay Madaksira (Fraunhofer Institute for Chemical Technology ICT) Dielectric measurement results show a strong corre- lation to differential scanning calorimetric data. Because of				Technology and Research (KUSTAR)) Composite sandwich struc- tures containing high-perfor- mance core materials based on vertical composite columns have been manufactured us-
of Mechanical Engineering), Michael Brand (Technische Universität München-Faculty of Mechanical Engineering), Klaus Drechsler (Technische Universität München-Faculty of Mechanical Engineering) The paper presents a man- ufacturing method for a sta- ple-like pin made of carbon fiber reinforced thermoplastic		Gupta (Tuskegee University), Aliyson Lattimore (Tuskegee University), Shaik Jeelani (Tuskegee University) Influence of montmorillonite nanoclay, graphene nan- oplatelets and combined binary nanoparticles of the two on flexural, viscoelastic	Organisation (CSIRO)) Investigation of thermally activated healing in high per- formance carbon fibre/epoxy composites using poly(eth- ylene-co-methacylic acid) (EMAA) as a thermoplastic		(Fraunholer Institute for Chemical Technology ICT), Vinay Madaksira (Fraunhofer Institute for Chemical Technology ICT) Dielectric measurement results show a strong corre- lation to differential scanning calorimetric data. Because of physical principles there is a				Technology and Research (KUSTAR)) Composite sandwich struc- tures containing high-perfor- mance core materials based on vertical composite columns have been manufactured us-

14:00 Stimulus-responsive polymer composites: a path towards active shape changing structures Jinsong Leng, Harbin Institute of Technology, People's Republic of China

## Thursday 23 July · Scientific programme

Aeeting room 5	Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8
211-3 STRUCTURAL	4212-4 FABRICATION	4213-4 INTRALAYER	4214-4 INDUCING	4215-4 INNOVATIVE	4216-4 DURABILITY	4217-4 MANUFACTURING	4218-3 PROGRESSIVE	4219-4 MATERIAL DESIGN		4221-4 NANOSTRUCTURED
	OF TIAL MATRIX	HYBRIDISATION TO	FAILURES IN COMPOSITE	METHODOLOGY BY	OF CARBON EPOXY		FAILURE ANALYSIS OF THE			'SKIN' FOR MECHANICAL
	COMPOSITE SHEETS	COMBINE THE DUCTILITY	FLYWHEELS- A STUDY		COMPOSITES MATERIAL	CONTINUOUS MULTI-TOW	OPEN-HOLE COMPOSITES	ADVANCED COMPOSITE		SENSING
	WITH CONTROLLED	OF SELF-REINFORCED	USING 3 & 4 POINT		FOR TIDAL TURBINE	SHEARING FOR HIGH-	LAMINATES USING SFEM	MATERIALS		Yinhu Deng (Leibniz - Institut
	MICRO-LAMINATED	POLYPROPYLENE WITH		ON CFRP WITHIN AN	BLADE APPLICATIONS.		METHOD AND TEST	Jens Zangenberg (LM Wind		für Polymerforschung
	ARCHITECTURE BY A	THE STIFFNESS OF	Jennifer Lenz (Imperial	INDUSTRIAL CONTEXT	Nicolas Tual (LBMS), Nicolas		VALIDATION	Power), Torben Jacobsen		Dresden e.V.), Jianwen
	SOLID-LIQUID REACTION	CARBON FIBRE	College London), Bamber	Nicolas SWIERGIEL (AIRBUS	Carrere (LBMS), Peter	COMPOSITES	Xiuhua Chen (Shanghai	(LM Wind Power), Rasmus		Liu (Leibniz - Institut
	Xiping Cui (Harbin	Yentl Swolfs (KU Leuven),	Blackman (Imperial College	GROUP INNOVATIONS),	Davies (Ifremer)	Evangelos Zympeloudis	Jiao Tong University).	Østergaard (LM Wind		für Polymerforschung
		Larissa Gorbatikh (KU	London)	Beniamin LEBOIME (AIRBUS)	Davies (internet)		Yin Yu (Shanghai Jiao	Power). Michael Koefoed		Dresden e.V.). Edith
ond (University of Bristol), hil H. Mellor (University	Institute of Technology),		London)		Desults from mochanical	(University of Bristol), Byung		(LM Wind Power)		
	Lin Geng (Harbin Institute	Leuven), Ignaas Verpoest	Composite hoom oppointing	GROUP INNOVATIONS),	Results from mechanical	Chul Kim (University of	Tong University), Hai	(Livi Willa Power)		Mäder (Leibniz - Institut
f Bristol)	of Technology), Guohua	(KU Leuven)	Composite beam specimens	Ana Cristina GALUCIO	tests after seawater ageing	Bristol)	Wang (Shanghai Jiao	The design and adjustication		für Polymerforschung
Characteristic states and an adverse state	Fan (Harbin Institute of	Oralized films (a slf as inferred)	with no defects and with in-	(AIRBUS GROUP	and a diffusion model to	The second of OMTO offere	Tong University), Jian	The design and reliability		Dresden e.V.), Gert
fibre reinforced polymer	Technology), Yuanyuan	Carbon fibre/self-reinforced	serted defects of transverse	INNOVATIONS), François	account for water ingress	The concept of CMTS offers	Zhao (Shanghai Jiao Tong	aspects of glass fibres and		Heinrich (Leibniz - Institut
	Gao (Harbin Institute of	polypropylene hybrids	or inter-laminar nature were	HILD (LMT Cachan), Caroline		the potential to dramatically	University)	non-crimp fabrics used		für Polymerforschung
oth magnetic and me-	Technology), Songhe	achieved a unique combina-	tested to failure in 3-point	PETIOT (AIRBUS GROUP	used to estimate long term	increase fibre steering		for the main load-carrying		Dresden e.V.), Christina
	Meng (Harbin Institute of	tion of stiffness and failure	bending and modeled using	INNOVATIONS), Stéphane	behaviour of a tidal turbine	capabilities by utilising the	The example of the open-	beam of a wind turbine rotor		Scheffler (Leibniz - Institut
eveloped. Particle-resin	Technology)	strain. The tensile, flexural	finite element analysis.	ROUX (LMT Cachan), Prisca	blade.	material shear deformation,	hole composite plates well	blade are addressed.		für Polymerforschung
Ims were incorporated as		and impact behaviour		VINCENT (AIRBUS GROUP		while enhancing productivity				Dresden e.V.), Uwe
	TiB-TiAl composites pre-	revealed the importance of		INNOVATIONS)		by employing multiple tows.	methodology based on			Gohs (Leibniz - Institut
	pared by foil metallurgy	bonding.					SFEM significantly reduces			für Polymerforschung
	sintering display unique			For quantifying transverse			modeling difficulty and com-			Dresden e.V.), Shanglin
	multi-layered structure and			cracking in layered com-			putational memory usage.			Gao (Leibniz - Institut für
	enhanced tensile properties			posites, global Digital Image						Polymerforschung Dresden
	and thus have potential for			Correlation (DIC) is applied						e.V.)
	high-temperature structural			during tensile tests. 2						
	applications.			trustworthy methodologies						An integration of optic per-
				are proposed for use at						formance and piezoresistive
				industrial level.						behaviour on glass fibres to
										realise strain sensor for tra-
										ditional fibre reinforcement
										composites.
211-4 MECHANICAL AND	4212-5 TENSILE	4213-5 EXPERIMENTAL	4214-5 GEOMETRY		4216-5 FINITE ELEMENT	4217-5 THERMOPLASTIC		4219-5 MULTI-AXIAL		·
	PROPERTIES OF	CHARACTERIZATION	DEFINITION FOR		MODEL OF GALVANIC	MATRIX COMPOSITES:		SUB-STRUCTURE FATIGUE		
	AN INFILTRATED	OF HYBRID MATERIAL	THE NORMAL AND		CORROSION IN A POLYMER			TESTING OF A 34M WIND		
	INTERPENETRATING	SYSTEMS CONSISTING	SHEAR STRENGTH OF		COMPOSITE CORE	QUICK, XTRA EFFICIENT		TURBINE BLADE		
	POROUS SIC MMC	OF SHEET METAL AND	BIMATERIALS USING THE		CONDUCTOR	MANUFACTURING		Jacob Waldbjørn (Technical		
	Matthias Merzkirch (KIT),	ADVANCED COMPOSITES	IOSIPESCU SPECIMEN		Eva Hakansson (University	ADVANCED COMPOSITES		University of Denmark).		
	Volker Walter (KIT), Kay	Michael Dlugosch	WITHOUT STRESS		of Denver), Paul Predecki	FOR THE A350 XWB AND		Christian Berggreen		
		(Fraunhofer Ernst-Mach-	SINGULARITIES.			BEYOND		(Technical University of		
	André Weidenmann (KIT)				(University of Denver),					
lasaki Yoshida (Kyoto	The summer has a set of sets	Institute-EMI), Dirk	Alberto Barroso (University		Maciej Kumosa (University	Angelos Miaris (Premium		Denmark), Henrik Stang		
	The current paper deals	Lukaszewicz (BMW Group),	of Seville), Alberto Martín		of Denver)	AEROTEC GmbH), Klaus		(Technical University of		
	with the producibility of SiC	Jens Fritsch (Fraunhofer	(University of Seville),			Edelmann (Premium		Denmark)		
	preforms and their infiltra-	Ernst-Mach-Institute-	Vladislav Mantic (University		A numerical model of the	AEROTEC GmbH), Sven				
	tion. In addition it could be	EMI), Stefan Hiermaier	of Seville), Federico París		atmospheric galvanic cor-	Sperling (Premium AEROTEC				
	shown that tensile sample	(Fraunhofer Ernst-Mach-	(University of Seville)		rosion between carbon fiber	GmbH)				
	can be manufactured in	Institute-EMI)			reinforced composite and					
he high-strength/light-	miniature dimensions.		Modified tensile and		aluminium in new design of	Premium AEROTEC man-				
eight composite reinforced		Hybrid coupon specimens	losipescu test samples		an overhead transmission	ufactures in a highly auto-				
y waste carbon fiber was		comprised of sheet metal	of bimaterial joints with		line conductor.	mated facility in Bremen				
ied to mold by extruding		and cfrp/gfrp have been	composites are proposed			5000 CFRP –Parts for every				
nolding method. The		tested under quasistatic	to evaluate the tensile and			A350 XWB. Quality, costs				
echanical properties of		tension and 3-point-bending	shear strength removing the			and on time delivery are				
omposite heated by carbon			stress singularities at the			the major key issues for the				
ber were discussed.		design parameters and	interface free-edges.			sucess of the projekt.				
		hybrid mechanisms	internation into ougou.			cacco or the project				

	Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
15:00	4301 Processing - Manufacturing Technology 12	4302 Nano Composites 12	4303 ONR Special Symposium on Marine Composites 7	4304 Multifunctional Composites - Self-Healing and Bio-inspired Designs 3	4305 Applications - Bio & Medical 2	4306 Experimental Methods for Process Characterisation 4	4307 Short Fibre Composites 3	4308 Biocomposites 11	4309 Recycling of Composites and Sustainability 3	4310 Fibres 2
15:00	TREATMENT OF CFRP <u>Hirohito Hira</u> (Daido University), Tomoyuki SUZUKI (Kyoto Institute of technology) Application of fan shape waterjet to the pretreatment of painting and repair of CFRP was studied. Good results were obtained for painting of PA66 matrix CFRP and for re- pair of epoxy matrix CFRP.	4302-1 MECHANICAL PROPERTIES OF CARBON NANOTUBE /EPOXY COMPOSITE LAMINATES PROCESSED USING PREPREG METHOD Toshio Ogasawara (JAXA), Sook-Young Moon (JAXA), Takeshi Ogawa (Aoyama- Gakuin University), Yoshinobu Shimamura (Shizuoka University), Yoku Inoue (Shizuoka University) This study examined the processing and mechanical properties of aligned MW-CNT /epoxy lamina and laminates processed using a hot-melt propers method. On-axis and off-axis tensile tests (0°, 45°, 90°)	4303-1 STATISTICAL PREDICTION OF TENSILE CREEP FAILURE TIME FOR UNIDIRECTIONAL CFRP <u>Masayuki Nakada</u> (Kanazawa Institute of Technology), Yasushi Miyano (Kanazawa Institute of Technology) A prediction method for the statistical creep failure time of polymer composites using the statistical static strengths of polymer composites meas- ured at various temperatures is proposed.	4304-1 EFFECT OF LOW TEMPERATURE ON SELF HEALING PERFORMANCE OF CARBON/EPOXY COMPOSITES Mohammad Asgar Khan (Concordia University), Suong Van Hoa (Concordia University) Effect of low temperature on self healing of carbon/epoxy composites were investigated in this work. Epoxy incor- porated with microcapsules containing 5-ethylidene- 2-Norbornene (5E2N) and Grubbs cataly	4305-1 CHARACTERIZATION OF A COMPOSITE MATERIAL TO MIMIC HUMAN CRANIAL BONE <u>Thomas Plaisted</u> (United States Army Research Laboratory), Jared Gardner (United States Army Research Laboratory), Michael Leadore (United States Army Research Laboratory), Michael Leadore (United States Army Research Laboratory) We report on the charac- terization of a composite material to mimic the me- chanical response of human cranial bones and serve as a surrogate for human tissue during testing of protective measures.	4306-1 INTEREST OF A RHEOKINETIC STUDY FOR THE DEVELOPMENT OF THERMOPLASTIC COMPOSITES BY THERMOPLASTIC - RESIN TRANSFER MOLDING Matthieu Thomassey (Cetim- Cermat), Dimitri LERAY (Cetim-Cermat), Frédéric RUCH (Cetim-Cermat), Julia SCHELL (Cetim), Michel BOUQUEY (Institut Charles Sadron) To a better control of T-RTM injection process, a rheolog- ical, physical and chemical study of the different phenom- enons is proposed. This study is completed with a numerical simulation of injections.	4307-1 FAST PREDICTION OF THE FATIGUE BEHAVIOR OF SHORT FIBER REINFORCED THERMOPLASTICS FROM HEAT BUILD-UP MEASUREMENTS: FROM THE SAMPLE TO THE STRUCTURE Leonell Serrano Abello (LBMS), Vincent Le Saux (LBMS), Pierre Charrier (Trelleborg/Ubracoustic), Gilles Robert (Solvay engineering plastics) This paper aims at describing a method based on thermal measurements that reduces substantially the characteri- zation duration of the fatigue properties for two families of samples	MORPHOLOGICAL AND MICROMECHANICAL CHARACTERIZATION OF GELATIN-BACTERIAL CELLULOSE COMPOSITES Franck Quera (Universidad de los Andes), Abigail Coveney (University of Bristol), Anna Lewandowska (University of Exeter), Robert Richardson (University of Bristol), Faulo Diaz Calderón (Universidad de los Andes), Ashraf Alam (University of Bristol), Koon- Yang Lee (University College London), Stephen Eichhorm (University of Exeter), Javier Enrione (Universidad de los Andes) The effect of adding bacterial cellulose (BC) to gelatin was investigated. The results showed that by adding 10 wt % UV opacity was in- creased by ~40 %, compared	4309-1 STRENGTH OF THEMERALLY CONDITIONED GLASS FIBRE: DEGRADATION, RETENTION, AND REGENERATION Liu Yang (University of Strathclyde), Peter Jenkins (University of Strathclyde), John Liggat (University of Strathclyde), James Thomason (University of Strathclyde) The aim of this study is to verify the concept of regen- erating thermally degraded glass fibres for a potential closed-loop recycling of glass fibre thermosetting composites.	4310-1 MICROSCOPIC INVESTIGATION OF THE MICRO-STRUCTURE OF FIBRILS OF TECHNICAL POLYACRYLNITRILE FIBERS SEPARATED BY ULTRASONI ETCHING (University of Augsburg), Judith Moosburger-Will (University of Augsburg), Judith Moosburger-Will (University of Augsburg), Siegfried Hom (University of Augsburg) Different morphologies of separated fibrils coexist in th same fiber. Based on FESEM AFM and TEM analysis we derive a model showing the relationship of the micro- structures and polymer chain folding.
15:20	Papini (Ryerson University), Jan Spelt (University of Toronto) The research examined the cut surface morphology of three composite materials (two CFRP and one GFRP)	4302-2 NOVEL STIFF AEROGEL-AEROGEL COMPOSITES FOR THERMAL INSULATION APPLICATION Jessica Laskowski (German Aerospace Center (DLR)), Barbara Milow (German Aerospace Center (DLR)), Lorenz Ratke (German Aerospace Center (DLR)) Non-fragile and stiff aero- gel-aerogel composites consisting of highly insulating granular aerogels (silica or RF) and a cellulosic aerogel matrix were synthesized and characterized.	4303-2 EXPERIMENTAL VIBRATIONS-BASED CHARACTERIZATION OF A COMPOSITE STIFFENED CURVED PANEL MANUFACTURED AS ONE PIECE FOR THE HULL OF A FAST BOAT Ioannis Georgiou (National Technical University of Atthens ) This work uses few sensors to collect dense space-time acceleration databases in composite ship structures for multi-scale damage detection and system identification by advanced data processing.	4304-2 EFFECT OF EMBEDDED CATALYTIC SELF-HEALING ON CARBON FIBRE REINFORCED POLYMER COMPOSITES Daniel Everitt (University of Bristol), Jan Bond (University of Bristol), Duncan Wass (University of Bristol), Richard Trask (University of Bristol) The successful inclusion of a catalytic epoxy curing agent within a fibre reinforced polymer is demonstrated. Subsequent repair of dam- aged FRP specimens is car- ried out using the embedded catalyst.	4305-2 THE ATTACHMENT OF TENDON TO BONE: STRATEGIES FOR MECHANICALLY ROBUST CONNECTIONS BETWEEN DISSIMILAR MATERIALS Stavros Thomopoulos (Washington University) The attachment of tendon to bone is a significant mechan- ical challenge. Developing strategies for effectively connecting the two tissues will have significant clinical impact.	4306-2 DEVELOPMENT OF IMPROVED METHODS FOR CHARACTERISING THE CURE OF COMPOSITE MATERIALS Ana Yong (National Physical Laboratory), Graham Sims (National Physical Laboratory), Paul Smith (University of Surrey), Stephen Ogin (University of Surrey) The Tg of CFRP materials at four states of cure was measured using DMA, DSC and TMA by a new method that aims to eliminate thermal lag, often cited as a cause of disagreement between these techniques.	4307-2 SHORT FIBRE POLYAMIDE UNDER COMBINED SHEAR AND TENSILE LOADING: A NON- DESTRUCTIVE EVALUATION OF MICRO DAMAGE EVOLUTION Karoline Metzkes (BAM Federal Insitute for Materials Research and Testing), Volker Trappe (BAM Federal Insitute for Materials Research and Testing) The evolution of micro dam- age in short fibre polyamide is focus on. Tube samples are subjected to biaxial fatigue loadings. The evolution of micro damage is analysed by X-ray refraction analysis.	to gelatin. <b>4308-2 SUSTAINABLE</b> <b>COMPOSITES FROM</b> <b>BIOCHAR AND ENGINEERING</b> <b>PLASTIC</b> <i>Amar Mohanty</i> (University of Guelph), Singaravelu Vivekanandhan (VHINSN College), Andrew Anstey (University of Guelph), Manjusri Misra (University of Guelph) Biochar filled nylon 6 compos- ites were fabricated through melt extrusion process. The effect of biochar loading on their mechanical properties was investigated.	4309-2 COMPRESSIVE 5TRENGTH AND MIX BEHAVIOUR OF RUBBERISED CONCRETE Istvan Pocklington (Kingston University London), Hsein Kew (Kingston University London), Ted Donchev (Kingston University London), Mukesh Limbachiya (Kingston University London) Compressive strength reduc- tions as a result of both uni- form and variable factors are discussed. Research suggests hydrocarbon contamination of rubber particles as but one of these causes.	4310-2 A STUDY ON 4310-2 A STUDY ON THE LENGTH EFFECT INFLUENCING THE MECHANICAL STRENGTH OI GLASS FIBRE FILAMENTS Alexander Maier (Processing of composites), Ralf Schledjewski (Processing of composites) In the present work a possibl length dependency for dry glass fibre bundles was investigated. These analyses are based on the needs for continuous composites manu- facturing processes.

Meeting room 5	Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8
4311 Multifunctional	4312 Composites with	4313 Hybrid Composites 2	4314 Simulation of	4315 Digital Image	4316 Durability, Creep and	4317 Impact and Dynamic	4318 Multiscale Modelling	4319 Applications - Ships	4320 Thermography 1	4321 Multifunctional
Composites - Adaptive	Metallic Components 3		Progressive Failure 1	Correlation 2	Agressive Environment 2	Structural Analysis 1	of Structures 3	and Boats		Composites - Processing
Response and										and Integration 1
Reconfiguration 4										
4311-1 MODELLING OF	4312-1 STRUCTURE AND	4313-1 NEW	4314-1 A CONTINUUM	4315-1 CHARACTERIZING	4316-1 DIRECTIONAL	4317-1 THE SIMULATION	4318-1 A	4319-1 COMPOSITE	4320-1 IMPROVEMENT	4321-1 MULTIFUNCTIONAL
TEXTILE COMPOSITES	PROPERTIES OF THE AK7-	MULTIFUNCTIONAL	DAMAGE MECHANICS	QUASI-STATIC IMPACT	DIFFUSION OF MOISTURE	OF THE IMPACT TESTS OF	MICROMECHANICAL	HATCH COVER FOR BULK	OF DETECTION OF	COMPOSITES REINFORCED
WITH VARIABLE STIFFNESS	SIC COMPOSITES AFTER	HYBRID POLYMER	MODEL FOR UD COMPOSITES WITH THE	EVENTS ON COMPOSITE MATERIALS WITH DIC	IN CARBON FIBRE /	COMPOSITE STRUCTURES WITH MIXED ELEMENT	APPROACH TO MODELING THE EFFECT OF IMPACT	CARRIERS	DEFECTS OF CFRP IN THE INFRARED PULSE PHASE	WITH FUNCTIONALIZED
Erik Marklund (Swerea	MACHINING Jolanta Cyboron (Institute	COMPOSITES REINFORCED BY CARBON AND STEEL	EVOLUTION LAW BASED	Bob Desnoo (Carleton	EPOXY COMPOSITES: EXPERIMENTS AND	TYPE ANALYSIS	INDUCED DAMAGE ON THE	<u>Philippe Noury</u> (DNV GL), Ragnar Hansen (HEAC),	THERMOGRAPHY	INTERPHASE
SICOMP AB), Gaurav Vvas	of Advanced Manufacturing	FIBERS	ON THE DAMAGE DRIVING	University), Calvin Rans	MODELLING	Weiyi Kong (University of	VIBRATION RESPONSE OF	Biørn Høyning (FiReCo)	Masashi Koyama (Meisei	CHARACTERIZATION AND
(Swerea SICOMP AB), Peter	Technology), Małgorzata	Benedikt Hannemann	FORCE CONCEPT	(Delft University of	Feras Korkees (Swansea	Nottingham), Richard Brooks	CFRP LAMINATES	Djølil Høylling (Filleco)	university), Masashi	APPLICATIONS
Hellström (Swerea SICOMP	Karolus (Institute of	(Institute for Composite	Tianhong Yu (University of	Technology), Xiao Huang	University), Sue Alston	(University of Nottingham),	Marco A. Pérez (Universitat	Strength and fire risk	Ishikawa (Tokyo University	<u>Qi An</u> (University of
AB)	Advanced Manufacturing	Materials (IVW GmbH)),	Nottingham), Shuguang Li	(Carleton University)	(Swansea University), Cris	Shuguang Li (University of	Politècnica de Catalunya	assessments carried out to	of Science). Haruki	Delaware), Andrew Rider
'	Technology), Piotr Putyra	Sebastian Backe (University	(University of Nottingham),		Arnold (Swansea University)	Nottingham), Elena Sitnikova	- BarcelonaTech), Lluís Gil	assess technical, regulatory	Kitamura (Tokyo University	(Defence Science and
In this work the macroscop-	(Institute of Advanced	of Kaiserslautern),	Elena Sitnikova (University			(University of Nottingham)	(Universitat Politècnica de	and economic feasibility of	of Science), Hirhoshi	Technology Organization),
ic stiffness response of a	Manufacturing Technology),	Sebastian Schmeer	of Nottingham)		Directional diffusion of		Catalunya - BarcelonaTech),	GRP composite hatch cover	Hatta (Japan Aerospace	Narelle Brack (La Trobe
short thermoplastic com-	Maciej Dyzia (Silesian	(Institute for Composite	_		moisture in composites	A mixed finite element type	Sergio Oller (Universitat	showed that a GRP design	Exploration Agency), Yasuo	University), Erik Thostenson
posite beam during impact	University of Technology),	Materials (IVW GmbH)),	The present paper is the		was studied to measure the	analysis, involving solid,	Politècnica de Catalunya	was feasible and had equiv-	Kogo (Tokyo University of	(University of Delaware)
at various temperatures is evaluated experimentally	Lucyna Jaworska (Institute of Advanced Manufacturing	Frank Balle (University of Kaiserslautern), Ulf	implementation of previous		diffusivity in all directions, and a multi-scale modelling	thin shell elements and	- BarcelonaTech), Carlos A. Felippa (Center for	alent fire safet	Science)	This research based on a
and supported by simu-	Technology)	Paul Breuer (Institute for	CDM theory with necessary extension, which further		approach was developed to	their coupling has been de- velop to reduce the cost of	A reippa (Center Ior Aerospace Structures-		Pulse phase thermography	novel processing technique
lations.	reciniology)	Composite Materials (IVW	develops the theoretical		predict these diffusivities.	modelling large composite	University of Colorado at		(PPT) is one of the infrared	to hybridize carbon nano-
lationo.	The effects of addition	GmbH))	model for UD composites			structures under impact	Boulder)		thermography techniques.	tubes with advanced fibers
	silicon carbide on the phase		into a functional material			loading,	boundory		we tried to improve of	to prepare multifunctional
	composition, crystallite size,	A carbon and steel fiber	subroutine for FEA.			-	This work deals with		detection of defect in the	composites, with focusing
	microstructure, residual	reinforced epoxy is investi-					modeling the effect of		concrete structures using	on characterizing inter-
		gated. Tests are conducted					low-velocity impact damage		PPT with the heating by the	phases.
	mechanical properties on	on coupons with different					upon the vibration response		halogen lamp.	
	aluminum matrix alloy were	metal fiber volume fractions					of CFRP laminates through a			
	investigated.	to demonstrate the electrical and mechanical material					micro-mechanical descrip- tion of the induced internal			
		potentials.					damage.			
4311-2 ELECTROSTATIC	4312-2 MECHANICAL	4313-2 DURABILITY OF	4314-2 REPRESENTING	4315-2 IN-PLANE SHEAR	4316-2 ESTIMATION OF	4317-2 IMPACT	4318-2 MULTISCALE	4319-2 EFFECT OF	4320-2 MONITORING	4321-2 THREE-
ADHESION FOR ADDED		FLAX-BASALT HYBRID	MATRIX CRACKS THROUGH		THE EFFECT THAT SPACE	PERFORMANCE OF		FLEXIBILITY ON THE	AND REPAIR TECHNIQUE	DIMENSIONAL PRINTING
FUNCTIONALITY OF	EVALUATION OF IN-	COMPOSITES FOR MARINE	DECOMPOSITION OF THE	FIBER REINFORCED	ENVIRONMENT ROAD	COMPOSITE SANDWICH	STRUCTURES	PERFORMANCE OF	FOR INTERFACIAL DE-	OF POLYVINYLIDENE
<b>COMPOSITE STRUCTURES</b>	SITU TITANIUM MATRIX	APPLICATIONS	DEFORMATION GRADIENT	THERMOPLASTIC	GIVES IN THERMAL AND	STRUCTURE UNDER HIGH	Roberta Massabo (University	POLYMERIC FOAMS	BONDING IN CARBON	FLUORIDE-
Callum Heath (University of	COMPOSITE PROCESSED	Vincenzo Fiore (University of	TENSOR IN CONTINUUM	COMPOSITES BY USING	MECHANICAL PROPERTY	VELOCITY IMPACT	of Genova), Marco Pelassa	IN SANDWICH	FIBER REINFORCED	BARIUM TITANATE
	BY SEVERE PLASTIC	Palermo), Tommaso Scalici	DAMAGE MECHANICS	V-NOTCHED SPECIMEN	OF CFRP	Long Yu (Imperial	(University of Genova)	CONSTRUCTION HULL	THERMOPLASTICS BY	NANOCOMPOSITE
of Bristol), Kevin Potter	DEFORMATION	(University of Palermo),	METHODS	AND DIGITAL IMAGE	<u>Satomi Asai</u> (Japan	College London), Iman		PANELLING UNDER	MEANS OF INDUCTION	SENSORS
(University of Bristol)	Weijie Lu (Shanghai	Luigi Calabrese (University	Frank Leone (NASA Langley	CORRELATION	Aerospace Exploration	Mohagheghian (Imperial	The influence of interfa-	SLAMMING LOADS	HEATING	Sampada Bodkhe (Ecole
An avanuious of the notan	Jiao Tong University), Yuonfai Han (Shanghai	of Messina), Antonino	Research Center)	Takashi MURAKAMI	Agency ), Ken Goto (Japan	College London), Bamber	cial imperfections on the	Tom Allen (Unviersity of	Takushi Miyake (Gifu	Polytechnique de Montreal), Daniel Therriault (Ecole
An overview of the poten- tial use of Electrostatic	Yuanfei Han (Shanghai Jiao Tong University),	Valenza (University of Palermo), Giuseppe La Bella	Presentation and demon-	(Shimadzu Corporation), Tuyoshi MATSUO (Tokyo	Aerospace Exploration Agency), Satoshi Yoneyama	Blackman (Imperial College London), John Dear	dynamic characteristics of multilayered plates is	Auckland), Mark Battley (University of Auckland)	University), Kazuya TAKENAKA (Gifu University)	Polytechnique de Montreal),
adhesion, as a reversible	Jiuxiao Li (Shanghai Jiao	(University of Messina)	stration of a new means	University)	(Aoyama Gakuin University),	(Imperial College London)	studied using a multiscale	(Oniversity of Ademand)		Frederick Gosselin (Ecole
attachment mechanism, to	Tong University), Guangfa	(and a solid of modeling)	of tracking matrix crack		Shuichi Arikawa (Aoyama	(	approach which couples a	This paper explores exper-	A novel method for monitor-	Polytechnique de Montreal)
introduce variable stiffness	Huang (Shanghai Jiao	In the present paper a	orientations in continuum	In-plane shear properties	Gakuin University),	The energy absorption for	single-layer theory and a	imentally how the stress	ing and repair the interfacial	
capability into FRP sandwich		study on the influence of	damage mechanics material	of carbon fiber reinforced	Satoshi Kobayashi (Tokyo	uniform and graded foam	cohesive-crack model.	state in polymeric foam	debonding in injection mold-	A novel fabrication approach
structures	lv (Shanghai Jiao Tong	basalt fibre layers on aging	models for use in progres-	thermoplastic composites	Metropolitan University)	core composite sandwich		cores varies as a result of	ed CFRTP parts was pro-	to create 3D piezoelectric
	University)	durability under salt spray	sive damage analysis finite	(CFRTP) were investigated		structures was investigated		flexibility in hull paneling	posed with MHz-frequency	polyvinylidene fluoride
	to all constructions and	exposition of flax/epoxy	element models.	by the digital image corre-	This study searches relation	under low and high velocity		during water impacts.	induction heating which	(PVDF) – barium titanate
	In situ synthesized titanium	laminates is presented		lation (DIC) analysis under	of damage of laminate	impact by using drop-weight			enable to heat carbon fibers	(BaTiO3) nanocomposite
	matrix composite with a strongly clustered TiB fibers			the V-Notched Rail Shear Method.	by thermal cycle and the changes in Young's modulus	tower and gas gun.			very rapidly.	sensors by solvent-cast 3D printing is presented.
	and TiC particles distribution				and CTE of CFRP laminate					printing is presented.
	is successfully subjected				by experimental obser-					
	to equal channel angular				vations.					
	pressing.									
	r									

Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
<ul> <li>4301-3 EFFECT OF TEMPERATURE AND CLEARANCE ON SHEAR CUTTING BEHAVIORS IN CFRP LAMINATES <u>Keiji Ogi</u> (Ehime University), Shigeki Yashiro (Shizuoka University)</li> <li>The purpose of the present study is to optimize the shea cutting conditions (tempera- ture and clearance) of ther- mosetting and thermoplastic CFRP cross-ply laminates.</li> </ul>	4302-3 PREPARATION AND PROPERTIES OF CNTS WEB/ EXOXY COMPOSITES Lulu Shen (Tongji University), Ling Liu (Tongji University) In the present study, the car- bon nanotube (CNT) buckypa- pers (BPS) were prepared by positive pressure filtering pro- r cess and then were infiltrated with epoxy resin by using of improved preparation proce		4304-3 EVALUATION OF SELF-HEALING PERFORMANCE IN EPOXY/ GLASS FIBER COMPOSITES MANUFACTURED USING VARTM Siddharth Dey (University of Massachusetts Lowell), Christopher Hansen (University of Massachusetts Lowell) Resin solvent healing using pre-synthesized solvent loaded double shell walled microcapsules is investigated for implementation into epoxy-based fiber-reinforced composite materials.	4305-3 DEVELOPMENT OF NOVEL SILK FIBROIN-MAGNETITE BIOCOMPOSITES FOR TISSUE ENGINEERING Catalin Zaharia (University Politehnica of Bucharest), Paul Stanescu (University Politehnica of Bucharest), Bianca Galateanu (University of Bucharest), Mihaela- Cristina Bunea (University Politehnica of Bucharest), Eugenia Vasile (University Politehnica of Bucharest) The goal of this paper is to develop a novel magnetic bio- composite scaffold made of Bombyx mori silk fibroin and magnetite nanoparticles for wound dressing applications.		4307-3 MODELLING ELASTICITY OF INJECTION MOULDED SHORT FIBRE REINFORCED POLYMERS: COMPARISON BETWEEN EXPERIMENTAL AND ANALYTICAL APPROACHES Andrea Bernasconi (Politecnico di Milano), Edoardo Conrado (Politecnico di Milano), Francesca Cosmi (Università desgli Studi di	4308-3 COMPRESSIVE PROPERTIES OF NATURAL FIBRE COMPOSITES Aart Willem Van Vuure (KU Leuven), Joris Baets (KU Leuven), Kimberly Wouters (KU Leuven), Kevin Hendrickx (KU Leuven) Compressive properties of 3 different uni-directional natural fibre composites have been evaluated, based on flax, bamboo and coir fibres. Compressive properties reach 60-80% of tensile properties.	4309-3 ECO-EFFICIENCY EVALUATION ON THE WASTE TREATMENT OF CARBON FIBRE REINFORCED POLYMER Xiang Li (The University of Nottingham), Jon McKechnie (The University of Nottingham), Ruibin Bai (The University of Nottingham) Life cycle costing and environmental assessment methods are applied in this	4310-3 TENSILE STRENGTH OF PAN- BASED CARBON FIBRES
<ul> <li>3:00 4301-4 MICRO-MECHANIC, MODEL AND MATERIAL REMOVAL MECHANISM OF MACHINING CARBON FIBEI REINFORCED POLYMER COMPOSITE Bin Niu (Dalian University of Technology), Rui Yang (Dalia University of Technology)</li> <li>The present paper studies th material removal mechanism of machining composites by micro-mechanical model, ar analytically derives cutting forces based on a two-parar eter elastic foundation bear</li> </ul>	FUNCTIONALIZATION AND ADDING METHOD OF CARBON NANOTUBE ON INTERLAMINAR PROPERTY OF CARBON FIBER/EPOXY COMPOSITE Mengsi Zhang (Beihang University), Yizhuo Gu (Beihang University), Yujiao Fan (Beihang University), Yujiao Fan (Beihang University), Min Li (Beihang University), Shaokai Wang (Beihang University), Zuoguang Zhang (Beihang University)		4304-4 TOUGH, 4304-4 TOUGH, BIOCOMPOSITES USING SILK AND NANOCELLULOSE FIBERS: TOUGHENING, INTERFACE MODIFICATION AND NEW MULTIFUNCTIONAL INTERFACE IMAGING PROBES Jeffrey Gilman (NIST), Jeremiah Woodcock (Georgetown University), Fritz Vollrath (Oxford University), Chelsea Davis (INST), Ning Chen (Georgetown University), Chelsea Davis (INST), Ning Chen (Georgetown University), Chelsea Davis (INST), Ning Chen (Georgetown University), Stephan Stranick (NIST), Ryan Beams (NIST), J. Alexander Liddle (NIST), J. Alexander Liddle (NIST), J. Jakacui (University of Maryland), Danielle Grolman (University of Akron), Alamgir Karim (University of Akron), Muzhou Wang (NIST), Darshil Shah (Oxford University) We will describe the surface functionalization methods developed to demonstrate new mechanically-activatable fluorescent probes (mech- anophores) and UV/water		4306-4 PROCESS MONITORING OF GLASS REINFORCED POLYPROPYLENE LAMINATES USING FIBER BRAGG GRATINGS Matthieu Mulle (King Abdullah University of Science and Technology (KAUST)), Husam Wafai (King Abdullah University of Science and Technology (KAUST)), Arief Yudhanto (King Abdullah University of Science and Technology (KAUST)), Gilles Lubineau (King Abdullah University of Science and Technology (KAUST)), Warden Schijve (SABIC), Nikhil Verghese (SABIC) The hot press process of glass reinforced polypropyl- ene is monitored with FBGs. UD0 and UD90 laminates are investigated for 2 cooling rates. Transition phases, residual strains and CTEs are estimated.	4307-4 A NOVEL TECHNOLOGY FOR SHORT FIBER REINFORCED COMPOSITE – DFFIM- <i>Ryosuke Nakaa (Kyoto</i> <i>Institute of Technology)</i> It is found that the CFRP made of carbon prepregs which impregnated nylon 66 resin in advanced had better bonding properties based on the tensile test and detailed SEM observations.	4308-4 CONDUCTIVE AND STRONG NANOCOMPOSITES BASED ON NANOFIBRILLATED CELLULOSE AND CARBON NANOTUBES Alireza Hajian (KTH Royal Institute of Technology) Single-wall carbon nanotubes can be dispersed with the aid of cellulose nanofibrils in aqueous medium and the dispersions can be utilized into making highly conductive nanocomposites.	4309-4 SUSTAINABLE AND RECYCLABLE THERMOPLASTIC SIZING BASED ON AQUEOUS DISPERSION Aurelie Malho Rodrigues (Laboratoire des IMRCP), Sophie Franceschi (Laboratoire des IMRCP), Emile Perez (Laboratoire des IMRCP), Isabelle Giraud (Institut Carnot CIRIMAT- Physiques des polymères), Eric Dantras (Institut Carnot CIRIMAT - Physiques des polymères), Colette Lacabanne (Institut Carnot CIRIMAT - Physiques des polymères) This work will illustrate how we succeeded to optimize, by QSPE method and ar- tificial neural network, an eco-friendly (REACH) aqueous dispersion for thermoplastic sizing at industrial scale.	4310-4 INVESTIGATION OF THE STATISTICAL DISTRIBUTIONS OF FRACTURE STRENGTHS FO FLAX FIBERS USING THE TOW TESTING TECHNIQUE Jacques Lamon (CNRS/ENS) Mohamed R'Mili (INSA LYON

## Thursday 23 July · Scientific programme

Meeting room 5	Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8
4311-3 ADAPTIVE	4312-3 TENSILE STRESS-		4314-3 DAMAGE	4315-3 DIGITAL IMAGE	4316-3 EFFECTS OF	4317-3 THE LOW VELOCITY	4318-3 NUMERICAL	4319-3 DESIGN	4320-3 DELAMINATION	4321-3 DEVELOPMENT OF
MULTIFUNCTIONAL	STRAIN BEHAVIOUR	COMPOSITES FOR HIGH	EVOLUTION DURING HIGH-	CORRELATION AND FINITE	TEMPERATURE ON STATIC	IMPACT RESPONSE OF	MODELS WITH LAYERED	AND ANALYSIS OF A	DETECTION IN LAMINATED	EXTREME-ENVIRONMENT
MATERIALS FOR ADDITIVE	OF MULTIAXIAL METAL	TOUGHNESS	TEMPERATURE OXIDATIVE	ELEMENT ANALYSIS	AND FATIGUE STRENGTH	SANDWICH STRUCTURES	ELEMENTS FOR NOMEX	COMPOSITE PATCH	GLASSY POLYMERS AND	ELECTRONIC
LAYER MANUFACTURING	MATRIX COMPOSITES	<u>H Daniel Wagner</u> (Weizmann		APPLIED TO FIBER-	OF WIND TURBINE	WITH GRADED FOAM	HONEYCOMB CORE UNDER	REINFORCEMENT	POLYMERIC COMPOSITES	INTERFACES THROUGH
Richard Trask (University	Gerald Watt (University	Institute of Science)	Kishore Pochiraju (Stevens	REINFORCED COMPOSITES		CORES	FLATWISE COMPRESSION		BY MEANS OF STRAIN	A COMBINATORIAL
of Bristol), Marc Scholz	of Surrey), Stephen Kyle-		Institute of Technology),	AT THE MICRO-SCALE	Sibrand Raijmaekers	Jin Zhou (University of	Longquan Liu (Shanghai	APPLICATION CASE	SOLITONS	MATERIAL OPTIMIZATION
(University of Bristol), Tom	Henney (TISICS Ltd), Andy		Jianyong Liang (Stevens	Mahoor Mehdikhani (KU	(Knowledge Centre WMC).	Liverpool), Zhongwei Guan	Jiao Tong University), Hai	Pablo Yarza (AIMEN-	Irina Semenova (loffe	AND ADDITIVE MATERIAL
Llewellyn-Jones (University	Crocombe (University of		Institute of Technology)	Leuven), Mohammadali	luri Rocha (Knowledge	(University of Liverpool),	Wang (Shanghai Jiao Tong	Technology Center), Arijana	Physical Technical Institute),	DEPOSITION APPROACH
of Bristol), Laura Beckett	Surrey), Stephen Ogin			Aravand (KU Leuven), Baris	Centre WMC), Rogier Nijssen		University), Zhongwei Guan	Milat (as2con), Tomislav	Galina Dreiden (loffe	Thomas Reitz (The United
(University of Bristol), Robert	(University of Surrey)		A high-resolution	Sabuncuoglu (KU Leuven),	(Knowledge Centre WMC)	University of Science-	(University of Liverpool)	Tomac (as2con), Giovanni	Physical Technical Institute),	States Air Force Research
Allen (University of Bristol),			chemo-mechanics-damage	Michaël G. Callens (KU	, , ,	Technology and Research	,	Risso (CETENA)	Alexander Samsonov (loffe	Laboratory), Evan Thomas
Bruce Drinkwater (University	A review of the ambient		model is used to predict the	Leuven), Stepan V. Lomov	The effect of temperature on	(KUSTAR)), Wesley Cantwell	Different modelling methods		Physical Technical Institute)	(University of Dayton
of Bristol)	temperature tensile stress-		degradation of high-tem-	(KU Leuven), Larissa	the mechanical behaviour of		of the Nomex honeycomb	The aim of this study was		Research Institute), Kevin
,	strain behaviour of uniaxial		perature polymer matrix	Gorbatikh (KU Leuven)	wind turbine composites is	Science-Technology and	sandwich structures under	to find the optimal configu-	The paper presents an	Yost (The United States Air
	and multiaxial metal matrix		composites under long-term		evaluated. Damage mech-	Research (KUSTAR))	flatwise compression were	ration of a composite patch	approach aimed for delam-	Force Research Laboratory),
	composites and a simple		thermo-oxidative aging	The application of mi-	anisms, such as physical		proposed and developed	for a marine application	ination detection in layered	Jared McCoppin (National
	model to predict non-linear		conditions.	cro-scale DIC to fiber-re-	ageing and thermal stresses	The low velocity impact	based on the structural	case, whose objective is	structures made of glassy	Research Council)
	tensile behaviour.			inforced composites is	are described and analysed.	response of sandwich struc-	features of the Nomex hon-	to increase fatigue life of	polymers and composites	
				explored. Validating against		tures with graded foams	eycomb cell walls.	a typical detail of balcony	based on the propagation	Homogeneous and het-
				FEA, it shows promises for		cores have been investi-		opening.	and optical detection of bulk	erogeneous tape casts of
				further mechanical investi-		gated both experimentally			strain solitons.	Nb-doped CaMnO3 were
				gation at the micro-scale.		and numerically. Sandwich				fabricated into multilayer
						structures, based on graded				piles as a strategy to sup-
						foams, were fabricated				press phonon transport and
										enhance the bulk thermoe-
										lectric properties at high T.
4311-4 STIMULI	4312-4 IN-SITU THERMAL	4313-4 STEEL	4314-4	4315-4 DATA-RICH	4316-4 GAMMA	4317-4 INVESTIGATION		4319-4 RETROFITTING THE	4320-4 THE	4321-4 NANOSPRING
RESPONSE, STRUCTURAL	STRESS MEASUREMENT	FOIL REINFORCED	MICROMECHANICAL	CHARACTERISATION OF	IRRADIATION AGING	ON THE ENERGY		SUPERSTRUCTURE OF A	CHARACTERISATION OF	FILMS FOR
RECONFIGURATION, AND	OF TUNGSTEN FIBER	COMPOSITES: STUDY OF	STUDY OF	DAMAGE PROPOGATION IN	OF BASALT FIBER	ABSORPTION CAPABILITY		LARGE PASSENGER SHIP	NOTCHED 3D WOVEN	MULTIFUNCTIONAL
PROPERTY CONTROL IN	REINFORCED TITANIUM	STRENGTH, PLASTICITY	UNIDIRECTIONAL	COMPOSITE MATERIALS	REINFORCED COMPOSITES	OF COMPOSITE CRASH-		USING COMPOSITES - A	COMPOSITES USING	INTERFACES
CROSS-LINKED POLYMER	<b>COMPOSITE BY HIGH-LOW</b>	AND PLY SIZE EFFECTS	HIGH FIBER CONTENT	AFTER INTERMEDIATE	Ran Li (Beihang University)	BOX WITH RECYCLABLE		DEMONSTRATION	THERMO-ELASTIC STRESS	Ryan Mott (University
Michael Aldridge (University	TEMPERATURE X-RAY	Kunal Masania (University	COMPOSITE UNDER	STRAIN RATE LOADING		THERMOPLASTIC		Vasileios Karatzas (Technical	ANALYSIS AND DIGITAL	of Illinois at Urbana-
of Michigan), Katherine	DIFFRACTION	of Applied Sciences	TRANSVERSE	Janice Dulieu-Barton	Gamma irradiation aging	MATERIAL		University of Denmark),	IMAGE CORRELATION	Champaign), <u>Ioannis</u>
Sebeck (University of	<u>Masayuki Nishida</u> (Kobe		COMPRESSIVE, TENSILE	(University of Southampton),	of E-glass fiber reinforced	Simonetta Boria (University		Niels Hjørnet (Niels Hjørnet	Paul Cunningham	Chasiotis (University
Michigan), Weimin Wang	City College of Technology),		AND SHEAR LOADINGS	Gary Battams (University of	epoxy matrix composite is	of Camerino), Alessandro		Yacht Design), Christian	(Loughborough University),	of Illinois at Urbana-
(University of Michigan),	Taisei Doi (Student of		<u>Hai Qing</u> (Nanjing	Southampton)	investigated in this study.	Scattina (Politecnico di		Berggreen (Technical	Shuo Dai (Loughborough	Champaign)
Andrew Bielawski	Advanced Course-Kobe	Applied Sciences and Arts	University of Aeronautics &		The composite were treated	Torino)		University of Denmark)	University)	
(University of Michigan),	City College of Technology),	Northwestern Switzerland),	Astronautics)	A novel methodology for	with a 60Co gamma irradi-					10-micron high Cu nanos-
John Kieffer (University of	Tatsuya Matsue (Niihama	Daniel Stefaniak (German		simultaneously capturing	ation dose up to 2.0MGy-	Starting from information		The superstructure of a	The paper is concerned with	pring films were studied for
Michigan)	National College of	Aerospace Centre ), Clemens		DIC and TSA IR image data	Ran Li	obtained in the first exper-		RoPax ferry has been re-	the investigation of notched	their mechanical compliance
	Technology), Takao	Dransfeld (University of	developed to perform more	from CFRP specimens		imental tests, the energy		designed using composite	versus un-notched strength	and reversible compressi-
Structural developments in	Hanabusa (The University of		detail theoretical analysis	during fatigue loading is de-		absorption capacity of ther-		materials and the new	using DIC, and the fatigue	bility as a function of seed
spatially confined epoxy-	Tokushima)	Northwestern Switzerland)	on the stress transfer	scribed and validated iusing		moplastic impact attenua-		design has been compared	damage progression using	spacing that varied in the
based materials systems			between fibre and matrix,	X-ray CT.		tors made as thin wall tubes		to the existing steel super-	TSA, of two 3D woven com-	range of 2000-3200 nm.
have been investigated	The thermal residual stress	Steel foil and carbon fibre	and distributions of stress,			of circular cross section is		structure.	posite specimen types.	
using a combination con-	alteration of W/Ti composite		strain and displacement in			investigated				
current Raman and Brillouin	was estimated by the	studied using ply level hy-	composites.							
scattering experiments and	x-ray diffraction with the	bridisation and thin plies to								
atomistic simulations.	cryogenic cooling system,	delay onset of damage circa								
	temperature from 25oC to	30%; failure modes varied								
	-250 oC	significantly with laminate								
		composition.								

	Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
16:40	4401 Processing - Manufacturing Technology 13	4402 Nano Composites 13	4403 Sandwich Structures and Materials 3	4404 Multifunctional Composites - Self-Healing and Bio-inspired Designs 4	4405 Applications - Bio & Medical 3	4406 Experimental Methods for Process Characterisation 5	4407 Textile-Based Composites and Fibre Architecture 10	4408 Biocomposites 12	4409 Recycling of Composites and Sustainability 4	4410 Fibres 3
16:40	4401-1 ECO-EFFICIENTLY CURED AND HALOGEN FREE FIRE RETARDANT COMPOSITES Frederik Goethals (Centexbel), Myriam Vanneste (Centexbel), Ralf Lungwitz (STFI), Martina Janickova (Inotex), Jan Marek (Inotex) Eco-efficiently cured and hal- ogen-free fire retardant com- posites are obtained by using UV-curable fire retardant oligomers as matrix material and glass UD fabrics as fibre reinforcement.	MULTI-FUNCTIONAL NANOCOMPOSITES FILLED WITH CARBON BASED NANOMATERIALS Soon Hyung Hong (Korea	4403-1 VIRTUAL TESTING OF FOLDCORES MADE OF POLYETHYLENE TEREPHTHALATE Yong Hao (Shenyang Engine Design & Research Institute), Shixi Zang (Shanghai Jiao Tong University), Xiuhua Chen (Shanghai Jiao Tong University), Hai Wang (Shanghai Jiao Tong University) Zhong You (University) of Oxford), <u>Xiang</u> Zhou (Shanghai Jiao Tong University) A virtual test method based on the dynamic finite element simulation was developed to simulate the mechanical properties of polyethylene terephthalate foldcores.	4404-1 OPTIMISED VASCULAR SYSTEMS FOR THE IN-SITU REPAIR OF COMPOSITE T-JOINTS Jack Cullinan (University of Bristol), Michael Wisnom (University of Bristol), Ian Bond (University of Bristol), Ian Bond (University of Bristol) Presentation on the use of vascules (micro-channels) to repair complex composite structures in-situ. Preliminary work on the potential of Cyanoacrylate for composite repairs has also been pre- sented.	4405-1 BIOMIMETIC ORGANIC-INORGANIC COMPOSITE COATINGS FOR BIOINERT METAL IMPLANTS USED IN ORTHOPEDICS AND DENTISTRY. PREPARATION AND CHARACTERIZATION Helga Euredi Milhofer (the Hebrew University of Jerusalem), Alon Elyada (the Hebrew University of Jerusalem), Maja Dutour Sikiric (Rudjer Boskovic Institute), Ronald Schade (Institute), Ronald Schade (Institute), Ronald Schade (Institute), Ronald Schade (Institute), Ronald Schade (Institute), Ronald Schade (Institute for Bioprocessing and Analytical Measurement Techniques (ibal), Steffi Grohmann (Institute for Bioprocessing and Analytical Measurement Techniques (ibal), Klaus Liefeith (Institute for Bioprocessing and Analytical Measurement Techniques (ibal), Nissim Garti (the Hebrew University of Jerusalem), Herbert P. Jennissen (University of Duisburg-Essen) Organic-inorganic composite coatings - polyelectrolyte multilayers with CaP - were prepared on glass and Ti sur- faces. Calcification increases the mechanical stability and	4406-1 CHARACTERISATION OF RESIN DEGREE OF IMPREGNATION OF OUT-OF- AUTOCLAVE PREPREG Marc Palardy-Sim (McGill University), Pascal Hubert (McGill University) Investigation of three methods used to characterize the initial degree of impregnation of out-of-autoclave prepreg: micro-CT, water pick-up, and active thermography.		4408-1 ADVANCED BIOCOMPOSITES MADE FROM METHACRYLATED EPOXIDIZED SUCROSE SOYATE RESIN REINFORCED WITH FLAX FIBERS Ali Amiri (North Dakota State University), Chad Ulven (North Dakota State University), Dean Webster (North Dakota State University) Flax fiber composites were processed with a Methacrylated Epoxidized Sucrose Soyate (MESS) resin and properties were com- pared agains those of Flax/ Vinyl Ester resin composite.	WITH VIRGIN AND RECYCLED CARBON FIBRES Marco Luigi Longana	4410-1 EVOLUTION OF CRYSTALLINE PARAMETERS DURING STABILIZATION OF POLYACRYLONITRILE FIBERS <u>Ray Frenzel</u> (University of Augsburg), Judith Moosburger-Will (University of Augsburg), Siegfried Horn (University of Augsburg) Textile polyacrylonitrile fibers showing different effective di- ameters were stabilized under air. The evolution of crystalline parameters of these fibers during stabilization was in- vestigated.
	PRODUCE U200 PROFILES BY PULTRUSION Joao Pedro Nunes (Polymer Engineering Dept / Minho University), David Melo (Minho University), Miguel Vasconcelos (VIDROPOL SA) This work concerns the study and optimisation of the production of U200 GRP pultrusion profiles. A steel	4402-2 POLY (VINYLIDENE FLUORIDE)/MULT-WALLED CARBON NANOTUBE COMPOSITES: POLYMORPHS TRANSFORMATION INDUCED DUCTILITY Xuelong Chen (Nanyang Technological University), Ming Yin (Nanyang Technological University) Unexpected largely enhanced ductility was achieved in PVDF/CNTs composites and mechanism was explored. It is believed the phase trans- formation and CNTs pinning are responsible for this phe- nomenon.	WITH CHOPPED FIBER REINFORCEMENT UNDER IN- PLANE COMPRESSION Shiyong Sun (Dalian University of Technology), Lingbing Xing (Dalian University of Technology), Jin Wang (Shenyang Aircraft Design & Research Institute), Xiaoshan Xu (Dalian University of Technology) The experimental test and finite element model are	HEATING UPON MAGNETIC	4405-2 BIOMIMETIC IMPLANT COATINGS FOR LOCAL DELIVERY OF GROWTH FACTORS AND ANTIBIOTICS Steffi Grohmann (Institute for Bioprocessing and Analytical measurements (iba)), Manuela Menne (Institute for Bioprocessing and Analytical measurements (iba)), Klaus Liefeith (Institute for Bioprocessing and Analytical measurements (iba)) The most challenging issues with bone implants i) stable osseointegration and ii) prevention of a possible implant-associated infection are adressed with a bioactive, biomimetic nano-coating.	4406-2 PRACTICAL DEMONSTRATION OF FIBRE EVANESCENT WAVE SPECTROSCOPY FOR CURE MONITORING POLYMER MATRIX COMPOSITES USING NOVEL H3-GLASS FIBRES. Peter Wilson (The University of Sheffield), Simon Hayes (The University of Sheffield), Russell Hand (The University of Sheffield) The development and practical demonstration of a reinforcing style, evanescent wave, fibre sensor for cure monitoring of epoxy resins.		4408-2 FORMING OF NATIVE STARCH/WOOD COMPOSITES Arnaud Regazzi (CNRS), Maxime Teil (CNRS), Pierre Dumont (CNRS), Barthélémy Harthong (CNRS), Didier Imbault (CNRS), Bobert Peyroux (CNRS), Jean-Luc Putaux (CNRS) This study deals with the manufacturing of starch/ softwood composites made by thermal and ultrasonic compression moulding while preserving the interesting native properties of their constituents	4409-2 RECYCLED GLASS FIBRE/POLYESTER COMPOSITES – PROCESSING AND MECHANICAL CHARACTERIZATION Durai Prabhakaran Rt (University of strathclyde), James Thomason (University of strathclyde) The present article demon- strate the recycling and reuse of waste glass fibre fabrics. The recycled regenerated long glass fibres are impregnated with polyester resin to study the mechanical properties	ALKALI TREATMENT AND CELLULOSE NANOCRYSTALS MODIFICATION Yan Li (Tongji University), Zhongsen Zhang (Tongji University) This study investigated the synergistic strengthening effect of sisal fiber with

Meeting room 5	Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8
4411 Multifunctional	4412 Composites with	4413 Hybrid Composites 3	4414 Simulation of	4415 Digital Image	4416 Dynamic Fracture 3	4417 Impact and Dynamic	4418 Multiscale Modelling	4419 Applications - Civil	4420 Thermography 2	4421 Multifunctional
Composites - Adaptive	Metallic Components 4		Progressive Failure 2	Correlation 3		Structural Analysis 2	of Structures 4	Engineering 3		Composites - Processing
Response and										and Integration 2
Reconfiguration 5										
4411-1 SYNTHESIS AND	4412-1 EFFECT OF	4413-1 CHEMICAL AND	4414-1 FAILURE ANALYSIS		4416-1 PERMISSIBLE	4417-1 OPTIMIZATION	4418-1 INTERLAMINAR	KEYNOTE	4420-1 FULL FIELD	KEYNOTE
CHARACTERIZATION OF	MICROSTRUCTURE	MECHANICAL PROPERTIES	OF NOTCHED FIBER-	OF THE INTERNAL STRAIN	LOW VELOCITY IMPACT	OF AN AUTOMOTIVE	STRESSES IN		INSPECTION OF	
BISMALEIMIDE BASED	CONTROL ON THERMAL	OF CO-CURED HYBRID	REINFORCED COMPOSITE	DISTRIBUTION IN A	DEFECTS IN ORGANIC	COMPOSITE BUMPER	CORRUGATED	4419-1 LONG TERM	COMPOSITE COMPONENTS	4421-1 MULTIFUNCTIONAL
THERMOSET TRIPLE-	AND ELECTRICAL	COMPOSITE/ALUMINIUM	MATERIALS	REINFORCED RUBBER-	INTERLOCK WOVEN	BEAM WITH OPEN	STRUCTURES MADE FROM	RELIABILITY OF CFRP IN	USING NATURAL	MICROVASCULAR
SHAPE POLYMERIC	CONDUCTIVITIES OF CNF/	STRUCTURES	<u>Guangyan Liu</u> (Beijing	MATRIX COMPOSITE	COMPOSITE	SECTION FOR PRODUCTION	ANISOTROPIC MATERIALS	BRIDGE ENGINEERING	FREQUENCY EXCITATION	COMPOSITES
SYSTEM	AL COMPOSITES	Sébastien MERCIER	Institute of Technology),	USING DIGITAL VOLUME	<u>Myriam Kaminski</u> (ONERA),	AND STRUCTURAL	<u>Claudia Thurnherr</u> (ETH	<u>Urs Meier</u> (EMPA-Swiss	Rachael Waugh (University	Scott White (University
<u>Qiwei Zhang</u> (Harbin	<u>Gen Sasaki</u> (Hiroshima	(ONERA), Romain AGUOGUE	Kaili Tang (Beijing Institute	CORRELATION	Adrien Elias (ONERA),	PERFORMANCE	Zürich), Gerald Kress (ETH	Federal Laboratories	of Southampton), Janice	of Illinois at Urbana-
Institute of Technology),	University), Yusuke Omuro	(ONERA), Anne MAVEL	of Technology), Hongchen	Hubert Schreier (Correlated	Frédéric Laurin (ONERA)	<u>Alem Tekalign Beyene</u>	Zürich), Paolo Ermanni (ETH	for Materials Science	Dulieu-Barton (University of	Champaign), Stephen
Yanju Liu (Harbin Institute of Technology), Jinsong	(Hiroshima University), Yongbum Choi (Hiroshima	(ONERA), Pilippe NUNEZ (ONERA)	Bao (Beijing Institute of Technology)	Solutions-Inc.), David Mollenhauer (US Air Force	A two-step simulation ap-	(Politecnico Di Torino), Giovanni BELINGARDI	Zürich)	& Technology), Rolf Brönnimann (EMPA), Peter	Southampton), Simon Quinn (University of Southampton)	Pety (University of Illinois at Urbana-Champaign),
Leng (Harbin Institute of	University), Kenjiro Sugio	(UNLINA)	(iconnology)	Research Laboratory).	proach has been proposed	(Politecnico Di torino), Giada	The present study inves-	Anderegg (EMPA)		Anthony Coppola (University
Technology)	(Hiroshima University),	This paper is related to the	Progressive failure analysis	Andrew Makeev (University	and has consisted in pre-	Falcinelli (Politecnico Di	tigates the influence of	Anderegg (Livit A)	Thermoelastic stress analy-	of Illinois at Urbana-
(connology)	Kazuhiro Matsugi (Hiroshima		of notched composite	of Texas Arlington), Eric	dicting the damage induced		geometry and material ani-	Starting from 1991 pilot	sis and digital image corre-	Champaign), Kevin Hart
This paper concerns the	University)	properties of Aluminium/	laminates was performed by	Jones (US Air Force	by an impact in order to es-	lonnoy	sotropy on the interlaminar	projects with CFRP applica-	lation (DIC) give different but	
synthesis and character-	chinolony)	CFRP hybrid materials. It	introducing surface-based	Research Laboratory), Sirina		GMT bumper beam has	shear and through-thick-	tions have been initiated in	complimentary information.	Urbana-Champaign), Jason
ization of bismaleimide	Fiber direction in CNF/AI	concerns the influence	cohesive contact to model	Safriet (University of Dayton	of the specimen.	been considered for light	ness stress in corrugated	bridge construction. Most	To enable both to monitor	Patrick (University of Illinois
based triple-shape memory	composites by sintering was		the longitudinal splitting.	Research Institute)		weight and better crash	laminates.	noticeable is the Verdasio	cyclically loaded panels	at Urbana-Champaign),
polymers. The author finds	controlled by rolling in order	treatment on the interface		,		worthiness . Open section		Bridge with a sustained	a lock-in DIC approach is	Ryan Gergely (University
it necessary to introduce	to improve the electrical and			A rubber-matrix composite		beam were chosen for		stress of 1610 MPa in the	introduced.	of Illinois at Urbana-
diisocyanate into polymeric	thermal conductibity. These			specimen was investigated		production viability . FE		CFRP cables.		Champaign), Nancy Sottos
system.	propertes was affected by			using digital volume cor-		cross-sectional and ribs op-				(University of Illinois at
	the fiber orientasion, density.			relation to assess bias and		timization has conducted.				Urbana-Champaign), Jeff
				noise from the technique						Moore (University of Illinois
				and compare experimental						at Urbana-Champaign)
				results to strain from finite						0
				element model.						Complex multidimensional
										vascular polymers and com-
										posites are seamlessly fab- ricated by using sacrificial
										material templates based on
										poly(lactide) polymers treat-
										ed with a tin catalyst.
										ou war a an outayou
4411-2 DEVELOPMENT	4412-2 EVALUATION OF	4413-2 FALLING-WEIGHT	4414-2 MODELING OF	4415-2 DYNAMIC	4416-2 AN ASSESSMENT	4417-2 CAI DAMAGE	4418-2 YARN-SCALE			-
OF NOVEL COMPOSITE	ALUMINA AS PROTECTIVE	IMPACT AND POST-IMPACT		ANALYSIS OF ADHESIVELY	OF THE ARAMID FELT	MECHANISM	ANALYSIS OF NOVEL			
SANDWICH STRUCTURES	COATING FOR CARBON	FLEXURAL PERFORMANCE	EFFECTS IN COMPOSITE	BONDED COMPOSITE	HIGH VELOCITY IMPACT	CHARACTERISATION	TEXTILE COMPOSITES			
WITH INTEGRATED	FIBERS IN MAGNESIUM-	OF HYBRID FLAX/CARBON		SINGLE LAP JOINTS	RESISTANCE	Yu Yang (Nottingham	LACKING AN ELEMENTARY			
SHOCK ABSORBING	BASED COMPOSITES	LAMINATES	LOW-VELOCITY IMPACTS.	USING FULL-FIELD	Natalia Dolganina (National	University), Shuguang Li	REPRESENTATIVE			
FUNCTIONALITY	Alfaferi Zainal Abidin	Fabrizio Sarasini (Sapienza	Ana Nieto (Petroleum	MEASUREMENT	Research South Ural	(Nottingham University)	ELEMENT			
Simon Bates (University	(Fraunhofer IKTS), Mario	University of Rome), <u>Carlo</u>	Institute), Fahad Almaskari	TECHNIQUES	State University), Oleg	(nounghan onversity)	Yann Le Cahain (University			
of Bristol), Richard Trask	Krug (Fraunhofer IKTS),	Santulli (Università degli	(Petroleum Institute)	George Crammond	Kudryavtsev (National	Parametric study about	of Bristol-ACCIS (Advanced			
(University of Bristol), lan	Michel Wolf (Technical	Studi di Camerino), Jacopo	, , , , , , , , , , , , , , , , , , , ,	(University of Southampton),	Research South Ural	damage mechanism of	Composites Centre for			
Farrow (University of Bristol)	University Dresden), Rafał	Tirillò (Sapienza University	The results of the effect of	J M Dulieu-Barton	State University), Sergey	CAI reveals multiplicity of	Innovation and Science)),			
, , , , , , , , , , , , , , , , , , , ,	Kozera (Faculty of Materials	of Rome), Teodoro Valente	geometrical properties in	(University of Southampton),	Sapozhnikov (National	delaminations is the major	Dmitry Ivanov (University			
A parametric study to	Science and Engineering	(Sapienza University of	the initiation and propaga-	S W Boyd (University of	Research South Ural State	factor. For CAI stress con-	of Bristol-ACCIS (Advanced			
assess the compressive	Warsaw University of	Rome), Luca Lampani	tion of damage in composite	Southampton)	University)	centration is the main failure	Composites Centre for			
behaviour of 3D printed,	Technology), Martin Knaut	(Sapienza University of	pipes under low-velocity			mechanism.	Innovation and Science))			
thermoplastic polyurethane	(Technical University	Rome), Paolo Gaudenzi	impact are presented and	Full-field evaluation of the	Non-woven needle-punched					
cellular architectures, de-	Dresden), Ingolf Endler	(Sapienza University of	analyzed.	strains in an adhesively	aramid felt "Twaron® Felt		A novel manufacturing			
signed to be integrated into	(Fraunhofer IKTS), Alexander	Rome)		bonded composite single	No.9" impacting by 6.35		technique based on 3D			
energy absorbing sandwich	Michaelis (Fraunhofer IKTS)	Undersial eartheat (O) (floor (C)		lap joint under quasi-static	mm steel ball was studied		printing of liquid resin into a			
panel composites.	Alumino this lower can be	Hybrid carbon(C)/flax (F)		and high rate loading using	numerically and experi-		dry textile reinforcement is			
	Alumina thin layer can be	fiber laminates have been		high speed Digital Image	mentally for better under-		presented. Tensile tests are			
	used as protective coating	investigated under impact		Correlation (DIC).	standing of the main energy		carried out and a pragmatic			
	in the Cf/AZ91 system.	up to 30 J measuring BVID and post-impact flexure and			dissipation mechanisms.		modelling approach is de-			
	No interfacial reaction is observed at the fiber-matrix	considering the respective					veloped.			
	interface and furthermore	merits of CFC and FCF con-								
	the layer promote wetting	figurations.								
	with AZ91.	guidalono.								
	Mu17201.									

(	Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
17:20 4	4401-3 A NEW SYNTACTIC	4402-3 ENHANCED	4403-3 PREDICTION OF	4404-3 SELF COOLING	4405-3 SILKFIBROIN-	4406-3 PERMEABILITY		4408-3 FEEDSTOCK AND	4409-3 A THERMO-	4410-3 USE OF FOAMED
F	FOAM MANUFACTURING	DIELECTRIC PROPERTIES	THE RESIN FILLET SIZE IN	FUNCTIONALITY VIA	CA-P COMPOSITE BONE	MEASUREMENTS AND		PROCESSING EFFECTS	CHEMICAL MODEL FOR THE	POLYPROPYLENE FIBERS
ſ	METHOD AND STUDY ON ITS	IN A THREE-PHASE	CO-CURED HONEYCOMB	VASCULAR CHANNEL HEAT	REPLACEMENT MATERIAL	PROCESS SIMULATION		ON THE PERFORMANCE	MECHANICAL PROPERTIES	<b>TO IMPROVE FIBER/MATRIX</b>
F	PROPERTIES	COMPOSITE INDUCED	SANDWICH STRUCTURES	TRANSIT IN AN EPOXY	FOR GUIDED BONE GROWTH	OF LARGE SANDWICH		OF NATURAL FIBER	OF RECYCLED CARBON	BOND FOR CEMENTITIOUS
		BY MICROSTRUCTURE	<u>Chao Chen</u> (Beihang	MATRIX	Feride Sermin Utku (Yeditepe	STRUCTURES FOR		THERMOSET COMPOSITES	FIBRES	COMPOSITES
	University), Yan Zhao (Beihang		University), Yanxia Li	<u>Brendan Dalton</u> (Ulster	University), Nazan Ebru Aksu	INDUSTRIAL WIND TURBINE		John Wolodko (Alberta	Joseph Heil (University of	Bartolomeo Coppola
		Zhang Zhenchong (BeiHang	(Beihang University), Yizhuo	University ), Edward Archer	(Yeditepe University), Nermin	BLADES		Innovates - Technology	Nottingham), Thomas Turner	(University of Salerno),
	Institute of Aeronautical	University), Yi Zhuo Gu	Gu (Beihang University),	(Ulster University ), Alistair	Yuksel (Yeditepe University)	Allan Roulund Gersborg (LM		Futures)	(University of Nottingham),	Luciano Di Maio (University
			Min Li (Beihang University),	McIlhagger (Ulster University)		Wind Power A/S)				of Salerno), Paola Scarfato
(		Wang (BeiHang University),	Zuoguang Zhang (Beihang		Pure silk fabric, boiled in			In this comprehensive study,	of Nottingham)	(University of Salerno),
		Min Li (BeiHang University),	University)	Vascular polymers have been	NaCO3 was Ca-P coated in 7	Experimental characterization		the mechanical performance	•	Loredana Incarnato (Universit
		Zuo Guang Zhang (BeiHang	The manual and does a	developed via the removal of	sequential immersion steps in	sandwich parts for wind tur-		of various natural fibre		of Salerno), Luc Courard
	a new manufacturing method	University)	The research provides a	sacrificial fibres. Components	Ca and HPO4, pH 7.4. Brushite	bine blades produced with the		thermoset composites is	heat flow and reaction kinet- ics is used to determine the	(University of Liège)
	nvolving syntactic foams.	A novel three-phase compos-	promising way to predict forming quality of honey-	have then been trialled to determine their ability for	crystals, analyzed with XRD, FTIR and SEM were trans-	VARTM process. A poor quan- titative fit with Darcy's law is		compared. The effect of fibre type, fibre processing and	mass loss and thermal profile	For cementitious composite
			comb sandwich structure	temperature control through	formed into HA using ECD.	found which limits the value			of a composite as it under-	materials fiber/matrix bond
			composites and guidance for	dynamic physical testing.	tormed into TIA dailing LOD.	of commercial software.		were investigated. Mechanical		is extremely important. This
				aynamic physical asting.		or commercial contware.		testing results include tensile	good rodyoning.	work is aimed to produce
ľ	5 HUIT 55WI & to 45WI &.	in polyvinylidene fluoride ma-	conditions and control of pro-					strength, tensile modulus,		fibers with improved surface
		trix filled with silicon carbide	cessing quality.					elongation and charpy impact.		roughness produced by foam
		whisker.	coooning quantiti					ciongation and onaipy impact		extrusion process.
17:40		4402-4 HYBRID TOUGHENING OF EPOXY WITH RUBBER AND NANOSILICA PARTICLES: EXPERIMENTS AND	4403-4 EXPERIMENTAL ANALYSIS OF STRESSES IN SANDWICH STRUCTURES DUE TO THE BRAZIER EFFECT	4404-4 SIMULATION OF SIMULTANEOUS REPAIR AND DEGRADATION PROCESSES IN SELF-HEALING MATERIALS		4406-4 COMPARATIVE STUDY ON INTERNAL AND EXTERNAL RELEASE AGENTS – EVALUATION OF PROCESS PARAMETER		4408-4 EXPERIMENTAL EVALUATION OF THE MECHANICAL PROPERTIES OF THE PLA-PAPER COMPOSITE	4409-4 PREPARATION AND CHARACTERIZATION OF LEATHER POLYMER COMPOSITES <u>Meenakshisundaram</u>	
		MODELLING	Carl-Johan Lindholm	Federico Bosia (University of Torino), Nicola Pugno		VARIATION ON DEMOLDING STRESSES		Fernando Ramirez	Omkumar (Colleg of	
		<u>Tasnuva Khaleque</u> (Imperial College London-South	(Diab Sweden AB), Anders T. Johansson (Chalmers	(University of Trento)		Maximilian Schaefer		(Universidad de los Andes), Mateo Jimenez (Universidad	Engineering Guindy), Annamalai Suresh Babu	
		Kensington Campus), Soraia	University of Technology),			(Technical Universitv of		de los Andes)	(College of Engineering	
		Pimenta (Imperial College	Johan Hedlund (DIAB Sweden	In this work we extend previ-		Munich), Swen Zaremba		uc 103 Anucoj	Guindy), Anbiah Jacob Moses	
		London-South Kensington	AB)	ous Hierarchical Fibre Bundle		(Technical Universitv of		In the present work, the	(College of Engineering	
		Campus), Ambrose C. Taylor	, , , , , , , , , , , , , , , , , , ,	models for self-healing to		Munich), Klaus Drechsler		mechanical properties of a	Guindy)	
		(Imperial College London-	Experimental study of curved	more general cases where		(Technical Universtiy of		laminated composite made	.,	
		South Kensington Campus)	sandwich beams using five	tissue growth/degradation is		Munich)		of paper and PLA laminae	This work proposes utilization	
			different grades of core mate-	considered, and derive overall				(PLAPER) were determined	of industrial leather wastes	
		Epoxies modified by different	rial captured several different	mechanical behaviour		The demolding stress is		experimentally, indicating its	such as PVB and milk pouch-	
		contents of nanosilica and	failure modes. Non-linear FEA			investigated dependent on		potential application in many	es to prepare a composite	
		core-shell rubber particles are	agreed fairly well with the			process parameter: amount		areas.	material with Green cost	
						of release agent, temperature			based objectives suiting to	
		characterised. The effect of	test results			of model ourfood numbers of			under a land under a lange and a strategy of the strategy of t	
		plasticity, particle debonding				of mold-surface, number of			various industrial applications	
						of mold-surface, number of demoldings, and the kind of a reinforcement structure.			various industrial applications	

## Thursday 23 July · Scientific programme

Meeting room 5	Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8
4411-3 RESONANCE	4412-3 TAILORABLE	4413-3 FRACTURE AND	4414-3 EFFECT OF	4415-3 AN EVALUATION	4416-3 LOW-VELOCITY	4417-3 UNDERSTANDING		4419-2 FUNCTION		4421-2
TUNING OF RF DEVICES	CERAMIC CONTENT	DAMAGE OF CARBON	FIBRE ORIENTATIONS ON	OF TEST METHODS FOR	IMPACT AND	THE SEQUENCE OF		INTEGRATED ARCH BRIDGE		"MULTIFUNCTIONAL
THROUGH ORIGAMI	ALUMINIUM-MATRIX	NANOTUBE MODIFIED	PROGRESSIVE DAMAGE OF	DETERMINING ADHESIVE	COMPRESSION AFTER	DAMAGE IN COMPLEX		IN A RESOURCE-EFFICIENT		FIBRE-REINFORCED METAL
FOLDING	COMPOSITES BY	HYBRID COMPOSITES	NOTCHED [ /0°/- /90°]S	SHEAR STRESS-STRAIN	IMPACT RESPONSE	HYBRID COMPOSITE-		LIGHTWEIGHT DESIGN		MATRIX COMPOSITES
Kazuko Fuchi (Wright State	SPONTANEOUS	Rico Zeiler (University	COMPOSITE LAMINATES	PROPERTIES	OF THIN PLY BASED	METALLIC STRUCTURES		Enrico Rudolph (Institution		WITH INTEGRATED
Research Institute), Philip	INFILTRATION	of Bayreuth), Zhe Zeng	Muhammad Ridha (National	Kara Storage (Air Force	COMPOSITE LAMINATES	SUBJECT TO OUT-OF-		of Lightweight Structures),		OPTICAL FIBRE SENSORS"
Buskohl (UES-Inc.), Gregory	Matteo Pavese (Politecnico	(University of Bayreuth),	University of Singapore),	Research Laboratory), Brett	Emilio V. Gonzalez	PLANE LOADING USING		Andreas Ehrlich (Institution		Piotr Malczyk (Technische
Reich (Air Force Research	di Torino), Xiang Chen	Dirk-Jacques Dijkstra	Tong Earn Tay (National	A. Bolan (Air Force Research	(Universitat de Girona),	COMPUTED TOMOGRAPHY		of Lightweight Structures),		Universität Dresden),
Laboratory), Richard	(Politecnico di Torino),	(Bayer Material Science AG),	University of Singapore),	Laboratory), Kevin A. Tienda	Albert Soto (Universitat	Trevor Allen (University		Sandra Gelbrich (Institution		Maik Gude (Technische
Vaia (Air Force Research	Claudio Badini (Politecnico	Volker Altstädt (University of	Alan Nettles (NASA)	(University of Dayton	de Girona), José Ramón	of Southampton), Warren		of Lightweight Structures),		Universität Dresden),
Laboratory), James Joo (Air	di Torino), Sara Biamino	Bayreuth)		Research Institute), Jeffrey	Sainz de Aja (Aernnova	Hepples (University of		Meike Röhrkohl (Institution		Jerzy Kaleta (Wroclaw
Force Research Laboratory)	(Politecnico di Torino), Paolo		A progressive damage	A. Smith (University of	Engineering Solutions	Southampton), Philippa		of Lightweight Structures),		University of Technology),
	Fino (Politecnico di Torino)	Carbon nanotubes are add-	simulation method was	Dayton Research Institute),	Ibérica S.A.), Federico	Reed (University of		Lothar Kroll (Institution of		Anna Szczurek (Wroclaw
Investigation of the im-		ed as matrix reinforcement	developed to predict the	David H. Mollenhauer (Air	Martin de la Escalera	Southampton), lan Sinclair		Lightweight Structures)		University of Technology)
pact of origami folding	A spontaneous infiltration	in carbon fiber reinforced	behaviour of [ /0/- /90] lam-	Force Research Laboratory),	(Aernnova Engineering	(University of Southampton),				
patterns on reconfigurable	technique is presented, to	composites produced by	inates with fiber orientation	Kevin H. Hoos (University of	Solutions Ibérica S.A.)	Mark Spearing (University of		Within the scope of a re-		This paper contributes to the
RF devices. Sensitivity of	obtain MMCs with any alloy	resin transfer molding.	varied from 0 to 90 under	Dayton Research Institute)		Southampton)		search project innovative,		understanding of hampering
resonance characteristics of	or preform. The theoretical	Fracture toughness, impact	open-hole tests.		The work presented is			functional integrated, mod-		phenomena occurring
frequency selective surfaces		resistance and damage		This effort evaluated a	an experimental study of	The progression of damage		ular support structures in		during the integration of
to fold angles on tessellated	dated in the AI-TiB2-Si02	tolerance are assessed.		variety of strain measure-	drop-weight impact tests	in a hybrid composite-me-		GFRP sandwich design have		Fibre Optic Sensors in the
structures.	system, and the composites			ment techniques (digital	and Compression After	tallic structure subject to		been developed for the ap-		structure of Metal Matrix
	characterized.			image correlation, moiré	Impact (CAI) tests on thin ply			plication in new lightweight		Composites via casting
				interferometry, and contact	laminates. These tests are	been examined throughout		arch bridges.		processes.
				extensometers) and gener-	performed on two type of	an interrupted quasi-stat-				
				ated comparative adhesive	laminates.	ic-indentation test using				
				property data.		micro-focus CT				
4411-4 TRIPLE-SHAPE	4412-4 DRAWABILITY		4414-4 A LEVEL SET		4416-4 TESTING AND	4417-4 SIMULATION		4419-3 RESPONSE OF FRP-		4421-3 ADDITIVE LAYER
MEMORY EFFECT OF	OF CFRP/HSS HYBRID		MODEL FOR THE		COMPARISON OF ENERGY	OF THE INTERMEDIATE		STRENGTHENED SLENDER		MANUFACTURING
POLYSTYRENE BASED	COMPOSITE MATERIAL		NUMERICAL MODELING		ABSORPTION FOR CRASH	VELOCITY IMPACT		RC COLUMNS UNDER		OF COMPOSITE
POLYMER	Min-Sik Lee (Pusan National		OF COMPOSITES		TUBES WITH DIFFERENT	BEHAVIOUR OF WOVEN		CYCLIC COMPRESSION		COMPONENTS: COMBINING
Wenbing Li (Harbin Institute	University), Sung-Jin Kim		DELAMINATION WITH		FIBRE ARCHITECTURES	COMPOSITE LAMINATES		Ghaithan Al-Amri (King		SHORT FIBRE COMPOSITE
of Technology), Jinsong	(Pusan National University),		NONCONFORMING MESH		AND MATRICES	APPLYING PROGRESSIVE		Saud University), Yousef		FEEDSTOCKS WITH
Leng (Harbin Institute	Ok-Dong Lim (R&D Center-		AND MINIMAL REMESHING		Sindy Engel-Watzek (BMW	DAMAGE MODELS FOR PLIES AND INTERFACES		Al-Salloum (King Saud		CURVED LAYER FUSED
of Technology), Yanju Liu (Harbin Institute of	Autogen), <u>Chung-Gil Kang</u> (Pusan National University)		Elia Picault (Ecole Centrale de Nantes-GeM Institut-UMR		Group), <u>Dirk Lukaszewicz</u> (BMW Group), Christian	Martin Schwab (Vienna		University), Nadeem Siddiqui (King Saud University).		Robert Allen (University of
	(Pusan National University)		CNRS 6183), Patrick Rozycki		Boegle (BMW Group)			Husain Abbas (King Saud		Bristol), Thomas Llewellyn-
Technology)	In this study, the formshility				Dueyie (Divivi Group)	University of Technology), Melopic Techt (Viappa				
In summary, we obtained a	In this study, the formability of the CR340LA/CFRP hybrid		(Ecole Centrale de Nantes- GeM Institut-UMR CNRS		Rectangular CFRP tubes	Melanie Todt (Vienna University of Technology).		University)		Jones (University of Bristol), Richard Trask (University
	composite material is evalu-		6183), Bastien Tranquart		were tested for their energy	Heinz E. Pettermann (Vienna		The available studies on		of Bristol)
new polystyrene-based tri- ple shape memory system,	ated during square cup deep		(Safran Composites)		absorption. Parameters such			FRP-confined slender		
which showed an excellent	drawing by considering the		(ounan composites)		as resin, geometry and lay-	oniversity of recimology)		RC columns under cyclic		Investigations are conducted
triple-shape memory effect	process parameters. The		Progressive delamination		up were studied. The results	A main feature of the pre-		loading are very limited. The		into the potential of con-
and could be potentially	experimental results show		of multilayered composite		show relevant trends for	sented modelling approach		present study investigates		structing short fibre com-
used in sensors and ac-	a decrease		laminates is investigated		effective crash structures.	is that the contributions of		the effect of cyclic com-		posite materials with tai-
tuators.	u uoorouoo		using a level set model with		อกออนพอ อานอก อแนอเนเซอ.	individual failure mecha-		pression on FRP-confined		lored reinforcement through
			nonconforming mesh. The			nisms to the total energy		slender RC columns.		curved layer fused filament
			case of several crack fronts			absorption of the laminate				fabrication (CLFFF).
			evolving simultaneously is			can be quantitatively				
			considered.			predicted.				
			conoraciou.			productou.				

## Scientific programme · Friday 24 July

Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
	erospace technologies: Challenges a		· ·	ry, Ohio, USA					
9:30 5101 Processing - Manufacturing Techn 14	5102 Nano Composites 14 plogy	5103 Sandwich Structures and Materials 4	5104 Fatigue 10		5106 Manufacturing Up- Scaling and Automation 4	5107 Processing - Manufacturing Technology 16	5108 Short Fibre Composites 4	5109 Process Induced Effects 8	5110 Fibres 4
9:30 5101-1 ASSEMBLY MI USED IN MANUFACTU 3D AUXETIC CELLULA STRUCTURES Xintao Wang (Harbin In of Technology), Li Ma ( Institute of Technology Jinshui Yang (Harbin In of Technology), Oi Shi Institute of Technology A novel manufacturing method of one type of 3D auxetic structure w briefly introduced. Neg Poisson's ratio charact the structure was num demonstrated .	RING         PROCESSING TO FORM ELECTRICALLY CONDUCTIVE EPOXY RESIN COMPOSITES USING NOVEL HYBRID CNT- tarbin           tarbin         COATED SILICA PARTICLES Arthur Wilkinson (University of Manchester), Ian Kinloch (University of Manchester), Raja Othman (University of Manchester)           Presents a rheological study of hybrid silica-multiwall CNT particles used to produce conductive epoxy-carbon	5103-1 NUMERICAL MODELLING OF FATIGUE CRACK GROWTH AND ARREST IN SANDWICH BEAMS INCLUDING CRACK STOPPERS Georgios Martakos (Aalborg University), Jens H. Andreasen (Aalborg University), Christian Berggreen (Technical University of Denmark), Ole T. Thomsen (University of Southampton) A novel crack arresting device is implemented in sandwich beams and tested under fatigue loads. An FE model of the set up is used to effec- tively simulate and predict the fatigue life of the specimens.	5104-1 ELECTRICAL MONITORING OF FATIGUE IN CARBON FIBRE REINFORCED COMPOSITES Peter Bailey (Instron) Investigating the variation in electrical resistivity of carbon fibre composites during cyclic loading, with a view to im- proved monitoring of fatigue damage accumulation.		5106-1 ON AN INTEGRATED PROCESS AND MACHINERY CONCEPT FOR ECONOMIC INDUSTRIALIZED PRODUCTION OF HIGHER QUALITY WIND TURBINE ROTOR BLADES Christian Doersch, Oliver Bagemiel (Fraunhofer Institute for Wind Energy and Energy System Technology IWES Northwest) FhG IWES identified by a cost model cost drivers in blade manufacturing. Development of innovative prefoming and blade finish in combination with CAD-CAE-Tools offer high potential for cost reduction.	5107-1 EFFECT OF HEATING CONDITIONS ON MECHANICAL PROPERTIES OF MOLDED PRODUCT IN HYBRID MOLDING Masaki Ohishi (Advanced Fibro-Science-Kyoto Institute of Technology), Tadashi Uozumi (Gifu University Composite Materials Center- Gifu University), Akio Ohtani (Gifu University), Akio Ohtani (Gifu University), Akio Ohtani (Gifu University), Akio Ohtani (Department of Mechanical Engineering Faculty of Engineering Faculty of Engineering-Gifu University) In the hybrid molding, the heating condition and the ejection resin temperature investigated the effect of mechanical properties of the molding articles in the molded parts having rib structure.	5108-1 MICROMECHANICALLY BASED MODELLING OF THE FAILURE BEHAVIOR OF SHORT FIBER REINFORCED POLYPROPYLENE COMPONENTS UNDER IMPACT LOADING Martin Reiter (Johannes Kepler University / IPPE), Michael Jerabek (Borealis Polyolefine GmbH), Zoltan Major (Johannes Kepler University / IPPE)	5109-1 UNDERSTANDING THE FLOW PROPERTIES OF A THERMOPLASTIC- TOUGHENED EPOXY RESIN FILM THROUGH MODEL- BASED ANALYSIS Claudia Creighton (Deakin University), Christian Weimer (Airbus Group Innovations), Patricia P. Parlevliet (Airbus Group Innovations), Bronwyn L. Fox (Deakin University) The through-thickness flow characteristics of a toughened epoxy resin film are modelled for cure cycle optimisation. This presentation also de- scribes the new Carbon Nexus research facility.	air plasma treatment has been performed. Both fibre treatments were compared to
9:50 5101-2 INTERFACIAL PROPERTIES OF CARE FIBER REINFORCED POLYMER LAMINATES JOINED BY A NOVEL PARTIAL CROSS-LINK PROCESS Judith Moosburger-Wii (University of Augsburg), Michael (University of Augsburg), Michael (University of Augsburg), Michael (University of Augsburg), Siegfried H (University of Augsburg), Siegfried H (University of Augsburg), Jochen Scholler (Premi Augsburg), Siegfried H (University of Augsburg), Jochen Scholler (Premi AEROTEC GmbH), Llord Llopart Prieto (Premiur AEROTEC GmbH) The interface region of partially cross-linked a fresh epoxy resin is an by nanoindentation. A match of material prop is found which is favor enhanced bonding qua	MWCNTS ON MECHANICAL RESPONSE OF FILAMENT WOUND CFRP CYLINDERS ING Xiaolong Jia (Beijing University of Chemical (Explored the control of the control (Beijing University of Chemical (Beijing	OF HONEYCOMB CORE SANDWICH COMPOSITES USING THE DCB-UBM TEST Vishnu Saseendran (Technical University of Denmark ), Christian Berggreen (Technical University of Denmark ), Leif Carlsson (Florida Atlantic University)	Liaojun Yao (Delft University		5106-2 EFFECT OF PROCESSING CONDITIONS ON THE QUALITY OF OUT- OF-AUTOCLAVE LAMINATES MADE BY AUTOMATED FIBER PLACEMENT Angi Dong (Concordia University), Suong Hoa (Concordia University), Yan Zhao (Beihang University) The combination of Automated Fiber Placement and Out-of-Autoclave tech- nology can not only increase manufacturing rate but also help deliver parts of superior quality.	5107-2 A NOVEL TOOL FOR CONTINUOUS PROCESSING OF POLYMER-METAL- HYBRIDS Stefan Mörl (University of Bayreuth), Volker Altstädt (University of Bayreuth) The presented design shows a novel tool for the processing of metal-polymer-hybrids. By inserting the metal foil directly into the extrusion die, a com- pletly continuous process has been developed.	5108-2 FINITE ELEMENT ANALYSIS OF LINEAR AND NONLINEAR BEHAVIOR OF SHORT FIBER REINFORCED COMPOSITES Mohamed Amine Tiar (UTC), Hocine Kebir (UTC), Rezak Ayad (URCA), Wajdi Zouari (URCA) Nonlinear projected fiber ap- proach for the analysis of ge- ometric nonlinear behavior of random short fiber reinforced composites based on Total Lagrangian Formulation.	5109-2 HIGH ACCURACY CURE PROCESS SIMULATION OF COMPOSITES BASED ON INTERNAL STRAIN MEASUREMENT Shoma Niwa (The University of Tokyo), Kazunori Takagaki (The University of Tokyo), Shu Minakuchi (The University of Tokyo), Nobuo Takeda (The University of Tokyo) A cure process is determined based on a lot of trial man- ufacture, which is costly and time-consuming. We developed an advanced cure simulation method based on in-situ measurement by FBG sensors.	5110-2 INVESTIGATION OF THE STRENGTH OF THERMALLY CONDITIONED BASALT AND E-GLASS FIBRES Peter Jenkins (University of Strathclyde), Eduardo Sáez-Rodriguez (University of Strathclyde), Liu Yang (University of Strathclyde), James Thomason (University of Strathclyde), Sara Riopedi Méndez (University of Strathclyde) A study of the mechanical properties of epoxy com- posite compatible E-glass and basalt fibres following heat treatment at 300 – 600 °C, and thermal analysis of the degradation of the fibre sizings.

## Friday 24 July · Scientific programme

Meeting room 5	Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8
5111 Multifunctional Composites - Coupled Properties and Multi- physics Models 2	5112 Tribology and Wear	5113 Damage Tolerance of Composite Structures 5	5114 Simulation of Progressive Failure 3	5115 Durability, Creep and Agressive Environment 3	5116 Dynamic Fracture 4	5117 Impact and Dynamic Structural Analysis 3	5118 Applications - Automotive and Rail 3	5119 Applications - Civil Engineering 4	5120 Ultrasound and Acoustic Emission	
5111-1 COMPUTATIONAL DESIGN AND PERFORMANCE ASSESSMENT OF MICROVASCULAR COMPOSITE PANELS FOR BATTERY COOLING Philippe H. Geubelle (University of Illinois), Stephen Pety (University of Illinois), Marcus Tan (University of Illinois), Ahmad Najafi (University of Illinois), Scott R. White (University of Illinois) This collaborative compu- tational and experimental study focuses on the design, manufacture and assess- ment of microvascular composite panels used for the active cooling of Li-ion car batteries.	5112-1 PENETRATION BEHAVIOR OF ELECTROLYTE SOLUTION THROUGH CARBON FIBER REINFORCED THERMOPLASTICS (CFRTP) MATERIAL USING IN AUTOMOTIVE STRUCTURAL APPLICATION Patarapon Palungvachira (Tokyo Institute of Technology), Masatoshi Kubouchi (Tokyo Institute of Technology), Shinsuke Katayama (JFE Techno- Research Corporation), Hiroyuki Ogata (JFE Techno- Research Corporation) In this study, the penetration behavior of water and other electrolytic solution through Carbon Fiber Reinforced Thermoplastics (CFRTP) has been investigated.	Schmid Institute of Materials	5114-1 A PHANTOM- NODE-BASED COHESIVE ELEMENT FORMULATION WITH COUPLED PLASTICITY FOR THE SIMULATION OF ADHESIVE JOINTS Carlos Sarrado (University of Girona), Joris J. C. Remmers (Eindhoven University of Technology), Albert Turon (University of Girona) A new cohesive element for the simulation of adhesive joints is presented. The element is based on the phantom node method and allows the simulation of coupled plasticity and dam- age of the interface.	Ning Jiang (Tongji University-China), Tao Yu (Tongji University-China), Yan Li (Tongji University- China) This paper focuses on the effect of jute fibre on the hy- drolysis of poly(lactic acid) (PLA) in deionized water un- der 60 °C. Water absorption, mechanical properties and so on were characterized.	5116-1 MODELLING OF WOUND, THICK UD COMPOSITES FOR HIGH- SPEED IMPACTS AND SUBSEQUENT DAMAGE EVALUATION Raif Matheis (Forschungsgesellschaft (Kraftfahrwesen mbH), Helmi Murnisya (Forschungsgesellschaft (Kraftfahrwesen mbH), Thomas Johansson (DYNAmore Nordic AB) As a part of a virtual testing methodology for crash anal- ysis, a modelling approach for wound Type IV CNG tanks is proposed that takes several failure mechanisms into account.	5117-1 PERFORMANCE OF COMPOSITE FUSELAGE AFTER MULTI-SITE IMPACTS Spyridon Psarras (Imperial College London), Paul Robinson (Imperial College London), Mazdak Ghajari (Imperial College London), Raul Muñoz (Imperial College London), Lorenzo lannucci (Imperial College London) This research investigates the post-impact behaviour of composite fuselage stiffened panels subjected to multi-site low-velocity impacts by comparing FE models with tests.	5118-1 EVALUATION OF THE STATIC AND DYNAMIC PERFORMANCE OF ALUMINIUM AND COMPOSITE JOINTS FOR RAIL APPLICATIONS Udayanga Galappaththi (University of Nottingham), Mike Johnson (University of Nottingham) Limited knowledge in the area of composite joining technologies acts as a barrier for using modular construction principles for the rail applications. The study is focused to develop aluminium-carbon fibre composite frictional grip joint. This would enable effective use of modular construction principle for composite integration in rail vehicles.	5119-1 FULL SCALE FORM FINDING: INTRODUCING FABRIC MATERIALITY IN FRP FABRICATION FOR ARCHITECTURAL ELEMENTS Arielle Blonder (technion), Yasha Grobman (technion) FRP's (fiber reinforced polymers) unique material properties have led to its wide application across industries in the past dec- ades. Although we witness a growing interest in the material in the archi	5120-1 HYGROTHERMAL EFFECTS ON FATIGUE BEHAVIOR OF NATURAL FIBERS COMPOSITES Kossi Sodoke (Université du Québec à Trois-Rivières), Lotfi Toubal (Université du Québec à Trois-Rivières), Luc Laperrière (Université du Québec à Trois-Rivières) The aim of this work is to determine the influence of hygrothermal ageing on the mechanical proprieties and fatigue proprieties of natural fiber composite specifically of quasi-isotropic flax/epoxy	
5111-2 COMPUTATIONAL AND EXPERIMENTAL STUDIES ON THE TRANSPORT PROPERTIES OF HYBRID NANOCOMPOSITES BASED ON CARBON NANOTUBES AND GRAPHITE NANOPLATELETS Mnasoud Safdari (University of Ilinois at Urbana- Champaign), <u>Marwan</u> <u>Al-Haik</u> (Virginia Tech), M Yousuff Hussaini (Florida State University)	5112-2 WEAR PROPERTIES OF NANO-SI-CARBON/ CARBON COMPOSITES WITH BACTERIAL CELLULOSE AND BAMBOO CHARCOAL ADDITIVE Yoshihito Ozawa (Fukushima University), Hiroki Sato (Fukushima University), Tokio Kikuchi (Fukushima Technology Centre) The fabrication method of SiC/C/C composites with Bacterial Cellulose and Bamboo Charcoal Powder additive and their wear properties were investigated and the effects of SiC addi- tive were discussed.	TOLERANCE OF DISPERSED-PLY LAMINATES Peyman Mouri Sardar Abadi (IMDEA Materials Institute),	5114-2 ANALYSIS OF COMPOSITES USING THE VOXEL FINITE ELEMENT METHOD WITH STRESS AVERAGING Guodong Eang (Harbin Institute of Technology), Stephen Hallett (University of Bristol), Bassam El Said (University of Bristol) Dmitry Ivanov (University of Bristol) The stress averaging tech- nique is an effective method to correct the spurious stresses introduced by the stepped block-liked inter- face at material junctions in voxel finite element models.	AGEING OF GLASS/EPOXY COMPOSITES FOR WIND TURBINE BLADES Juit Bocha (Knowledge Centre WMC), Sibrand Raijmaekers (Knowledge Centre WMC), Rogier Nijssen (Knowledge Centre WMC)	5116-2 INTEGRATION OF SHAPE MEMORY ALLOY WIRES IN FIBER REINFORCED POLYMERS FOR ENDLESS CRASH ABSORBER STRUCTURES Sebastian Nissle (Institute for Composite Materials), Moritz Hübler (Institute for Composite Materials), Sebastian Schmeer (Institute for Composite Materials) Sebastian Schmeer (Institute for Composite Materials) Sebastian Schmeer (Institute for Composite Materials) We present a theoretical extrapolation of the behavior of new hybrid structures under tensile loading, give an estimation of their poten- tial and demonstrate a first experimental validation.	5117-2 EXPERIMENTAL AND NUMERICAL CHARACTERIZATION OF HIGH-VELOCITY IMPACT DAMAGE IN CFRP LAMINATES Shigeki Yashiro (Shizuoka University), Keiji Ogi (Chime University), Akinori Yoshimura (Japan Aerospace Exploration Agency (JAXA)), Yoshihisa Sakaida (Shizuoka University) Mechanisms of damage extension in CFRP laminates due to high-velocity impact will be discussed based on the experiments and predic- tions by smoothed particle hydrodynamics (SPH).	ECS), Otto Bergsma (Delft University of Technology) A new test method is presented to assess the	5119-2 MECHANICAL PROPERTIES AND WATER UPTAKE OFPULTRUDED CARBON FIBER REINFORCED POLYURETHANE PLATES Hong Bin (Ministry of Education), Xian Guijun (Ministry of Education), Li Hui (Ministry of Education), Li Hui (Ministry of Education), Water absorption and ther- mal-mechanical properties of PU resin and pultruded carbon fiber reinforced PU plates were studied through immersion of specimens in distilled water at different temperatures.	5120-2 A REVIEW OF REFERENCE METHODS FOR AUTOMATED ULTRASONIC EVALUATION OF COMPOSITE STRUCTURES Steen Artifred Nielsen (FORCE Technology) The paper discusses auto- mated ultrasonic testing of large composite structures like a wind rotor blade and reviews six different refer- ence methods for evaluating the ultrasonic images.	

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	Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
10:10	5101-3 INTEGRATION OF	5102-3 MECHANICAL	5103-3 IMPACT BEHAVIOUR	5104-3 MODE I FATIGUE		5106-3 NON-CRIMP	5107-3 INFLUENCES OF	5108-3 FLOW	5109-3 INTERNAL STRESS	5110-3 LARGE-
		PROPERTIES AND	OF BIO-INSPIRED	CRACK PROPAGATION OF		TUBULAR PREFORMING	PROCESS PARAMETERS	CHARACTERISTICS OF	AND DAMAGE ASSESSMENT	
1		BIOCOMPATIBILITY	KAGOME SANDWICH	UNIDIRECTIONAL CFRP		WITH AUTOMATION SYSTEM	ON THE MECHANICAL	CARBON FIBRE SHEET	IN THICK EPOXY BY LASER	HIERARCHICALLY
1		OF FUNCTIONALIZED	CORE STRUCTURES	LAMINATE TOUGHENED		AND HIGH PRODUTIVITY	PROPERTIES OF	MOULDING COMPOUNDS	INDUCED SHOCK WAVE:	NANOPOROUS CARBON
		CARBON NANOTUBES	MANUFACTURED THROUGH	WITH CNF INTERLAYER		Tadashi Uozumi (Gifu	HYBRID SHEET METAL-	Anthony Evans (University		NANOFIBERS AS EFFICIENT
1		FILLED POLYPROPYLENE	SELECTIVE LASER MELTING	Masahiro Arai (Nagoya		Universtiy), Motohiro Tanigawa		of Nottingham), Connie Qian	Christian Jochum (ENSTA	METAL-FREE CATALYSTS
1		COMPOSITES FOR	Inam Ullah (RMIT University),	University), Jun-Ichi Hirokawa		(MURATA MACHINERY-LTD.),	MANUFACTURED	(University of Nottingham),	Bretagne), Michel Arrigoni	FOR ORR
		ORTHOPEDIC BONE	Milan Brandt (RMIT	(Shinshu University), Masaki		Tatsuhiko Nishida (MURATA	BY PREPREG PRESS	Lee Harper (University of	(ENSTA Bretagne)	Yongpeng Lei (National
1		IMPLANTS APPLICATION	University), <u>Stefanie Feih</u>	Hojo (Kyoto University),		MACHINERY-LTD.), Takahiro	TECHNOLOGY	Nottingham), Nicholas Warrior	(Live in Drotagno)	University of Defense
	Dresden), Michael Krahl	Jing Ma (Taiyuan University of		Marino Quaresimin (University),		Miura (MURATA MACHINERY),	Christian Lauter (University	(University of Nottingham),	Thermo-mechanical coupling	Technology), Qi shi (National
1	(Technische Universtität	Technology), Xi Nan (Taiyuan	Manufacturing Technology	of Padova)		Akio Ohtani (Gifu Universtiy),	of Paderborn), Zheng Wang	Paul Brookbank (University	predicts mechanical charac-	University of Defense
1		University of Technology)	(SIMTech))	or radova)		Asami Nakai (Gifu Universtiy)	(University of Paderborn),	of Exeter), Luke Savage	teristics, in thick epoxy, aand	Technology), Hongliang
1	(Technische Universtität			Wwe implemented an alter-		nounn nunan (und onnoroliy)	Isabel Koke (University of	(University of Exeter)	their dependance on the de-	Yuan (National University of
1	· · · · · · · · · · · · · · · · · · ·	This study investigates the ef-	SLM manufactured 3D	native way to increase the in-		A multi-supply filament wind-	Paderborn), Thomas Troester		gree of cure. A contactless la-	Defense Technology), Yingde
1	(Technische Universtität	ficiency of carbon nanotubes	Kagome truss structures	terlaminar fracture toughness		ing machine was developed	(University of Paderborn)	In-mould flow charac-	ser induced shock inspection	wang (National University of
1	· · · · · · · · · · · · · · · · · · ·	(CNTs) as reinforcement for	outperform conventional	and fatigue property of CFRP		based on the concept of high		teristics of carbon/epoxy	evidences this dependence.	Defense Technology)
1	,	polypropylene (PP) for ortho-	sandwich core structures in	laminates by inserting carbon		productivity of produce non-	The prepreg press tech-	Directed Fibre Compounds	отасносо ино исрениенсе.	Derende reennology/
1	As part of the research project		static compression and shear.	nanofibers between the unidi-		crimp tubular fiber preforms	nology is an approach to	(DFC) compared with Press		B, N-codoped carbon nano-
1		tion as a function of different	The superior static properties	rectional CFRP laminates.		with full automation system.	manufacture sheet-metal-FRP	Formed Compounds (PFC)		fibers (5.25 at% B, 6.68 at%
1		surface functionalization	translate into superior impact	Tectional orne laminates.		with full automation system.	structures with expected cycle			N, 306.3 m2 g-1) were mas-
1	design for thermoplastic		performance.				times of less than five min-	Carbon Fibre Sheet Moulding		sively prepared, showing goo
1	support-frame-structures that		perioritance.				utes, for instance for automo-	Compounds (CF-SMC)		cycling stability, methanol
1	can be manufactured highly						tive lightweight applications.	Compounds (CF-SIVIC)		tolerance and direct four-elec
1	automated.						live lightweight applications.			
	automated.									tron pathway for ORR.
1										
10.30	5101-4 CFRP BONDING PRE-	5102-4 DEVELOPMENT	5103-4 VISCOELASTIC	5104-4 TROUGH PROCESS		5106-4 IN-SITU	5107-4 OPTIMIZATION	5108-4 INTEGRATED	5109-4 LAMINATE	
10.00		OF NANOCOMPOSITE	BEHAVIOR OF TWO-LAYER	MODELLING FOR THE		MEASUREMENT OF RESIN	OF THE INTRINSIC	NONLINEAR MULTI-SCALE	PROCESSING EFFECT	
1		MATERIAL FILMS AND	COMPOSITE BEAM IN	FATIGUE LIFE ASSESSMENT		STATE AND CURE FOR	MANUFACTURING	MATERIAL MODELLING	ON MICROVOIDS AND	
1		INTEGRATION INTO CFRPS	BENDING	OF INJECTED NOTCHED		EFFICIENT NON-AUTOCLAVE	PROCESS OF METAL-FRP-	OF FIBER REINFORCED	HYDRAULIC FLUID	
1		FOR THE DEVELOPMENT	Miroslav J. Cerny (Czech	SAMPLES: DIFFERENT		MANUFACTURING	STRUCTURAL AUTOMOTIVE	PLASTICS WITH DIGIMAT	ABSORPTION OF QUARTZ/	
1		OF MULTIFUNCTIONAL	Technical University in	APPROACHES FOR THE		Daniel Kim (University	COMPONENTS BY RESIN	- PRESSURE AND RATE-	BMI LAMINATES	
1		STRUCTURES.	Prague), Pavel Slapak (Czech	FATIGUE CRITERION		of Southern California),	TRANSFER MOULDING	DEPENDENT MATERIAL	Keith R. Hurdelbrink II	
1		Athanasios Masouras	Technical University in	APPLICATION		Timotei Centea (University of	CONCERNING BOND	BEHAVIOURS.	(University of Oklahoma),	
1	Fabian Fischer (Institute	(University of Patras/Applied	Prague)	Carole Nadot-Martin (Institut		Southern California), Steven	STRENGTH	Laurent Adam (MSC Software	Gorkem E. Guloglu (University	
1		Mechanics Laboratory), An-	Tague)	Pprime - CNRS - ENSMA -		Nutt (University of Southern	Zheng Wang (Chair for	Belgium), Samuel Melchior	of Oklahoma). Zahed Siddique	
		tonios Vavouliotis (University	A theory of viscoelastic	Université de Poitiers-UPR		California)	Automotive Lightweight	(MSC Software Belgium),	(University of Oklahoma), M.	
1		of Patras/Applied Mechanics	bending for two-layer beams	3346), Sylvie Castagnet		oanorna)	Construction). Christian	Marc Duflot (e-Xstream engi-	Cengiz Altan (University of	
1	ing-TU Braunschweig)	Laboratory), Athanasios Bal-	subjected to arbitrary loading	(Institut Pprime - CNRS		The study clarifies the coupled	Lauter (Chair for Automotive	neering Sarl)	Oklahoma)	
1	nig-io biaunschweig)	topoulos (University of	has been given. The beam	- ENSMA - Université de		effect of out-time and expo-	Lightweight Construction),	neening Sally	Unianullia)	
1	This publication focuses on	Patras/Applied Mechanics	has generally unsymmetrical	Poitiers-UPR 3346), Andrea		sure to humid environments	Thomas Troester (Chair for	Presentation of Digimat which		
1	the application of CO2 laser	Laboratory), Vassilis	structure with both viscoelas-	Bernasconi (Polytechnics),		for a representative thermoset	Automotive Lightweight	bridges the gap between		
1	radiation in the M-IR for the	Kostopoulos (University of	tic layers.	Edoardo Conrado		resin, and confirms the use-	Construction), Carolin Zinn	process and structural mode-		
1		Patras/Applied Mechanics	uo layers.	(Polytechnics)		fulness of in-situ dielectric	(Materials Science), Mirko	ling via nonlinear multi-scale		
	CFRP utilizing the high ab-	Laboratory), Laurent		(1 0) y (60) (11) (03)		property monitoring.	Schaper (Materials Science)	material models. Focus on		
				Simulated fatique lives of in-		property monitoring.	Schaper (Wateriais Science)	pressure sensitive behavior of		
		Pamhaguian (European Coaco						fiber reinforced plastics.		
	sorption of the matrix resin for									
		Pambaguian (European Space Agency/ESA)		jected notched samples (3 ra-				noer reinforced plastics.		
	sorption of the matrix resin for	Agency/ESA)		jected notched samples (3 ra- dii and 2 injection geometries)						
	sorption of the matrix resin for	Agency/ESA) Development of nano - com-		jected notched samples (3 ra- dii and 2 injection geometries) are compared to experiments.						
	sorption of the matrix resin for	Agency/ESA) Development of nano - com- posite films with high content of		jected notched samples (3 ra- dii and 2 injection geometries) are compared to experiments. Results show the TPM ability				noor reinforced plastics.		
	sorption of the matrix resin for this wavelength.	Agency/ESA) Development of nano - com- posite films with high content of nano-particles and integration		jected notched samples (3 ra- dii and 2 injection geometries) are compared to experiments. Results show the TPM ability to distinguish notch and mi-						
	sorption of the matrix resin for this wavelength.	Agency/ESA) Development of nano - com- posite films with high content of nano-particles and integration of them to CFRP composites		jected notched samples (3 ra- dii and 2 injection geometries) are compared to experiments. Results show the TPM ability						
	sorption of the matrix resin for this wavelength.	Agency/ESA) Development of nano - com- posite films with high content of nano-particles and integration of them to CFRP composites with enhanced electrical and		jected notched samples (3 ra- dii and 2 injection geometries) are compared to experiments. Results show the TPM ability to distinguish notch and mi-						
	sorption of the matrix resin for this wavelength.	Agency/ESA) Development of nano - com- posite films with high content of nano-particles and integration of them to CFRP composites		jected notched samples (3 ra- dii and 2 injection geometries) are compared to experiments. Results show the TPM ability to distinguish notch and mi-						

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	Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8
5111-3 OPTIMIZING	5112-3 EROSION TESTING	5113-3 PROGRESSIVE	5114-3 DAMAGE	5115-3 EFFECT OF	5116-3 THE IMPACT	5117-3 EQUIVALENT	5118-3 IMPLEMENTING	5119-3 UPGRADING		
MICROSTRUCTURES FOR	OF FILLED VINYLESTERS	DAMAGE MODELLING OF	INDUCED PLASTICITY	ACCELERATED AGING ON	DAMAGE ANALYSIS	IMPACT SET-UP FOR	OF THE OPTIMIZED TRUCK	SHEAR-STRENGTHENED		
	IN WATER AT ELEVATED	COMPOSITE STRUCTURES	AND LOW VELOCITY		OF 2.5D BRAIDED	LIGHTNING STRIKE	SEAT PLATE MADE OF	RC BEAMS IN FATIGUE		
	TEMPERATURE	<u>Reza Vaziri</u> (The University	IMPACT BEHAVIOR OF	COMPOSITES AND NEAT	COMPOSITES	DAMAGE ON COMPOSITE	THERMOPLASTIC GF/PP	USING EXTERNALLY-		
	Sanna Siljander (Tampere	of British Columbia), Ofir		EPOXY RESIN	Yonggi Yang (Harbin Institute	COUPONS	COMPOSITE	BONDED CFRP		
	University of Technology),	Shor (The University of	Harpreet Singh (Indian in-	Ana Paula Cysne Barbosa	of Technology), Licheng	Floriane Soulas (ISAE),	Edgars Labans (Riga	Georges El-Saikaly		
Science and Engineering	Meri Kiviniemi (Tampere	British Columbia). Mina	stitute of Technology Delhi),	(Federal University of	Guo (Harbin), Jiuzhou	Christine Espinosa (ISAE),	Technical University),	(University of Quebec-École		
(KAUST)-Physical Science	University of Technology),	Shahbazi (The University of	Puneet Mahajan (Indian	Rio Grande do Norte).	Zhao (Harbin Institute of	Frederic Lachaud (ISAE),	Kapsars Kalnins (Riga	de Technologie Supérieure		
	Reija Sujhkonen (Tampere	British Columbia)	Institute of Technology Delhi)			Stéphane Guinard (Airbus		(ÉTS)). Omar Chaallal		
and Engineering Division- COHMAS Laboratory),		Briush Columbia)	Institute of Technology Deini)	(Federal University of Rio	Technology), Yidong Zhang	Group Innovations), Bruno	Technical University), Eduards Skukis (Riga	(University of Quebec-École		
	University of Technology),	An edentive discusts model	An electe plastic demons		(China)		, ,			
	Mari Lindgren (Outotec	An adaptive discrete model-	An elasto plastic damage	Grande do Norte), Maria		Lepetit (Airbus Group	Technical University),	de Technologie Supérieure		
University of Science and	Research Center), Essi	ling approach is combined	model for FRP composites	Carolina Burgos Costa		Innovations), Ivan Revel	Philippe Lefort (Volvo Group			
	Sarlin (Tampere University of		is proposed. A user defined	do Nascimento (Federal		(Airbus Group Innovations)	Trucks Technology), Clement			
Physical Science and	Technology), <u>Jyrki Vuorinen</u>	modelling methodology to	subroutine is developed and	University of Rio Grande do		<b>_</b>	Dufour (GEMTEX), Wolfgang	The effectiveness of two		
Engineering Division-	(Tampere University of	simulate the progression	finite element (FE) simu-	Norte), José Daniel Diniz		The paper presents the	Trümper (TU Dresden), Tim	externally-bonded carbon		
COHMAS Laboratory),	Technology)	of inter- and intra-laminar	lations are performed of a	Melo (Federal University of		work done to design an	Callin (TU Dresden)	fiber-reinforced polymer		
Angel Mora (King Abdullah		damage modes in compos-	laminate subjected to low	Rio Grande do Norte)		equivalent mechanical		(EB-CFRP) systems in		
	Slurry erosion of vinyl ester	ite materials.	velocity impacts.			impact to lightning strike.	In current research design,	extending the service life of		
Engineering (KAUST)-	matrix composites; the ef-			Evaluation of effects of		The methodology, equivalent		RC T-beams shear-strength-		
	fect of resin, filler and glass			aging on carbon-epoxy		tests and results are ana-	of truck cabin seat plate	ened for fatigue upgrade		
	fibre reinforcement was			composites and neat epoxy		lyzed in order to validate the	made of thermoplastic GF/	has been examined.		
COHMAS Laboratory)	studied at elevated temper-			subjected to accelerated		equivalent method.	PP composite was per-			
	atures. Erosion testing was			aging in an aging chamber			formed. Prototyped part has			
(	done in pilot-scale reactor.			with controlled conditions of			been validated by NDE and			
				temperature, humidity and			bolt pull-out test			
				UV-radiation.						
	5112-4 MECHANICAL	5113-4 DELAMINATION		5115-4 COMBINED		5117-4 EXPERIMENTAL	5118-4 BALLAST			
	BEHAVIOUR OF HIGH	PROPAGATION UNDER		CHARACTERIZATION OF		AND NUMERICAL	IMPACT EFFECT ON			
	PERFORMANCE FIBER	FATIGUE LOADING		THE EFFECTS OF HOT /WET		ANALYSIS OF A	FATIGUE RESISTANCE			
		IN BONDED-BOLTED		AGING ON PULTRUDED		LAMINATED BASALT	OF COMPOSITE BASED			
	APPLICATIONS	COMPOSITE STRUCTURES		FRP PLATE		COMPOSITE PLATE	CARBODYSHELLS IN			
	Markus Michael (TU	Luke Richard (University of		Sotirios Grammatikos		SUBJECTED TO BLAST	RAILWAYS			
	Chemnitz), Thorsten Heinze	Washington), Kuen Y. Lin		(University of Bath), Richard		LOAD	Mohamed Rachik (UTC),			
	(TU Chemnitz), Annett	(University of Washington)		Ball (University of Bath),		Süleyman Ba türk (Turkish	Pengcheng Cheng (UTC),			
	Schmieder (TU Chemnitz)	(oniversity of washington)		Mark Evernden (University		Air Force Academy), Sedat	Abdelouahed Laksimi (UTC)			
		Composite delemination		of Bath)		Süsler ( stanbul Technical	Abueloualleu Laksiiiil (UTC)			
	During the last years filter	Composite delamination		UI Daul)			The aim of this study is to			
	During the last years, fiber	arrest by fasteners is ana-		This names presents a		University), Halit S.	The aim of this study is to			
	ropes have proven to be an	lyzed under both static and		This paper presents a		Türkmen ( stanbul Technical	integrate ballast impact			
	option to replace steel wire	fatigue loading in order to		'complete' characterization		University), Valentina	influence in fatigue as-			
	ropes in many technical	develop predictive capabili-		study of the hot/wet aging		Lopresto (University of	sessment for carbodyshell			
	applications. Especially for	ties for the design of prima-		effects on a commercially		Naples Federico II), Silvio	design. Lifetime of damaged			
	hoisting applications or	ry aircraft structures.		available pultruded Glass		Genna (University of Naples	structures can be estimated			
	winch-based applications,			Fibre Reinforced Polymer		Federico II), <u>Zafer Kazancı</u>	according to S-N curve of			
	fiber ropes			(GFRP).		(Turkish Air Force Academy)	undamaged one.			
						The use of the advanced				
						laminated composites is				
						become more important in				
						the structures of many engi-				
						neering applications such as				
						space stations, aerospace				
						vehicles, automotives and				
						· ·				
						marine structures.				
						marine structures.				

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Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
5201 Processing - Manufacturing Technology 15	5202 Nano Composites 15	5203 Sandwich Structures and Materials 5	5204 Multifunctional Composites - Self-Healing and Bio-inspired Designs 5	5205 Structural Design Criteria, Safety and Reliability	5206 Experimental Methods for Process Characterisation 6	5207 Liquid Composites Moulding 3	5208 Short Fibre Composites 5	5209 Recycling of Composites and Sustainability 5	5210 Fibres 5
CHARACTERIZATION FOR DETERMINING THE CONSOLIDATION PROPERTIES OF CARBON FIBER TAPES WITH PA 6 MATRIX Philipp Schaefer (Technische Universitaet Muenchen), Swen Zaremba (Technische Universitaet Muenchen), Klaus Drechsler (Technische Universitaet Muenchen)	5202-1 FRACTURE TOUGHNESS MODELLING OF POLYMER MATRIX MODIFIED WITH NANO-RUBBER AND MICRO-INORGANIC FILLERS Bernd Lauke (Leibniz-Institut für Polymerforschung Dresden e.V.) A hybrid composite consisting of a brittle polymer matrix and two filler components are considered. An analytical equation for the composite fracture toughness was obtained.	PLANE LOADING <u>Kenan Çınar</u> (Namik Kemal University), Fatih E. OZ	KEYNOTE 5204-1 SINGLE CHANNEL MICROVASCULAR DELIVERY FOR SELF-HEALING POLYMER COMPOSITES Brett Krull (University of Illinois), Yelizaveta Fedonina (University of Illinois), Scott White (University of Illinois), Nancy Sottos (University of Illinois) We present a microfluidic de- vice that accomplishes in-situ mixing of two-part healing agents through a single microvascular channel in pol- ymer matrix composites.	5205-1 PROBABILISTIC JUSTIFICATION OF COMPOSITE AIRFRAME IN- SERVICE INSPECTIONS <i>Martin Gaitonde (Aircraft Manufacturer)</i> A probabilistic approach is described. It has been used to verify in-service inspection tasks for composite aircraft structures, such as those on A380 and A350, per damage tolerance requirements.	5206-1 SIGNAL EVALUATION OF FIBER OPTICAL SENSORS EMBEDDED BETWEEN UNIDIRECTIONAL THERMOPLASTIC PREPREG TAPES IN A HOT-PRESS CONSOLIDATION FOR ONLINE PROCESS MONITORING <i>Robert Gaitzsch (Faserinstitut Bremen e. V.), Michael Koerdt (Technische Universität Chemnitz), Christian Brauner (Faserinstitut Bremen e. V.), Lothar Kroll (Technische Universität Chemnitz), Axel Siegfried Herrmann Fibre optical sensors were embedded in a unidirectional PA-6/GF laminate for online monitoring of the consolida- tion and annealing process. The sensor signals are discussed and compared with DSC scans.</i>	MOLDING: ROLE OF MODELING AND SIMULATION	5208-1 INFLUENCE OF MEAN STRESS AND WELD LINES ON THE FATIGUE BEHAVIOUR OF SHORT FIBRE REINFORCED POLYAMIDE Andreas Primetzhofer (Montanuniversität Leoben), Andreas Mösenbacher (Montanuniversität Leoben), Gerald Pinter (Montanuniversität Leoben), Julia Brunbauer (Montanuniversität Leoben) Proposal for consideration of mean stress effect and weld lines on the fatigue behaviour for short fibre reinforced polyamide by the local stress approach.	5209-1 MEASUREMENT OF SHORT FIBRE LENGTH USING A RHEOLOGICAL METHOD Thomas Turner (University of Nottingham), Jiang Guozhan (University of Nottingham), Kok Wong (University of Nottingham), Steve Pickering (University of Nottingham) A method is demonstrated for the quality assessment of recovered carbon fibres. Specifically, the concept of determination of fibre length from the shearing of a viscous fibre-containing suspension	KEYNOTE 5210-1 SIMULTANEOUSLY STRONG AND TOUGH CONTINUOUS NANOFIBER NEXT GENERATION REINFORCEMENT FOR NEW STRUCTURAL SUPERCOMPOSITES? Yuris Dzenis (University of Nebraska-Lincoln) This talk reviews recent progress on continuous nanofibers with unique sim taneously high strength, m ulus and toughness and th prospects for nanofibers to replace carbon as reinforce ment in the next generatio supercomposites.
TEXTILE COMPOSITE MADE FROM PRE-IMPREGNATED COMMINGLED YARN Toshihiro Motochika (Gifu university), Akio Ohtani (Gifu university), Akio Ohtani (Gifu university), Mitsuro Takagi (Kajirene Inc.) New intermediate material for c-CFRTP called pre-impreg- nated commingled yarn was developed. Impregnation and mechanical property were investigated by comparing to commingled yarn.	5202-2 SUPERHYDROPHOBIC SELF- REGENERATIVE SILICONE RUBBER NANOCOMPOSITES FOR ELECTRICAL OUTDOOR INSULATION Ana Isabel Mendoza (KTH Royal Institute of Technology), Henrik Hillborg (ABB), Emma Strömberg (KTH Royal Institute of Technology) Development of new struc- tural composite materials for HV outdoor insulation applica- tions using PDMS coated with ZnO nanoparticles, creating hierarchical superhydrophobic and self cleaning surfaces.	5203-2 FABRICATION AND AXIAL COMPRESSIVE BEHAVIOR OF COMPOSITE SANDWICH CYLINDRICAL SHELLS WITH PYRAMIDAL LATTICE TRUSS Jian Xiong (Harbin Institute of Technology), Wei Zheng (Harbin Institute of Technology), Lina Feng (Harbin Institute of Technology), Fanyi Meng (Harbin Institute of Technology) We developed interlocking method and a hot press meth- od to manufacture lightweight carbon fiber composite cy- lindrical shell with pyramidal truss constructions.		5205-2 PROBABILISTIC ANALYSIS OF COMPOSITE STRUCTURES USING THE CGSM <u>Qi Yin</u> (Université de Technologie de Compiègne), Frédéric Druesne (Université de Technologie de Compiègne), Pascal Lardeur (Université de Technologie de Compiègne) The CGSM is developed for probabilistic analysis of laminated composite plates and shells modeled by finite elements, taking into account the variability of material and physical properties.	5206-2 ROOM TEMPERATURE CURE MONITORING USING A DMA /THERMAL FLUX CELL AND MECHANICAL BEHAVIOR OF A PHENOLIC SYNTACTIC FOAM Mounia Bouslah (Ecole Centrale de Lyon), Michelle Salvia (Ecole Centrale de Lyon), Isabelle Deschëres (Institut Textile et Chimique de Lyon), Raymond Barbin (ACOEM group) The transformation process of a phenolic syntactic foam was studied by a coupled calorim- etry-DMA and a study of the compression behavior was performed by a macroscopic test and by X-ray tomography.	TRANSFER MOLDING Claudio Di Fratta (ETH Zürich), Grigorios Koutsoukis (ETH Zürich), <u>Paolo Ermanni</u> (ETH Zürich) The work investigates a fast and cost-effective method, based on few pressure sensors, for monitoring the resin flow and controlling the injection parameters during	5208-2 FATIGUE DAMAGE MECHANISMS DESCRIPTION IN SHORT GLASS FIBRE REINFORCED THERMOPLASTIC BY MICROTOMOGRAPHIC OBSERVATIONS Héloise Rolland (12M - Arts et Métiers ParisTech - Bordeaux), Niclas Saintier (12M - Arts et Métiers ParisTech - Bordeaux), Gilles Robert (Solvay Engineering Plastics) Fatigue damage mecha- nisms of PA66GF have been observed in relation to its microstructure. Proportions of identified mechanisms are determined at different dam- age levels.	5209-2 SMART SELF- REINFORCED POLY(LACTIC ACID) (PLA) COMPOSITES WITH ENHANCED IMPACT PERFORMANCE, TENSILE PROPERTIES AND HEAT RESISTANCE <i>Fang Mai</i> (Queen Mary University of London), Emiliano Bilotti (Queen Mary University of London), Ton Peijs (Queen Mary University of London) Through development of fully bio-based and recyclable self-reinforced PLA, the high brittleness and low HDT of PLA have been overcome, while simultaneously improv- ing the tensile strength and modulus.	

Meeting room 5	Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8
5211 Multifunctional	5212 Matrix materials 5	-		5215 Durability, Creep and			5218 Hybrid Composites 4	5219 Applications - Civil		
Composites - Coupled		Composite Structures 6	Progressive Failure 4	Agressive Environment 4		Structural Analysis 4		Engineering 5		
Properties and Multi-				<b>3</b>				5 5.		
physics Models 3										
5211-1 ELECTRON AND	5212-1 PREPARATION AND	5213-1 INTERFACE	5214-1 AN IMPROVED	5215-1 MECHANICAL		5217-1 MODELLING	5218-1 ELECTRICAL AND	5219-1 ACTIVITY		
THERMAL TRANSPORT	PROPERTIES OF A NEW	STRENGTH GRADATION	COHESIVE ZONE	BEHAVIOR OF		DELAMINATION DAMAGE	MECHANICAL PROPERTY	REGARDING APPLICATION		
MECHANISM IN CNT-	SILICON-POLYTRIAZOLE	IN THERMOPLASTIC	MODEL VIA SELECTIVE	CARBON FIBER/EPOXY		IN 'EX-SITU' TOUGHENED	INVESTIGATION OF FUZZY	OF THERMOPLASTIC		
NETWORK COMPOSITES	RESIN AND ITS COMPOSITE			FILAMENT WOUND FLAT		LAMINATES DUE TO	FIBRE-REINFORCED	FRP TO JAPANESE		
FOR STRAIN RESILIENT ELECTRONICS	Bing Guo (Key Laboratory	APPROACH TO INCREASE THE DAMAGE TOLERANCE	<u>William Peterson</u> (Montana	LAMINATES EXPOSED		IMPACT	COMPOSITES	INFRASTRUCTURE		
Ajit Roy (Air Force	for Specially Functional Polymeric Materials and	Luigi Sorrentino (CNR -	State University), Douglas Cairns (Montana State	CONDITIONING		Dafei Li (University of Nottingham), Elena Sitnikova	<u>Idris Gürkan</u> ( stanbul Technical University), Hülya	<u>Atsushi Hokura</u> (Kanazawa Institute of Technology),		
Research Laboratory),	Related Technology(East	IPCB), Fabrizio Sarasini	University)	José Humberto Almeida		(University of Nottingham),	Cebeci ( stanbul Technical	Shinichi Miyazato		
Sergei Shenogin (Air Force	China University of Science	(University of Rome -	onnonony)	Jr. (Federal University of		Shuguang LI (University	University)	(Kanazawa Institute of		
Research Laboratory),	& Technology)), Ligiang Wan	Sapienza), Jacopo Tirillò	We demonstrate a method	Rio Grande do Sul), Samia		of Nottingham), Xiaosu		Technology)		
Vikas Varshney (Air Force	(Key Laboratory for	(University of Rome -	that results in an initially	Souza (São Paulo State		Yi (Beijing Institute of	The electrical conductivity			
Research Laboratory),	Specially Functional Polymeric		rigid cohesive zone in which	University (UNESP)), Edson		Aeronautical Materials	is measured in plane and	Research activity on		
Jonghoon Lee (Air Force	Materials and Related Tech-	(University of Naples	intrinsic cohesive elements	Botelho (São Paulo State		(BIAM))	out of plane and mode 1	infrastructure application		
Research Laboratory)	nology(East China University	Federico II), Salvatore	remain dormant until need-	University (UNESP)), <u>Sandro</u>		Mandall's a desire as in	fracture toughness test is	of thermoplastic FRP in		
We propose carbon pape	of Science & Technology)), Lei		-	Amico (Federal University of Bio Grande do Sul)		Modelling damage in	performed to the specimens to determined multi-func-	Japan is described with an introduction to the KIT-		
We propose carbon nano- tube network in high-strain	Du (Key Laboratory for Specially Functional Poly-	Russo (CNR - IPCB)	analysis.	Rio Grande do Sul)		laminated composites of toughened interface through	tional properties of fuzzy	COI (Kanazawa Institute		
tolerant polymer phase to	meric Materials and Re-	Film stacked thermoplastic		Filament wound composites		'Ex Situ' technique, in low	fiber-NECs.	of Technology-Center of		
implement strain resiliency	lated Technology(East China	composites based on the		are exposed to hygrothermal		speed impact, standard		Innovation) project.		
in electronic materials and	University of Science &	gradation of the interlaminar		conditioning. Non-Fickian		fracture tests such as mode				
provide materials modeling	Technology)), Farong Huang	interface strength (IGIS)		kinetics govern moisture		I, mode II and mix mode.				
to design CNT contact	(Key Laboratory for Specially	have been investigated by		absorption, elastic and						
morphology.	Functional Polymeric Mate-	flexural and impact tests as		strength tensile/shear						
	rials and Related Techno-	well as by acoustic emission		properties reduced for aged						
	logy(East China University of	analyzes.		specimens.						
	Science & Technology))									
	Si-PTA resin synthesized									
	from 4,4'-diazidomethyl bi-									
	phenyl(DAMBP) and LPSA via									
	1,3-dipolar cycloaddition was									
	preparation and characteri-									
	zation. The resin possessed									
	good heat resistant property.									
5211-2 HARVESTING	5212-2 SYNTHESIS AND	5213-2 EVALUATION OF	5214-2 A THERMAL-	5215-2 LONG-TERM		5217-2 ANALYTICAL	5218-2 IMPACT OF NON-	5219-2 BUCKLING		
ENERGY BY DEPOLING FERROELECTRIC PZT	CHARACTERIZATION OF A NEW HIGH TEMPERATURE	THROUGH-THE-THICKNESS STRESS DISTRIBUTION	MECHANICAL A-FEM FOR FRACTURE IN TEXTILE	DURABILITY TESTING OF Tokyo Rope Carbon		MODELLING AND FE SIMULATION OF IMPACT	HOOKEAN BEHAVIOUR ON MECHANICAL	BEHAVIOUR OF POLYURETHANE FOAM		
BASED COMPOSITES	SHAPE MEMORY	UNDER PURE MODE II ON	COMPOSITES	CABLES		RESPONSE AND DAMAGE	PERFORMANCE OF HYBRID			
Christopher Roberts	POLYIMIDE	A MODIFIED TRANSVERSE	Qingda Yang (University	Ahmed Ali (Université de		GROWTH IN A THIN PLY	COMPOSITES	STEEL C-SECTIONS		
(University of California-	Xinli Xiao (Harbin Institute	CRACK TENSION TEST	of Miami), Bao-Chan Do	Sherbrooke ), Hamdy M.		LAMINATE	Christen Malte Markussen	Aaron von der Heyden (TU		
Los Angeles), Peng Lv	of Technology), Xueying	Tommaso Scalici (Università		Mohamed (Sherbrooke		Robin Olsson (Swerea	(DTU Wind Energy), Bo	Darmstadt-Institute for Steel		
(University of California-Los	Qiu (Harbin Institute	degli Studi di Palermo),	,	University), Adel Elsafty		SICOMP), Alann André	Madsen (DTU Wind Energy),	Structures and Materials		
Angeles), <u>Christopher Lynch</u>	of Technology), Deyan	Giuseppe Pitarresi	This paper presents how	(University of North Florida),		(Swerea SICOMP), Peter	Hans Lilholt (DTU Wind	Mechanics), Jörg Lange (TU		
(University of California-Los	Kong (Harbin Institute of	(Università degli Studi di	the novel augmented finite	Brahim Benmokrane		Hellström (Swerea SICOMP)	Energy), Tom Løgstrup	Darmstadt-Institute for Steel		
Angeles)	Technology), Yang Hu (Harbin		element method (A-FEM)	(Université de Sherbrooke)		Immost domosto in this	Andersen (DTU Wind Energy)			
The depelarization of DZT	Institute of Technology), Wonho Zhang (Harbin	(Università degli Studi di Palormo), Giucoppo	can be extended to account	The main objective of this		Impact damage in thin	Hybrid compositor, based	Mechanics)		
The depolarization of PZT 52/48 and PZT 95/5 is	Wenbo Zhang (Harbin Institute of Technology),	di Palermo), Giuseppe Catalanotti (Universidade do	for path-arbitrary, single in- tra-elemental discontinuities	The main objective of this study is to investigate the		ply laminates differs from conventional laminates.	Hybrid composites, based on unidirectional fibres of	Cold-formed steel members		
investigated under uniaxial	Shen Zhang (Harbin	Porto). Pedro P. Camanho	under general thermo-me-	effect of different environ-		Models for predicting dam-	carbon and glass, in an	tend to fail before reaching		
stress at stress rates of 0.1-	Institute of Technology ),	(Universidade do Porto)	chanical loading.	mental conditions on the		age initiation and growth in	epoxy matrix have been	their yield strength due to		
100 MPa/ms for impact en-	Yanju Liu (Harbin Institute			long-term behavior of Tokyo		a thin ply ply laminate are	used to investigate the pos-			
ergy harvesting applications.		implementation of two full-		Rope carbon-cables (CFCCs)		presented and compared	sibility of a hybrid effect. The			
	Leng (Harbin Institute of	field experimental stress		subjected to tensile load		with experiments.	hybrid effect is observed	filling the cross-section		
	Technology)	analysis techniques to eval-					experimentally	with polyurethane foam is		
		uate the strain and stress						analysed.		
	Shape memory polyimide	field on the through-thick-								
	with high glass transition	ness surface of TCT samples								
	temperature and excellent shape memory perfor-									
	mances is reported, and the									
	mechanism of high temper-									
	ature shape memory effects									
	of polyimide is proposed.									

# Scientific programme · Friday 24 July

	Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
12:00	5201-3 NOVEL PREHEATING	5202-3 CELLULOSE	5203-3 COST-OPTIMAL	5204-2 TOUGHER	5205-3 PROBABILISTIC	5206-3 FLOW FRONT AND	5207-3 WETTING ALONG	5208-3 A LOCAL STRESS	5209-3 EFFECT OF FIBRE	5210-2 CARBON FIBRES
	METHOD WITH MATRIX	NANOCOMPOSITES -	DESIGN AND AUTOMATED	COMPOSITES CONTAINING	STRENGTH ESTIMATION	CURE MONITORING OF	FIBER(S) PLACED ON SOLID	ANALYSIS OF THE EFFECT	LENGTH AND SUSPENSION	WITH MODULATED
	RESIN IMPREGNATION FOR	CONTROLLING DISPERSION	PRODUCTION OF SANDWICH	SELF-HEALING MONOMERS	IN CONSIDERATION OF	THICK CFRP LAMINATES	SUBSTRATE	OF FIBRE ORIENTATION ON	CONCENTRATION ON	PROPERTIES AND SHAPE
		AND MATERIAL PROPERTIES		PREPARED BY INKJET	SIZE EFFECTS AND LOAD	WITH INTEGRATED FIBER	Takuma Setoquchi (Tokyo	FATIGUE THE BEHAVIOUR OF		ALONG THE FIBRE LENGTH
	Takahiro Hayashi (The	THROUGH NANOCELLULOSE	TURBINE ROTOR BLADES	PRINTING	MODES FOR GLASS-	OPTIC SENSORS	University of Science), Ichiro	A SHORT FIBRE REINFORCED		Jonny Blaker (The University
		SURFACE MODIFICATION	Peipei Wang (Fraunhofer	Patrick J. Smith (University	SHORT-FIBER-REINFORCED	Jonathan Oelhafen	Ueno (Tokyo University of	POLYAMIDE.	CARBON FIBRE	of Manchester), David B.
		Farhan Ansari (KTH Royal	IWES), Roman Braun	of Sheffield), Yi Zhang	THERMOSETTING PLASTICS.	(Technische Universität	Science)	Andrea Bernasconi	Zhe Liu (The University of	Anthony (Imperial College
	Tokyo), Jun Takahashi (The	Institute of Technology),	(Fraunhofer IWES), Christian	(University of Sheffield), Elliot	Takahiko Sawada (Hitachi	München), Ruben Fernandez	,	(Politecnico di Milano),	Nottingham), Kok Hoong (The	London), Guang Tang
	University of Tokyo)	Michaela Salajkova (KTH	Dörsch (Fraunhofer	Fleet (University of Sheffield),	Ltd.), Hiroshi Aoyama (Hitachi	(Premium Aerotec GmbH), Dirk	A special attention is paid to	Edoardo Conrado (Politecnico	University of Nottingham),	(University of Dundee), Siti-
	,	Royal Institute of Technology),	IWES), Heiko Rosemann	Jonathan Stringer (University	Ltd.)	Niefnecker (Premium Aerotec	the wetting process along	di Milano), Alessandro	Thomas Turner (The University	Ros Shamsuddin (Imperial
	We investigated the effect of	Lars Berglund (KTH Royal	(Fraunhofer IWES), Florian	of Sheffield), Simon A. Hayes		GmbH), Swen Zaremba	glass fiber(s) settled on the	Cavallaro (Politecnico di	of Nottingham), Stephen	College London), Gerhard
	the impregnation conditions	Institute of Technology)	Sayer (Fraunhofer IWES),	(University of Sheffield), Alma	We propose a strength esti-	(Technische Universität	substrate. The tip velocity	Milano), Peter Hine (University	Pickering (The University of	Kalinka (Federal Institute
	by a vacuum press preheater		Oliver Bagemiel (Fraunhofer	Hodzic (University of Sheffield)	mation method for short-fi-	München), Klaus Drechsler	and the profile of the liquid	of Leeds)	Nottingham)	of Materials Testing and
	for semi-impregnated CFRTP	This work investigates com-	IWES), Frank Prissok (BASF		bre-reinforced plastics in	(Technische Universität	between the fiber(s) and the			Research (BAM)), Milo Shaffer
	to develop novel preheating	posites of surface modified	Polyurethanes), Ragnar	Poly(methyl methacrylate)	consideration of load modes	München)	substrate are evaluated.	A review of the effect of fiber	Hydrodynamic alignment	(Imperial College London),
	device with impregnation.	cellulose nanocrystals with	Stoll (BASF Polyurethanes),	and/or polyethylene glycol	and size effects by using the			orientation on the fatigue	process is devised to achieve	Amin Abdolvand (University of
		PVAc and discusses the effect	Jens Brandes (Fibretech	have been deposited between	Weibull statistical theory, FEA,	Flow front measurements		strength of a short glass fiber	highly aligned orientation	Dundee), Alexander Bismarck
		of resulting nanostructure	Composites), Erwin Fröse (2	laminate plies by inkjet	and experimental approaches.	with embedded FBGs and		reinforced polyamide based	distribution mats with dis-	(Imperial College London)
		on the end properties of the	Komponenten Maschinenbau)	printing; resulting in a 40%		Fresnel reflectometer during			continuous random recycled	
		composites.		improvement in Gic (prop-		vacuum infusion. Additionally,		and local stress analysis is	carbon fibre.Effects of fibre	The possibility to weaken
			Automated in-situ foaming of	agation).		curing and Tg measurements		presented.		carbon fibres and shape their
			liquid polyurethane directly			with Fresnel reflectometer			invested.	diameter using a nanosecond
			in the mold is proposed and			in isothermal neat resin ex-				pulsed laser will be demon-
			analytically assessed as a			periments.				strated. Predetermined break
			means to reduce production							points can therefore be intro-
			costs of sandwich panels for							duced into carbon fibres.
			wind turbine rotor blades.							
12:20	5201-4 THERMOPLASTI	5202-4 COMPARISON	5203-4 NUMERICAL	5204-3 SELF HEALING OF	5205-4 PROBABILISTIC	5206-4 PROCESS	5207-4 MINIMIZING	5208-4 METHOD FOR	5209-4 MICROWAVE	5210-3 EXTRACTION AND
		OF THE PROPERTIES OF	MODELING OF RESIN	EPOXY RESINS USING SELF	ANALYSIS OF WIND TURBINE		VOLATILE-INDUCED	ENABLING HIGHLY		CHARACTERISATION OF
	DEVELOPMENTS FOR	POLYESTER-BASED POWDER		ASSEMBLING HEALING	BLADES CONSIDERING	RESINS, CARBON FIBER	SURFACE POROSITY IN	LOADABLE MATERIAL		CELLULOSE MICROFIBRILS
	AEROSPACE APLLICATIONS, INCORPORATION OF A	COATINGS CONTAINING DIFFERENT CLAYS MODIFIED	IN COMPOSITE SANDWICH	AGENTS	STIFFNESS, STRENGTH AND	FABRICS, PREFORMS AND	RTM VIA MATERIAL AND PROCESS OPTIMIZATION	COMBINATIONS OF PP AND ALUMINUM WITHOUT THE	POLYESTER FOR FIBER AND RESIN RECOVERY	FROM PONGAMIA PINNATA SEED HULL
				Frank Jones (The University	STABILITY UNDER EXTREME					
	FUNCTIONAL TIE LAYER	WITH -AMINO- Propyltriethoxysilane	Hubert Courteau-	of Sheffield), Russell Varley	AND FATIGUE LOADING	BY HF RADIO WAVE TECHNIQUES	Mark Anders (University of Southern California),	USE OF ADHESIVES	<u>Hülya U. Sokoli</u> (Department	<u>Manjula P</u> (National Institute of Technology Karnataka
		Paula Bertuoli (Federal	<u>Godmaire</u> (Polytechnique Montreal). Philippe Causse	(CSIRO), Stephen Kalista (Rensselaer Polytechnic	<u>K. C. Bacharoudis</u> (Centre for Renewable Energy Sources		Jonathan Lo (University	<u>Kim Kose</u> (inpro), Ivonne Clausner (Neue Materialien	of Chemistry and Bioscience,	Surathkal)
		University of Rio Grande do	(Polytechnique Montreal),	Institute), Buu Dao (CSIRO),	and Saving), D. J. Lekou	<u>Henning Heuer</u> (Technische Universität Dresden), Martin	of Southern California),	Fürth GmbH), Fred Eggers	Aalborg University, Esbjerg, Denmark), Rudi P. Nielsen	Suraurkai)
		Sul), <u>Lisete Scienza</u> (Federal	Edith-Roland Fostsing	Christopher Pillsbury (Union	(Centre for Renewable Energy	Schulze (Fraunhofer IKTS),	Timotei Centea (University of	(Daimler), Birgit Faisst	(Department of Chemistry	Biodiesel is a renewable
		University of Rio Grande	(Polvtechnique Montreal). Edu	College)	Sources and Saving). T. P.	Matthias Pooch (Fraunhofer	Southern California). Steven	(TRUMPF Laser- und	and Bioscience, Aalborg	resource of energy and has
		do Sul). Ademir Zattera	Ruiz (Polvtechnique Montreal)	conege)	Philippidis (University of	IKTS). Simone Gaebler	Nutt (University of Southern	Systemtechnik GmbH)		gained its importance in India
	improve the adhesion strength			Healing agents of critical	Patras)	(Leibniz Institute of Polymer	California)		Erik G Søgaard (Department	due to soaring oil price and
	between these substrates and		Finite element sensibility	MW for thermal mending of	1 40 40)	Research)	Gamornia	A new method for the joining		largely enhanced environmen-
		In this work the effect of si-	analysis of the formation of	epoxy resins self-assemble	Effect of measurement uncer-	noodalonj	A description of the underly-	of polymer-metal-hybrid parts		tal awareness. Biodiesel and
		lane modified montmorillonite	surface defects on the visible	in situ via ionomer formation.	tainty related to the material	EddyCus® High Frequency	ing mechanism behind vola-	is presented. Examples of	Denmark). Morten E.	other biofuels are produced
		clays on the mechanical,	panel side of blind insert	Efficiencies compare to	properties and of model un-	Eddy current technology ap-	tile-induced surface porosity	reinforced PP (PP-LGF30) on	Simonsen (Department of	from
		morphological and corrosion	assembly. The defects affect	high MW systems with less	certainties connected to the	plied on CFRP gives valuable	in RTM, and strategies to	aluminum show very good	Chemistry and Bioscience,	
		protection properties of a pol-	visual appearance of business	impact on viscosity for RTM	loads and the structural mod-	information for material di-	minimize this type of defect	results even after thermal and	Aalborg University, Esbjerg,	
				processing.	els directly on the reliability	agnostic and process control	by modifying the resin cure	corrosive aging.	Denmark)	
		was evaluated.			level of a 90m rotor blade.	e.g. fiber position or cure	kinetics.		,	
						quality of resins.			A solvolysis process to depo-	
						1,			lymerize the resin in glass fib-	
									er reinforced composites and	
									recover the glass fibers has	
									been investigated using mi-	
									crowave induced irradiation.	

## Friday 24 July · Scientific programme

Meeting room 5	Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8
211-3 THERMO	5212-3 THE PROPERTIES	5213-3 STATIC AND	5214-3 MODELLING	5215-3 ON THE		5217-3 LOW-IMPACT	5218-3 AN IMPROVED	5219-3 A NOVEL ANCHOR		
IECHANICAL BEHAVIOR	OF A SILICON-CONTAINING	DYNAMIC PROPERTIES	OF PROPAGATING	MECHANICAL		TESTING ON EPOXY	FRAGMENTATION MODEL	METHOD OF FRP CABLE		
F THERMOPLASTIC	ARYACETYLENE	OF NEEDLE PUNCHED	DELAMINATIONS IN	CHARACTERIZATION		COMPOSITES	TO ASSIST THE SELECTION	FOR LONG-SPAN CABLE-		
OMPOSITE HIGHLY	RESIN MODIFIED BY	CHOPPED STRAND MATS	TEXTILE REINFORCED	OF PULTRUDED FIBRE		REINFORCED WITH DNA-	OF FIBRES IN HYBRID	SUPPORTED BRIDGES		
ILLED	OCTA(AZIDOPROPYL)	COMPOSITE WITH OPEN	DUROPLAST BEAMS BY	REINFORCED PLATES		FUNCTIONALIZED CARBON		Xin Wang (Southeast		
Intoine Jeancolas (Pole de	POLYHEDRAL OLIGOMERIC	HOLE	AN ENRICHED SHELL	SUBJECTED TO		NANOTUBES	Josep Costa (University	University)		
Plasturgie de l'Est), Henri	SILSESQUIOXANE AND	Daiki Ichikawa (Kyoto	ELEMENT FORMULATION	HYGROTHERMAL AGING		Susanna Laurenzi (Sapienza				
Perrin (Pole de Plasturgie	ITS CARBON FIBER	Institute of Technology),	Jim Brouzoulis (Chalmers	Behrouz Zafari (The		Università di Roma), Matteo	Vanegas-Jaramillo	This paper proposes a novel		
	REINFORCED COMPOSITES		University of Technology),	University of Warwick), Toby		Sirilli (Sapienza Università	(Universidad Pontificia	anchor toward large capac-		
aBPS), Hafid Sabar	Xiaojun Bu, Lei Du (Key	Machinery Co), Tohru	Martin Fagerström	Mottram (The University of		di Roma), Mariagabriella	Bolivariana), Albert Turon	ity fiber-reinforced polymer		
LaBPS)	Laboratory for Specially	Morii (Shonan Institute of	(Chalmers University of	Warwic)		Santonicola (Sapienza	(University of Girona), Luís	(FRP) cable and demon-		
2021 0)	Functional Polymeric	Technology), Akio Ohtani	Technology), Johannes	1141110)		Università di Roma)	Javier Cruz (Universidad	strates anchor efficiency by		
tudy of the shaping pro-	Materials and Related	(Gifu University)	Främby (Chalmers University	This paper presents ex-			Pontificia Bolivariana)	the finite element method		
ess and evaluation of the	Technology (East China	(and onivoloidy)	of Technology), Jan Krollman			Despite the high elastic	i onancia bonvananaj	(FEM) and experiments.		
nermomechanical behavior	University of Science &	In this study, needle punch	(Technische Universität	characterization work to un-		modulus and tensile	Tow hybridization, to escape			
f a thermoplastic compos-	Technology)	process was applied on	München), Peter Hellström	derstand mechanical prop-		strength of carbon nano-	from brittleness and to			
e highly filled of micronized	(outiliology)	chopped glass fiber mat in	(Swerea SICOMP)	erty changes of a polymeric		tubes (CNTs), the enhancing				
articles of ceramic	A novel resin OAPS-PSA was			composite after exposure to		of the mechanical properties				
	obtained from PSA resin and		A recent XFEM enriched	hot/wet conditioning.		of epoxy resins reinforced	means of an advanced ana-			
	octa(azidopropyl) polyhedral		shell element formulation,	noo wet conultioning.		by CNTs are largely unpre-	lytical fragmentation model			
	oligomeric silsesquioxane	with circular 10165.	which internally can repre-			dictable due to their s	for unidirectional hybrid			
	(OAPS) by "click" polymeri-		sent multiple interlaminar				composites.			
	zation and the T300/0APS-		cracks, has been validated				composites.			
	PSA had good mechanical		against experiments con-							
	properties.		ducted on textile reinforced							
			Duroplast beams							
5211-4 MULTI-	5212-4 STIFF MONOLITHIC					5217-4 IMPACT		5219-4 SIMULATION		
FUNCTIONAL PROPERTIES	AEROGEL MATRICES					BEHAVIOUR OF		OF INTERMEDIATE		
N NATURAL FIBER	FOR STRUCTURAL FIBRE					COMPOSITE PLATES		DEBONDING IN FRP-		
	COMPOSITES					SUBJECT TO HIGH-		STRENGTHENED RC		
litoshi Takagi (Tokushima	Hui Qian (Imperial College					VELOCITY IMPACT BY		BEAMS		
Iniversity), Antonio	London), Sang Nguyen					RIGID PROJECTILES:		Ricardo Perera (Technical		
lakagaito (Tokushima						ANALYTICAL MODELLING				
	(Imperial College London),							University ), Rui Sun		
Iniversity), Ke Liu (Wuhan	David Anthony (Imperial					OF THE ELASTIC		(Technical University),		
Textile University)	College London), Emile					RESPONSE.		Enrique Sevillano (Technical		
	Greenhalgh (Imperial					Andreas Schiffer (Khalifa		University)		
he transverse thermal	College London), Alexander					University), Vito L. Tagarielli				
	Bismarck (Imperial College					(Imperial College London)		Formulation of a spectral		
reen composites is found	London), <u>Milo Shaffer</u>							model based on a discrete		
be expressed as a func-	(Imperial College London)					Analytical models are		crack approach to simulate		
on of lumen size, thermal						developed to predict the		the structural response of		
onductivity ratio of fiber	Carbon aerogel precursors					elastic dynamic response of		flexural FRP-strengthened		
matrix, and fiber volume	were introduced into struc-					circular clamped composite		concrete beams. It is		
action.	tural carbon fibre weaves,					plates subject to high-ve-		focused on intermediate		
	to generate monolithic hi-					locity impact by a rigid		debonding.		
	erarchical carbon preforms,					projectile.				
	subsequently infused with									
	polymer resins to produce									
	dense composites									
	·									

## Scientific programme · Friday 24 July

Congress Hall A	Auditorium 15	Auditorium 10	Auditorium 11	Auditorium 12	Meeting room 18	Meeting room 19	Meeting room 20	Meeting room 17	Meeting room 16
12:40 5201-5 PRODUCTION STUDY	5202-5 ALIGNMENT OF		5204-4	5205-5 MICROMECHANICS				5209-5 INVESTIGATION	
OF CARBON FIBER WOVEN	CARBON NANOTUBES IN		MICROENCAPSULATED	AND RELIABILITY BASED				OF CATALYSED FLUIDISED	
FABRIC/PA6 COMPOSIE	GLASS FIBER COMPOSITES		SOLVENT-BASED HEALING	COMPOSITE MATERIAL				BED FOR THERMOSET	
SHEET USING PA6 SOLUTION	USING AC ELECTRIC FIELD		OF SHAPE MEMORY	CHARACTERIZATION FOR				COMPOSITE RECYCLING	
Osuke Ishida (Kanazawa	Charles Bakis (Penn State		POLYMERS	WIND TURBINE BLADE				Kyle Pender (University	
Institute of Technology),	University), Ambuj Sharma		Jesse Hamilton (University	COMPOSITES				of Strathclyde), Liu Yang	
Wataru Okumura (Industrial	(Penn State University),		of Massachusetts Lowell),	Ghulam Mustafa (Uni of				(University of Strathclyde)	
Research Institute of	Kon-Well Wang (University of		Bradford Olson (University	Victoria BC Canada), Curran					
Ishikawa), Mitsugu Kimizu	Michigan)		of Massachusetts Lowell),	Crawford (Uni of Victoria BC				An investigation into catalysed	
(Industrial Research Institute			Siddharth Dev (University	Canada), Afzal Suleman (Uni				thermal decomposition of	
of Ishikawa), Kiyoshi Uzawa	Experiments and finite el-		of Massachusetts Lowell),	of Victoria BC Canada)				epoxy resin was carried out	
(Kanazawa Institute of	ement analysis are used to		Norman Rice (Triton Systems					with the goal to improve	
Technology), Isao Kimpara	investigate the alignment of		Inc.), Christopher Hansen	This work presents a coupled				the commercial viability of	
(Kanazawa Institute of	carbon nanotubes through		(University of Massachusetts	approach for stiffness prop-				glass fibre reinforced plastic	
Technology)	the thickness of unidirectional		Lowell)	erty prediction of composite				recycling.	
	glass/epoxy composites using			materials used in wind turbine					
In this study, the solution im-	an alternating electric field.		Self-healing is pursued by a	blades using advanced					
pregnation process using the			close-then-heal approach,	micromechanics and reliabili-					
mixture of calcium chloride			in which the shape mem-	ty-based methodologies.					
and methanol was investigat-			ory effect is activated by						
ed to produce carbon fiber			damage-induced release						
woven fabrics and polyamide			of encapsulated solvent to						
6 composite.			compress and bond fracture						
			surfaces.						
13:00 Lunch in the Exhibition									
4:00 Closing Ceremony									

Meeting room 5 Meeting room 6	Meeting room 7	M1	M2	M3	M4	M5	M6	M7	M8
Meeting room 5         Meeting room 6           5212-5 A TERNARY         MWCNT/CERIA/           POLYANILINE COMPOSITE         FOR CORROSION           PROTECTION         Cynthia Oueiny (MAPIEM           laboratory), Sophie berlioz         (MAPIEM laboratory),           François-Xavier perrin         (MAPIEM laboratory)           Ternary MWCNT/Ce/polyan         line nanocomposites were           easily prepared andcarac- terized. MWCNT/Ce(III)/EB         pigments inserted in poly- vinylbutyral matrix showed           a good corrosion protection         efficiency.		M	<u>M2</u>	<u>M3</u>	<u>M4</u>	<u>M5</u>	M6	<u>M7</u>	<u>M8</u>

# Scientific programme

# How to navigate in the scientific programme

Remember that you can also search for all presentations in your ICCM20 app.

The **session number** is made of 4 digits: XYZZ X = day (Monday = 1, Tuesday = 2 ...) Y = session number this day ZZ = room code

The programme number is made of the above 4 digits and adding the order of the presentations in the session: XYZZ-VV X = day (Monday = 1, Tuesday = 2 ...) Y = session number this day

ZZ = room code

VV = presentation order in the session

Break out room	Room code
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Center Stage

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# How to navigate the poster and mini-oral programme

The poster presentations at the ICCM20 are fully integrated in the scientific programme. The poster sessions will include a short 3 minutes long oral overview presentation (termed "mini-oral") of each poster (maximum of 3 slides) given in plenum to the entire conference. This will be followed by a poster session that will take place in the Exhibition area and Foyer of the Bella Center and where the presented posters will be on display and open for discussion. The Posters are on display from Mon-

day 20 July at 9.00 and until Wednesday 23 July at 16.30. The numbers in the mini-oral programme is also the number of the posters : the numbers are as follows: PXXZ-VV P=Poster XX = session – (session 100 from 9:30 and session 200 from 13:00) Z = Stage number for presentation (stages 1,2,3,4,5) VV = presentation order in the session (20 presentations in each session)

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