



POLITECNICO
MILANO 1863



Credit: NASA

MSCA IF – GF: CRADLE

Dr. Mirko Trisolini, *Postdoctoral Research Fellow, COMPASS Group, Politecnico di Milano*

Prof. Camilla Colombo, *Associate Professor, COMPASS Group, Politecnico di Milano*

Prof. Yuichi Tsuda, *Associate Professor, ISAS JAXA*

Challenges and opportunities for the aerospace frontier research offered by the ERC and the MSCA programme

AIDAA Educational Series and Academy

Presentation layout



- About the project
- Starting out
 - The idea: do not think only about your strengths
 - The consortium: complementarity and profile
- Proposal writing – My experience
 - Plan in time
 - Style your writing
 - Its not just about the science
 - Career planning
 - Project management
 - External reviews
- Final thoughts

About the project



- The project will start shortly → 16th of March at Politecnico di Milano
- Current needs for future space missions
 - Extend the knowledge of asteroid composition
 - Enable multi-asteroid sampling
 - Rich in valuable resources (space mining)
- CRADLE main topics
 - Asteroid fragments dynamics
 - In-orbit particle sample and return devices
 - Physical characterization of asteroid particles
 - Start from the knowledge of Hayabusa-2 mission by JAXA

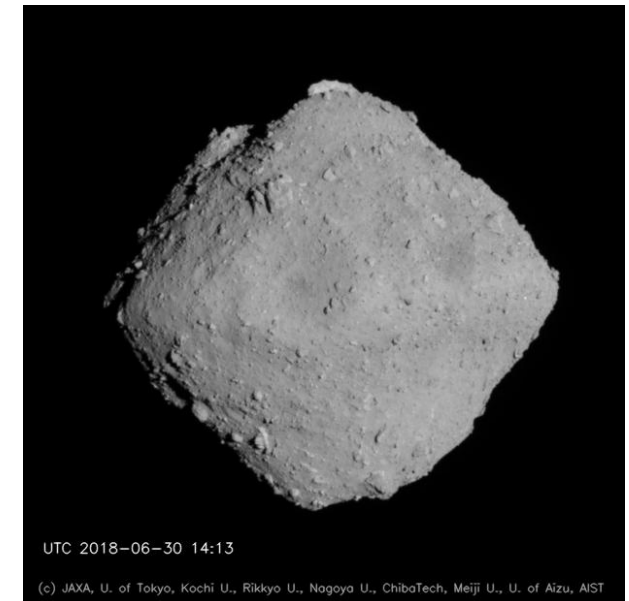


Image of Ryugu asteroid from Hayabusa-2 mission. Credit: JAXA

- Collaborations





Starting Out

The Idea

Strengths, improvement areas, and storytelling



- Identify clear objectives
- Try not to focus only on your strengths

	Strengths	Knowledge gaps	Bet on yourself
	<ul style="list-style-type: none">• Use your strengths and the ones of your group as a foundation for the project	<ul style="list-style-type: none">• Identify what is missing right now and why is it important• How can you use it?	<ul style="list-style-type: none">• Be bold• Learn from your tasks• Shows self improvement
My example	<ul style="list-style-type: none">• Small particles dynamics• Fragmentations• Continuum propagation	<ul style="list-style-type: none">• Continuum propagation for small bodies dynamics• In-orbit particle collection	<ul style="list-style-type: none">• Small bodies environments• Image processing

- Search for a **story to tell**: connect your strengths (starting point) with your goals, addressing the knowledge gaps you will fill and the contributions you will bring.

The consortium

Complementarity and institutional profile



- Focus on the **complementarity** of the consortium: each institution should bring something different to the table
- Stress how each part of the **consortium meets your research needs**
- Highlight how the consortium is at the forefront of your research field



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Host institution

Strong expertise in orbital mechanics, perturbation theory and continuum propagation • Experience with mission design and fragmentation modelling

Main partner (Third country institution)

Strong expertise in asteroid missions and sample return mission • Hayabusa2: only mission to return samples from asteroids, and induce and record particle ejection from its surface

Secondment

Strong expertise in the study of fragmentations, both experimental and computational • Experience in design and development of particle detection and collection devices

Secondment

Expertise in mission and system design • Possible future application for the space debris environment

Proposal Writing

My experience



Plan in time

Start early but not too much



T – 3 months

T – 2 months

T – 1 month

Submission deadline

- Good time to start planning
- Contact the consortium
- Layout of the proposal and table of content

- Start writing
- Have a first draft
- Have your supervisor and someone else in the group review it

- Implement comments
- Have an external review
- Make adjustments
- Work on the final details

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What about me?

- Started late
- Managed to get a late external review



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- Have a first draft
- Have your proposal reviewed by someone
- review it

- Implement comments
- Have an external review

What about me?

- Started late
- Managed to get a late external review
- Worked full time to implement revisions and refine the details



Style your writing

Conciseness, highlights, visual aids



- The whole proposal must be within 10 pages
 - Try to be concise and direct
 - Allocate pages according to the section importance: Excellence (50%), Impact (30%), Implementation (20%)
- Highlights important concepts
 - **Text boxes** for objectives and more important concepts

1) Implementation of density-based approach, enabling a more timely development of on-board algorithms. The devise of a novel in-orbit of regions around the asteroids where the collection can be safely

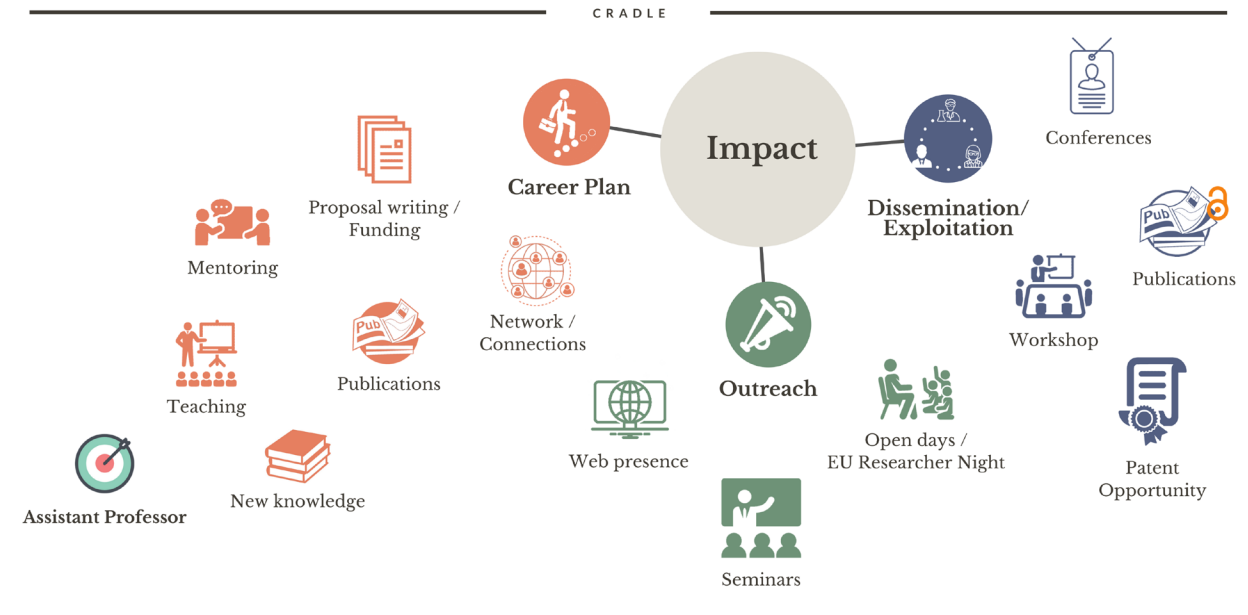
2) Development of an algorithm to characterise the particle ejecta will enable the on-board characterisation of the initial conditions

3) Development of a novel particle collection device concept ena

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- Highlights important parts
 - **Text boxes** for objectives and more important concepts
 - Bold and underlined words
 - Use **colour-coding**
- Insert few but meaningful **diagrams**



It's not only about the science

Other key ingredients



- The scientific objectives are the fundamental part of the proposal; however...

Career impact

- Match scientific objectives to growth opportunities
- Identify a career path
- Highlight how the fellowship will contribute to the career goals
- Identify key ingredients for your growth
 - Networking, publications, teaching, etc.

Project implementation

- Identify the work packages
- Identify clear milestones and deliverables
 - Connect them to the scientific and career planning parts
- **Use tables**
 - Clear and concise organisation
 - Save space
- Include risk management

External reviews



- Try to have an external review if you have the chance
 - **Ask your university** if they provide such a service
- Gives you a better perspective on what the actual reviewers are searching for
- It is useful to have someone looking at your proposal with “fresh eyes”
- They also check your CV!

- In my case, I had almost 40 comments (mainly on the implementation part) to my proposal and few adjustments to the CV
- Most certainly I would not have got the Fellowship without the external review

Final thoughts



- These were few suggestions I thought would be valuable; however, it will be your proposal...make it your own!
- Regardless of the outcome, writing the proposal will be beneficial in many ways
 - Explore new possibilities and novel approaches
 - Establish connections with partner institutions and researchers
 - Experience with EU proposals and judging criteria
 - Experience in project management and scheduling

Good luck with your proposal!



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Mirko Trisolini

Postdoctoral Research Fellow, Politecnico di Milano

mirko.trisolini@polimi.it