Science communication

Camilla Colombo, Robert Jedicke, Detlef Koschny, Richard Wainscoat, Andreas Burkert
With: Giovanni Carrada, Peter Jedicke, Felicitas Mokler, Ivonne Maier

Near-Earth Objects: Properties, Detection, Resources, Impacts and Defending Earth
14 May - 8 June 2018, Munich Institute for Astro- and Particle Physics (MIAPP)
An example

Asteroid close approach

Today's Asteroid Flyby Will Miss Earth... But The Threat Is Real

FLYING VISIT What is an asteroid, when will 2010 WC9 fly past Earth and could a meteor strike destroy the planet?

When an asteroid crashes into the Earth, it's known as a meteorite - and it can cause potentially huge damage, depending on the size

By Sara Kamouni and Mark Hodge
15th May 2018, 9:20 am | Updated: 15th May 2018, 11:49 am
A successful example

Rosetta
The Boy Who Cried Wolf

Armageddon

Picture of the Fable of Aesop
How to communicate

THE INNER SOLAR SYSTEM

This animation shows the motion of the inner part of the solar system over a two-year time period. The sun is at the center and the orbits of the planets Mercury, Venus, Earth and Mars are shown in light blue (the locations of each planet are shown as large crossed circles). Comets are shown as blue squares (numbered periodic comets are filled squares, other comets are outline squares). Main-belt minor planets are displayed as green circles, near-Earth minor planets are shown as red circles.

The individual frames were generated on an OpenVMS system, using the PGLOT graphics library. The animation was put together on a RESC OS 4.00 system using ImageJ.

17/05/2018
NEOs properties, detection, resources, impacts and defence
POLITECNICO MILANO 1863
How to communicate

The Torino Scale

KINETIC ENERGY (MJ)

COLLISION PROBABILITY

-10^2
-10^1
-10^0
-10^{-1}
-10^{-2}
-10^{-3}

Events having no likely consequences
Events meriting careful monitoring
Events meriting concern
Threatening events
Certain collision

Dimension of the NEO

Global
Regional
Local
No Consequence

How to communicate

Bolide events 1994-2013
(Small asteroids that disintegrated in the Earth's atmosphere)
How to communicate

space situational awareness

→ NEAR-EARTH OBJECTS

Close approach fact sheet for asteroid 2010 WC9
A small size asteroid will approach the Earth on 15 May 2018.

- **Fly-by date**: 2018-05-15
- **Closest approach time**: 22:03:51 UTC (± 2 s)
- **Minimum distance from Earth surface**: 156,573 km, 0.511 Lunar Distances (0.00314 au (± 3 km))
- **Fly-by speed**: 12.8 km/s
- **Size range**: 50-120 m

Orbit information
As the approach distance to the Earth is not small the changes in the orbital elements are very limited.

<table>
<thead>
<tr>
<th>Date before and after fly-by</th>
<th>Orbital period (days)</th>
<th>Aphelion Distance (au)</th>
<th>Perihelion Distance (au)</th>
<th>Eccentricity</th>
<th>Inclination (deg)</th>
<th>Rotation Period hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018-04-15</td>
<td>112 (409)</td>
<td>1.380</td>
<td>0.778</td>
<td>0.279</td>
<td>17.994</td>
<td>Not</td>
</tr>
</tbody>
</table>

**NEO Earth Close Approaches**

Close Approach Data

The following table shows close approaches to the Earth by near-Earth objects (NEOs) limited as selected in the "Table Settings" below. Data are not available prior to 1900 A.D. nor after 2200 A.D. Data are further limited to encounters with reasonably low uncertainty.

<table>
<thead>
<tr>
<th>Object</th>
<th>Close-Approach (CA) Date</th>
<th>CA Distance Nominal (LD)</th>
<th>CA Distance Minimum (LD)</th>
<th>V relative (km/s)</th>
<th>V infinity (km/s)</th>
<th>H (mag)</th>
<th>Estimated Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2018 JG)</td>
<td>2018-May-17 22:21 ± 00:01</td>
<td>17.59 (0.04020)</td>
<td>17.51 (0.04090)</td>
<td>9.33</td>
<td>9.33</td>
<td>23.4</td>
<td>56 m - 130 m</td>
</tr>
<tr>
<td>(2018 GL1)</td>
<td>2018-May-18 02:21 ± 00:01</td>
<td>14.25 (0.03090)</td>
<td>14.23 (0.03057)</td>
<td>5.24</td>
<td>5.22</td>
<td>20.6</td>
<td>52 m - 130 m</td>
</tr>
</tbody>
</table>
Some questions...

- Does Education and public outreach provide benefits to scientists? to science?
- What are the problems and misperceptions? How do we correct them?
- How do we best convey the danger of an asteroid impact to the press in a way that we avoid miscommunication?
- Are we desensitising the public to asteroid impacts because every close approach of a small object is in the press?
- Can we develop guidelines for reporting objects to the public? e.g. impact threat
- Should scientists ever write anything for the public?
- When should impact corridors be published?
- Do we need a colour scale for flybys - to give journalists an idea of how important it would be to report on a flyby from a technical/scientific view? E.g. based on fly-by distance and size.
- From the journalist's perspective what is the point of reporting the flybys? Science or sensationalism?
- Are refereed scientific journals no longer the best way for scientists to publish research?
Giovanni Carrada

- MSc in Biological sciences
- Author, curator and consultant,
  - Communication of science and innovation
  - Communication of cultural heritage
- Author of TV program SuperQuark, Rai
- Worked for:
  - World Health Organization
  - European Commission
  - Bayer Cropscience
  - RAI
  - ENEA
  - National Institute of Research for Food and Nutrition
  - Etc..

17/05/2018
Peter Jedicke

- Based in London, Canada
- Retired college teacher
- Royal Astronomical Society of Canada
- Public lectures
- Edited collections
- Six children’s books
- Media work
- Philosophy of Science
Felicitas Mokler has a research background in astrophysics (PhD in planet formation); since several years she works in science communication and journalism. As a free lance science writer she covers topics in astronomy and physics for print and online media such as Neue Zürcher Zeitung, Spektrum der Wissenschaft or Frankfurter Allgemeine Zeitung. She recently founded the online platform weltraumreporter.de as a member of the cooperative of free lance science writers in Germany RiffReporter, which is currently nominated for the Grimme Online Award 2018.
Waldenmaier Stefan

- Manager Public Relations of the Excellence Cluster Universe
- Press Officer of an International Technology Company (Giesecke + Devrient)
- Journalist and Senior Editor of a German Technology Magazine (Funkschau)
- Studies: Physics (Saarland University), Journalism (University of Hohenheim)