



MW-Gaia WG3 Workshop

Asteroids and comets: revealing the history of the Solar System

Helsinki (Finland), 28th-29th September 2021

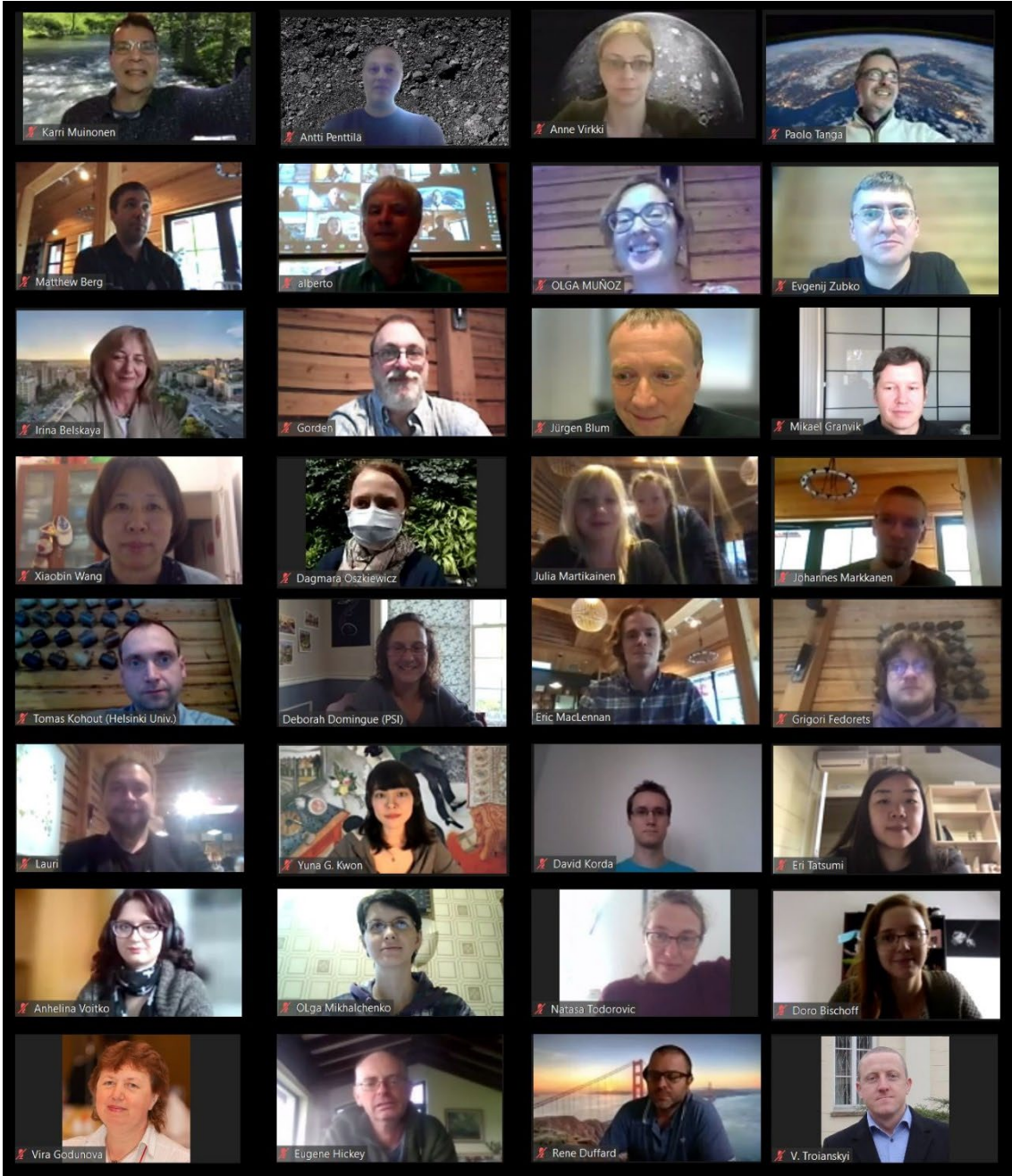
The workshop [Asteroids and comets: revealing the history of the Solar System](#) took place hybrid, hosted by department of Physics of University of Helsinki, from 28th to 29th September 2021.

This was the second workshop of the Working Group 3 of the MW-Gaia COST Action. The program is composed of invited oral presentations with a duration of 20 min each (15 min for the talk, 5 min for questions, answers, and change of speaker). Additionally, there will be specific sessions for discussion. The workshop attendance was by invitation only, with the restriction of maximum 25 participants on site. The workshop was organized in hybrid mode with participants attending virtually and on site. Both modes of attendance involved scientific presentations via Zoom. Mankelaitta of the Krapfi Conference Center (Tuusula, Finland) served as the workshop venue, with accommodation at the Onnela premises.

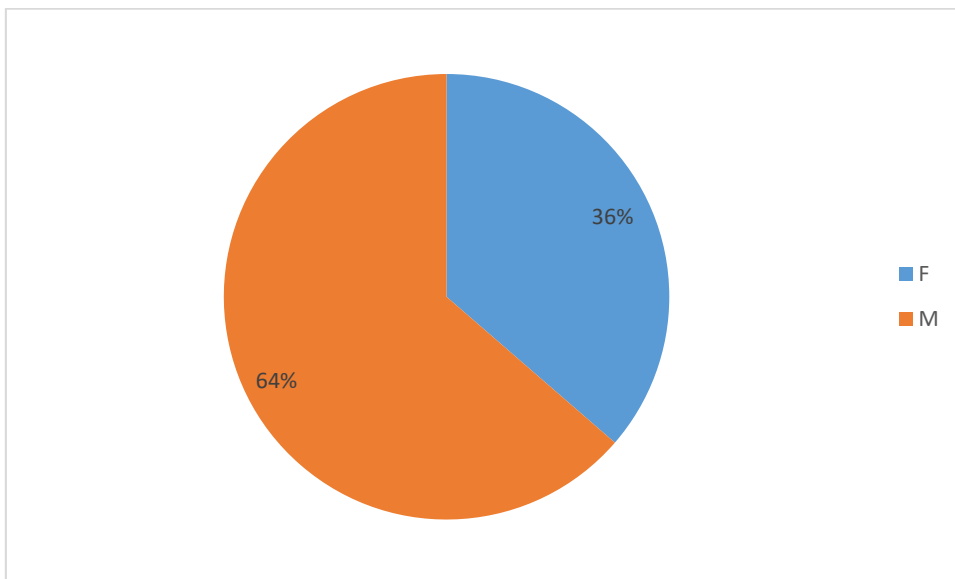
Scientific motivation of the workshop

Asteroids and comets are the key to the evolution of the Solar System. These small Solar System objects (SSOs) are being systematically observed, with unprecedented precision in photometry, spectroscopy, and astrometry, by the ESA *Gaia* space mission. The workshop will cover the synergies and challenges in the combination of *Gaia* data and data from other sources, that is, from ground-based astronomical observations and space missions to small SSOs. The former includes astrometry, occultations, spectroscopy, polarimetry, and photometry, whereas the latter include the high-resolution observations of asteroid Ryugu by the Hayabusa2 mission (JAXA), of asteroid Bennu by the OSIRIS-REx mission (NASA), and of Comet 67P/Churyumov-Gerasimenko by the Rosetta mission (ESA). How *Gaia* relates to future SSO space missions, such as DART (NASA) and Hera (ESA), Comet Interceptor (ESA), and Destiny+ (JAXA), was addressed.

The workshop improves the understanding of the physics of small SSOs to draw inferences on their origin and formation. Topics covered, for example, exploitation of the extraordinary accuracy of, first, *Gaia* astrometry for orbit improvement, navigation to mission targets, and asteroid mass determination, and, second, *Gaia* photometry for the retrieval of asteroid phase curve parameters, shapes, and rotational characteristics. Tutorial sessions are organized using pre-recorded videos on data analysis techniques in astrometry and photometry, including applications of machine learning techniques to large samples of asteroid data.



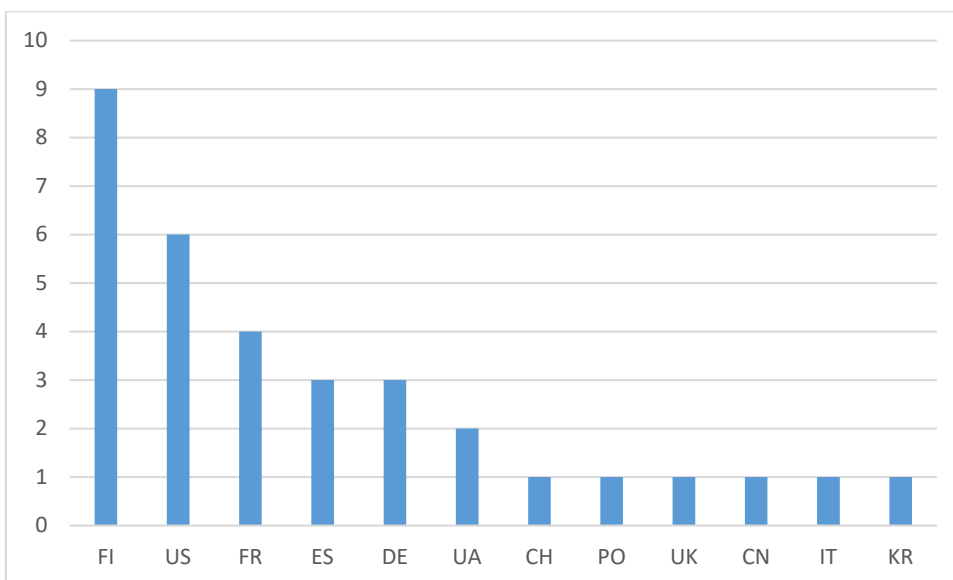
The workshop in numbers



The workshop was attended by 33 researchers, 36% of them female.

The SOC and LOC had a 33% (1 out of 3) and 50% of female researchers (3 out of 6) respectively.

From the total, 14 participants (42%, including invited speakers) had financial support by the COST Action.



There were researchers from 12 different countries: Europe (mostly FI), the United States, China and Korea.

There were 31 presentations (42% female).

Report prepared by Lola Balaguer-Núñez.