

## Resolved stellar populations in and around the Galaxy in the era of Euclid

Dec 1-5 2025, Lorentz Center@omega

### Scientific programme

#### Description and aims

The aim of the workshop was to bring together astronomers from the Milky Way & Resolved Stellar Populations Science Working Group of the Euclid Consortium and kickstart the scientific exploration of the mission's first major data release (DR1). Timed to occur shortly after DR1 had become available in October 2025, the workshop focussed on the vast legacy science potential of Euclid's data. While designed to map dark matter and dark energy, Euclid's deep, wide-field, high spatial resolution imaging will provide an unprecedented view on resolved stellar populations in the Milky Way, its satellites, star clusters, Magellanic Clouds, and other nearby galaxies. The workshop was thus intended as a platform for participants to share knowledge, coordinate efforts, and establish the initial science projects that will capitalize on the one-year proprietary access to this unique dataset.

The overarching goal was to maximize the scientific return from Euclid by fostering collaboration and developing a clear strategy for the analysis of the data. One way in which we aimed to achieve this was by developing a roadmap for tackling key scientific questions, such as detecting faint stellar streams, discovering and following up on ultra-faint dwarf galaxies, and probing the history of the Milky Way (and its satellites) through globular clusters. The workshop was designed to be highly interactive, with the specific objectives of consolidating teams, sharing analysis code and techniques, and organizing task forces for essential follow-up observations. By bringing together the community, we thus aimed to ensure that the wealth of data from Euclid will be effectively harnessed in a time-critical manner and pave the way for many exciting discoveries about resolved stellar populations in and around the Milky Way.

#### Tangible outcome

Based on feedback received and our own impression, the workshop was highly successful. Over the five days, attendees discussed preliminary work, explored synergies and complementarities, and coordinated the write-up of key scientific results. Attendees who had not fully engaged with Euclid data before benefited from tutorials and hands-on sessions on how to access the internal data archive and the types of data products that were available. Thanks to these sessions, some participants were able to download and carry out an initial inspection of data for planned papers for the first time. Most afternoons were used for small-group work and discussions, which gave the workshop a highly interactive feel.

#### Scientific breakthrough

It was gratifying to see that many people were already busy exploring the DR1 data; for example, searches for dwarf galaxies had already turned up several interesting new candidates, some of these having been discovered independently by several attendees. One important outcome of the workshop was a more systematic coordination of these efforts and agreements about authorship on the resulting publications. Another topic of much discussion was the quality of the pipeline-produced photometry and astrometry, and the potential need for bespoke (improved) reductions for a subset of the DR1 resolved stellar populations papers.

#### "Aha" moments

The ease with which low-surface brightness structure around galaxies out to several Mpc can be revealed by relatively basic archival queries provided a spectacular demonstration of the potential of the Euclid data. The comparison of different photometric techniques was an eye-opener for some participants. Needless to say, it will be important to carefully assess which data products to use for a given purpose.

## **Organization**

### Format of the workshop

The workshop was attended by nearly 50 members of the Milky Way & Resolved Stellar Populations Science Working Group (SWG) within the Euclid Consortium. Almost all participants attended in person (4 attended online). Nearly half the participants were early-career researchers (ECRs), either PhD students or junior postdocs. The remaining participants spanned a variety of career stages, from senior research fellows to full professors. There was a near-perfect gender balance, and many countries were represented (UK, France, The Netherlands, Germany, Spain, Italy, Denmark and Japan).

Apart from the scientific programme, the workshop provided rich opportunities for networking and social interaction. This included a welcome reception at the Lorentz Centre and a workshop dinner at Restaurant Verboden Toegang in Leiden. The organisers gratefully acknowledge the award of RAS and NOVA funding, which was used to subsidise the workshop dinner and the participation (hotel and travel costs) of several ECRs who would not have been able to attend otherwise.

### Other comments

We thank the Lorentz Center for their guidance throughout the process and for providing the facilities and organizational assistance that helped make the workshop a success.

**Eduardo Balbinot** (Leiden, Netherlands)

**Giuseppina Battaglia** (La Laguna, Tenerife, Spain)

**Annette Ferguson** (Edinburgh, UK)

**Søren Larsen** (Nijmegen, Netherlands)

**Teymoor Saifollahi** (Strasbourg, France)