



# From star clusters to field populations: survived, destroyed and migrated clusters

Villa Galileo 20–23 Nov 2023

## Organisers

### SOC

Laura Magrini (INAF-OAA), Sofia Randich (INAF-OAA), Pavel Kroupa (University of Bonn & University of Prague), Germano Sacco (INAF-OAA), Lorenzo Spina (INAF-OAA)

### LOC

Elena Franciosini (INAF-OAA), Mathieu Van der Swaelmen (INAF-OAA), Patrizia Braschi (INAF-OAA), Carlos Viscasillas Vasquez (University of Vilnius)

**Keywords:** star clusters, kinematics and dynamics, galaxy evolution, stellar populations.

## Topics

**Cluster formation:** star formation models, spatial and temporal variation of the rate of cluster formation

**Cluster demographics:** the *Gaia* mission, new identification techniques based on artificial intelligence, description of new samples, complete characterisation of existing samples; presence of halo and tidal tails in clusters.

**Cluster disruption and stellar migration:** cluster disruption models, role of stellar migration in the redistribution of populations, chemical and kinematic evidence of radial and vertical displacement, differences between field stars and clusters, numerical models of cluster migration and disruption rates.

**Clusters in current and next generation instruments/surveys:** what are the key open questions that we could tackle with the next generation of instruments and surveys, e.g., WEAVE@WHT, 4MOST@VISTA, MOONS@VLT.

## Summary of the Conference

Open star clusters play a key role in various aspects of Galactic Archaeology. They are formed by groups of stars born from the same molecular cloud, which share the same age, kinematics, and chemical composition; therefore their properties can be measured much more precisely than those of individual stars.

Moreover, they are among the best test particles to prove the conditions of galaxies both at present and back in time, being located across the entire Galactic disc and covering a wide range of ages. In addition, star formation is believed to occur mainly in areas of high density, while stars rarely form in isolation; the majority of clusters then disrupt, contributing to the population of field stars. Consequently, open clusters stand at the intersection between the structure of the Galactic disc and the stellar populations it contains.

However, the transition between gravitationally bound stellar populations and field populations is not fully understood, and there are still many open questions: what is the rate of cluster destruction and how does it vary across the Galactic disc? how do field stars and open clusters differ in the way they trace the Galaxy in space and time? How representative is the current population of open clusters in our Galaxy, especially the oldest ones, of the initial cluster population?

This workshop brought together about 40 experts in various fields of cluster formation and evolution, creating ample room for discussion and exchange of ideas. Many new exciting results were presented by both young and senior researchers, inspiring new collaborations among participants. The workshop triggered new innovative and critical inputs into the panorama of large spectroscopic surveys and *Gaia* satellite results, for a deeper understanding of the origin and evolution of the Galactic stellar populations.

The website of the meeting, including all the presentations, is available at this link: <https://indico.ict.inaf.it/event/2472/overview>



Figure 1. Group picture of the workshop in the courtyard of Villa Galileo.