

# INTERNATIONAL ASTRONOMICAL UNION

## INTER-DIVISION COMMISSION H4

### Stellar Clusters

#### Annual Report 2021

##### Organizing Committee

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Research of the commission H4 concerns star clusters, of any size, at any distance, and of any age, includes the observation and theory of stellar groupings as they form and evolve, cluster disruption, stellar interactions inside clusters, and star formation in dense environments.

The Commission H4 has an official newsletter: "The Stellar Clusters Young and Old Newsletter" (SCYON), edited by M. Netopil, E. Paunzen, and by A. Adamo (who replaced G. Carraro at the end of 2021). The newsletter is a link to the scientific activity in the field.

Research addresses the formation and dynamical evolution of star clusters; stellar evolution and ages; star clusters as tracers of stellar populations; not-so-simple stellar populations in star clusters; studies of specific types of objects within clusters; nuclear clusters; extragalactic cluster systems; structure of star clusters. An increasing portion of the electromagnetic spectrum, ranging from X-rays to the far-infrared is used in the analysis, as well as advanced  $N$ -body simulations.

Interconnections between the different topics (Associations and Young clusters; Old Clusters and Globular Clusters; Dynamics) continues to be dominant in the study of this field. During this year, the astrometric Gaia 'revolution' played a further role, with the early third data release (EDR3) by the GAIA collaboration. Several spectroscopic surveys (GALAH, APOGEE and Gaia-ESO) have also been exploited for cluster stars. Great advance in cluster research is now to be expected, when data from JWST, launched at the end of 2021, will become available.

For the future, the survey "Stellar clusters in 4MOST" (PIs: Lucatello, Vallenari, Bragaglia) was selected among the Community Surveys for 4MOST, which were evaluated in 2021. 4MOST will start in 2024.

Although meetings in person have been hampered by the Covid 19 pandemia, we list:

- **Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun (Cool Stars 20.5)**, (virtual meeting, March 2-4 2021): it included several sessions on Star Clusters and Globular clusters and featured talks (some of which are available on youtube) by A. Bragaglia, N. Bastian, A.F. Marino, G. Cordoni and A. Milone.
- **EAS 2021**, virtual meeting, June 28–July 2, 2021, included Symposia and Session which involve stellar clusters, <https://eas.unige.ch/EAS2021/>
- **Star Clusters: the Gaia revolution**, Barcelona 5-7 October 2021, on line, <https://indico.icc.ub.edu/event/114/>
- **Aspen Winter Conference "Illuminating Galaxy Formation with Ancient Globular Star Clusters and their Progenitors"**, March 13–18, 2022

A recent web site dedicated to research in the field of the Commission H4: **Catalogue of stars in Milky Way globular clusters from Gaia EDR3**, by Eugene Vasiliev and Holger Baumgardt, who derived membership of stars in all Globular Clusters of the Milky Way by using the early third data release of GAIA.