

Preface

Stars form mainly in clustered mode. Over time, these clusters evaporate and/or disrupt, enriching the general field population. Cluster lifetimes can vary enormously, ranging from a large population of short lived individuals that get shattered in a few Myr while emerging from their parent clouds, to old globular clusters that have been inhabiting the halo of Milky Way for more than 12 Gyr.

These characteristics confer multiple roles to the star cluster population. As stellar birth sites they are laboratories for studying local and large scale star formation processes, and later on, stellar evolution. Emergence from their gaseous and dusty cocoons highlights the interaction of stellar systems with the interstellar medium (ISM): If on one side, stellar winds will blow away the surrounding medium, on the other side, this sweeping of the ISM will have dramatic consequences on the kinematics of cluster stars, affect a cluster's morphology, star loss to the field and even its survival. Analysis of the Galactic cluster population, either as a whole or in age groups has already provided a wealth of insight on the morphology and dynamics of spiral arms, the various scales of Milky Way (disk heights, distance to Galactic centre, extension of the warp, flare, and others), Galactic rotation, formation and development of the Milky Way.

Estimates indicate that the Milky Way has around 200 billion stars (number growing every few years) and presently hosts $\sim 10^5$ or more star clusters. However, only about 2,500 open clusters have been identified and constitute a sample affected by several well known selection effects. Less than a half of these clusters has actually been studied, and this subset suffers from further selection biases.

Given the estimated number of present day clusters, one would expect that available all sky surveys would have produced many thousands of identifications. Yet, only $\sim 1,300$ clusters, i.e. 1/3 of the optically visible clusters (~ 600 of 1,800) and most of the infrared clusters (~ 700), have been discovered through automatic or semi-automatic searches on large scale survey data products from ground based (mainly DSS, 2MASS and GLIMPSE), and space (Hipparcos) endeavours. Expectations are that the new generation of all sky surveys (UKIDSS, the VISTA-based VHS and VVV, and Gaia) will add many more.

The symposium “Star Clusters in the Era of Large Surveys” was held in Lisbon on Sep 9–10 during JENAM 2010. It has been a meeting point for discussing what and how can recent, on-going and planned large area surveys from ground and space, availability of efficient reduction pipelines, development of analysis algorithms and access to databases around the world, contribute to produce a leap in this research field that has a strong European history.

Science topics addressed included:

- Cluster searches
- Clustered vs isolated star formation, large scale star formation, enrichment of the field population
- Structure, populations and evolution of the Milky Way
- Cluster dynamics (internal and within the Milky Way)
- Variability of stars in clusters (from time resolved surveys)
- Analysis techniques for large samples
- Archiving

By any measure the meeting was a great success, proving that the time was right for it. The credit for this goes to all the participants who made the meeting reach beyond the mere presentation into a forum of prolific discussions. The “official provokers” appointed by the SOC helped immensely by stimulating hours of lively and fruitful debate. We thank the SOC for this and for enforcing a very focused program which generated the good level of discussion during the meeting. It was hard to leave well known researchers outside of the program, but in hindsight it was the right decision. Finally, if only one thought remains from the meeting it is that stellar clusters are indeed unique and fundamental tools to investigate a series of important astrophysical problems, from planet formation to galaxy evolution. And that the time to study clusters is *now*.

The invited “provokers” were Coryn Bailer-Jones, Emmanuel Bertin, Eli Bressert, Laurent Eyer, Simon Goodwin, Simon Hodgkin, David Martínez-Delgado, Giusi Micela, Nickolas Moeckel, Estelle Moraux, Tim Naylor, Martin Netopil, Sofia Randich, John Stauffer, Paolo Ventura, Günther Wuchterl and Hans Zinnecker.

We would like to thank the tireless help of staff at the SIM laboratory and the Faculty of Science of the University of Lisbon. Very special thanks to the LOC and its extremely helpful and kind crew of student volunteers: Alexandra Guerreiro, Ana Matos, Andreia Ribeiro, André Viana, Daniela Bolrão, Diogo Pereira, Gil Marques, Gustavo Mil-Homens, Gustavo Sousa, Joana Oliveira, Joana Pires, João Calhau, João Resende, João Retrê, Mariana Vargas, João Faria, Raul Mendes, Pedro Carvas, Salomé Matos and Susana Fernandes.

The meeting would have not been possible without the support of the European Astronomical Society, the Portuguese Astronomical Society and the Portuguese Foundation for Science and Technology.

Lisbon,
Vienna

*André Moitinho
João Alves*

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Star Clusters in the Era of Large Surveys
Proceedings of Symposium 5 of JENAM 2010
Moitinho, A.; Alves, J. (Eds.)
2012, XIV, 266 p., Hardcover
ISBN: 978-3-642-22112-5