

Preface

Where do most stars (and the planetary systems that surround them) in the Milky Way form? What determines whether a young star cluster remains bound (such as an open or globular cluster), or disperses to join the field stars in the disc of the galaxy? These questions not only impact understanding of the origins of stars and planetary systems like our own (and the potential for life to emerge that they represent), but also galaxy formation and evolution, and ultimately the story of star formation over cosmic time in the Universe.

To help young (and older) scientists understand our current views concerning the answers to these questions as well as frame new questions that will be answered by the European Space Agency's *Gaia* satellite that was launched in late 2013, we proposed the 42nd Saas-Fee Advanced Course "Dynamics of Young Star Clusters and Associations" to the Swiss Society of Astronomy and Astrophysics in October, 2010. The course was approved and we began to organise the school. The lectures were held in the alpine village of Villars-sur-Ollon in March 2012. We were very fortunate to have such world renowned experts agree to participate as lecturers, including Cathie Clarke (University of Cambridge) who presents the theory of star formation and dynamical evolution of stellar systems, Robert Mathieu (University of Wisconsin) who discusses the kinematics of star clusters and associations, and I. Neill Reid (Space Telescope Science Institute) who provides an overview of the stellar populations in the Milky Way and speculates on from whence came the Sun. We also benefitted from the participation of Dr. Timo Prusti (ESA) who presented a special lecture on the expected performance and impact of the *Gaia* satellite (material presented in that lecture can be found at https://cast.switch.ch/vod/clips/29ksi0s1o8/link_box and is not part of this book). Although Prof. Tim de Zeeuw was not able to participate in the school, we are grateful for his thoughtful words that grace the preceding page of this volume.

In March 2012, over 60 Ph.D. students, post-doctoral fellows and senior scientists of every career stage came to hear these lectures, think about the formation and evolution of star clusters, argue, discuss and learn (there was probably some skiing involved as well). We are grateful to each of the attendees for their active and enthusiastic participation in the school. As is often the case, the organisers and

lecturers learnt as much from them as the students did from us. Each lecturer presented seven individual lectures, and a few combined lecture/discussions were also held. We also provided electronic transcripts of the lectures to each author as an aid in preparing this written version. In this volume we attempt to capture most of the material presented. Each of the lecturers of course has a unique style, as well as associated strengths and weaknesses in the presentations. We have tried to preserve those, while also injecting some uniformity of content and format. If you wish to review our work, you may view the lectures online at <http://www.astro.phys.ethz.ch/sf2012/index.php?id=videos-slides>.

Of course with any undertaking such as this, there are many people to thank. Ms. Marianne Chiesi (ETH) is chief among them. She was crucial to the organisation of the school, was on-site during the week of the event, and played a critical role afterwards in helping us get organised to produce this volume. We also thank Ms. Myriam Burgener from the University of Geneva for providing very helpful organisational advice in the lead up to the school. The local organising committee consisted of Dr. Richard Parker, Ms. Maddalena Reggiani, Mr. Michiel Cottaar, Dr. Richard I. Anderson and Mr. Lovro Palaversa. In particular, Dr. Richard Anderson and Lovro Palaversa were instrumental in helping to record the lectures for online access and transcription. The staff of the Eurotel Victoria Villars Hotel was very helpful, friendly, and accommodating to our needs. We also thank the Community of Villars-sur-Ollon for helping us to arrange some social events (at discount) for the participants of the school. Finally, we would also like to thank our colleagues at Springer, in particular Mr. Ramon Khanna and Ms. Charlotte Fladt, for their patience and support throughout this process.

One of us (MRM) would like to also express his gratitude to his colleagues, Dr. Cameron Bell and Dr. Laurent Eyer, for their dedicated effort, and unwavering support throughout this editorial process. In particular, Cameron Bell, who joined our efforts after the school was completed, deserves all possible recognition and accolade for his hard work in completing this volume as lead editor. Without him, this book would never have been published. However, for any errors that remain, despite our best efforts to catch them, we take full responsibility.

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