

## Foreword

The Symposium “Gaia: at the frontiers of astrometry”, held in Sèvres (Hauts de Seine, France) from 7 to 11 June 2010, was the closing conference of the European ELSA network (European Leadership in Space Astrometry), a Marie Curie Research Training Network supported by the European Community’s Sixth Framework Programme (FP6). Gaia, selected as one of the cornerstones of the European Space Agency (ESA) Science Program in October 2000 and planned for launch in 2012, has been conceived in the wake of the success of the Hipparcos satellite, the first space astrometry mission, launched by ESA in 1989. Combining the power of discovery of a systematic and repeated survey of the sky with three complementary instruments (astrometric, photometric and spectroscopic) and extreme accuracy astrometry, Gaia will provide an unprecedented stereoscopic map of our Galaxy and the nearby universe and bring a wealth of homogeneous and high quality data to decipher the structure, formation and evolution of the Milky Way. Gaia will also identify and measure a large number of small bodies in the solar system (asteroids, comets, satellites), extra-solar planets, quasars and compact galaxies, and will make a major contribution to fundamental physics.

The ELSA network started on 1st October 2006, for four years, with the overall objectives of developing theoretical understanding and practical analysis tools of importance for Gaia and transferring the European expertise in space astrometry acquired with Hipparcos to the new generation of scientists. The network, which joins together 14 European institutes, has recruited ten PhD students and five post-docs. They worked on different aspects of the preparation of Gaia: data analysis (algorithms, numerical analysis, software engineering), modelling of the instrument (attitude, radiation damage to CCDs), improvement of the astrometric solution, preparation of the scientific exploitation in various domains (stellar structure and atmosphere, stellar variability, stellar populations in the Galaxy and its neighbours, solar system objects). These activities have been conducted in complement to and in close interaction with the Gaia Data Processing and Analysis Consortium (DPAC), and in partnership with ESA and industry engineers.

The objectives of the Symposium were to present the results obtained in the framework of the ELSA European network, to review the progress of the mission and of the preparation of the data analysis, and to enhance contacts between the ELSA fellows and many other contributors to Gaia and to the many fields related to Gaia preparation and data exploitation. The Symposium was also an opportunity to draw once more the attention of the community to the extraordinary potential of Gaia and to the various preparatory works necessary to take full benefit from them, both in terms of theory, modelling and ground-based observations. Finally, Gaia has been put in the 2015 context, and progress on parallel or connected topics have been presented: progress on other astrometric satellites, performance of light detectors in astronomy, processing of massive data sets, especially in astronomy,

real-time classification of transients, access to massive data sets, and prospects for ground-based observations in complement to astrometry.

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As editors of this Symposium and coordinator of the ELSA network, we would like to warmly acknowledge all those who made this Symposium a success: the members of the Scientific and Local Organising Committees, Dagmara Oszkiewicz, Aidan Fries and Maya Belcheva who were in charge of the difficult task of summarising the posters, all the speakers and poster presenters, and Anthony Brown for accepting to make the conclusion of the Symposium. Finally, we would also like to acknowledge the very professional work of the “Centre International d’Études Pédagogiques” in Sèvres where the Symposium was hosted, in a very convenient and pleasant environment.

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