

PhD student position in 3D mapping of the Milky Way, at MPIA Heidelberg - Deadline 17 July 2020



The Galaxies and Cosmology Department at the Max Planck Institute for Astronomy in Heidelberg invites applications for a PhD student position to work with Dr. Gregory Green on mapping the three-dimensional structure of the Milky Way.

We are at an exciting moment in the study of Milky Way structure. Precision astrometry from the Gaia mission, coupled with large-scale photometric and spectroscopic surveys of the Galaxy, now allow for us to map the three-dimensional structure of the Milky Way on an unprecedented scale. It is now possible to tackle the numerically challenging, tightly coupled problems of mapping the distribution of dust and stars throughout the Milky Way disk. At the same time, stellar kinematics, gleaned from the Gaia mission, allow us to trace the full distribution of mass - including the unseen dark matter component - throughout the Galaxy. A comparison of the full mass distribution - derived from stellar dynamics - with the stellar mass distribution - inferred from photometry and spectroscopy - will be of great interest.

The student will work on inferring stellar properties from photometry and astrometry, and applying modern statistical techniques to map out the distribution of dust and stars in the Milky Way. The student will gain experience in techniques from Bayesian inference and machine learning, and in working with large astronomical datasets. The student will have the opportunity to work with exciting new datasets, including stellar spectroscopy from SDSS-V (<https://arxiv.org/abs/1711.03234>), astrometry from Gaia (<https://www.cosmos.esa.int/web/gaia>), and deep optical and near-infrared photometry from the Dark Energy Camera Plane Survey (<http://decaps.skymaps.info/>). For more background about Dr. Green's work on mapping dust in the Milky Way, see <http://argonaut.skymaps.info/>.

The student will participate in the broader Heidelberg astronomical community (at the MPIA, Heidelberg University and HITS), and will have the opportunity to build independent collaborations with scientists at the MPIA and worldwide.

The position comes with up to 4 years of funding (at 65% of the German TVL E13 pay scale), and could start as early as September 2020 (and no later than December 2020). The student will join the International Max Planck Research School for Astronomy and Cosmic Physics at the University of Heidelberg (<https://www.imprs-hd.mpg.de/>).

We are looking for students with a strong physics education and research experience in astronomy. The applicant should hold a Masters' degree or equivalent in physics or astronomy at the time they begin at the MPIA. Exceptional students with a 4-year Bachelor's degree may be accepted. Advanced language skills in English (both written and spoken) are required. Experience with and interest in numerical methods and programming are strongly desired.

Required materials:

- Curriculum Vitae
- Copies of academic certificates and grade transcripts
- A 1-2 page statement of research interests
- Two letters of reference, to be sent separately

Application deadline: 17 July 2020.

Job start date: between September and December 2020.

All materials may be submitted by email (green@mpia.de) or by mail:

Dr. Gregory Green
Max Planck Institute for Astronomy
Königstuhl 17
D-69117 Heidelberg
Germany

Please contact Dr. Gregory Green (green@mpia.de) with any questions about the position or application process.

The Max Planck Society is an equal opportunity employer. Applications from women, disabled people and minority groups are particularly encouraged. The MPIA supports its employees in their search for suitable child care institutions.