



One Post-doctoral Research Fellow in the project

Reconstructing the MAGnetic field of the Milky way via Astrophysical Techniques and Numerical SIMulations (MagMASim)

FORTH-SYNERGY grant

Ref: 112042

Heraklion 15/06/2023

The Institute of Applied and Computational Mathematics (IACM), of the Foundation for Research and Technology Hellas (FORTH), in the framework of the FORTH-SYNERGY project **MagMASim**, is seeking to recruit one (1) Post-doctoral Research Fellow.

Job Description

Project **MagMASim** is based on a multidisciplinary synergy between the Institute of Astrophysics (IA) and the Institute of Applied and Computational Mathematics (IACM) of FORTH. The project involves experiments, numerical methods for boundary value problems, numerical magnetohydrodynamic simulations of the evolution of galaxies through cosmic time, and statistical inference methods, in order to *study and reconstruct the magnetic field of the Galaxy*. To achieve this, we introduce a new approach to extracting information from Galactic magnetic field observations, with two major innovations compared to the current state of the art: (a) our approach will be based on the known physical properties of the magnetic field, in order to maximize our ability to predict the value of the magnetic field in between observations; and (b) it will be free of a series of usually adopted assumptions regarding the Galactic magnetic field geometry that severely restrict the obtainable accuracy of any magnetic field reconstruction. To address the above, we will pursue a multi-stage High Performance Data Analytics (HPDA, combination of HPC and Data Analytics tools) study of the Galactic field, involving numerical simulations and statistical inference methods.

A highly competitive, post-doctoral research fellow is sought for the project MagMASim, for 12 months initial contract, with an additional up to 12 months, extension foreseen upon performance. The successful candidate must have a PhD degree in Physics, Astrophysics, Engineering, Applied Mathematics, or a similar discipline, with a strong background in the numerical solution of differential equations and/or statistical inference methods, being proven by publications record, previous experience and/or thesis subject and reference letters. Previous background on numerical simulations related to research topics in astrophysics will be considered as a strong asset.

FORTH is a major research organization in Greece, with the mission to pursue high quality basic and applied research. IACM (www.iacm.forth.gr) focuses its research activities in several fields of natural sciences and engineering including among others multi-scale modelling of complex systems, scientific computing, and computational statistics, being the main applied and computational mathematics research centre in Greece. The project is conducted in close collaboration with the Institute of Astrophysics (IA,

<https://www.ia.forth.gr/>), which focuses its activities on cutting-edge astrophysics problems, including the physics of the Galaxy and the interstellar medium, high-energy astrophysics, and cosmology.

The successful applicant will work in close collaboration with scientists at the IA and IACM institutes at FORTH. She/he will be in direct contact with the members of the “Mathematical and Computational Modeling of Complex Molecular Systems” research group at IACM-FORTH and Univ. of Crete, led by Prof. V. Harmandaris, and the “High-energy Astrophysics and Cosmology” group at IA-FORTH and Univ. of Crete, led by Prof. V. Pavlidou.

Required qualifications

- ✚ PhD degree in Physics, Astrophysics, Applied Mathematics, or Engineering,
- ✚ Experience in numerical solution of differential equations and/or statistical inference methods
- ✚ Working knowledge of English

Location: IACM-FORTH and IA-FORTH, Heraklion Crete GREECE

Start Date: September 2023 onwards

Project Duration: 12 Months with possibility of extension according to the needs of the project

Net Monthly Salary: around 1300 Euros

Application Submission

Applications received before **June 30, 2023** will receive immediate attention. The deadline for applications July 10, 2023.

Interested candidates who meet the aforementioned requirements are kindly asked to submit their applications to the secretariat of IACM Ms. M. Papadaki (mariapap@iacm.forth.gr) with cc to the Scientific Coordinators of the project Prof V. Harmandaris (harman@uoc.gr) and Prof. V. Pavlidou (pavlidou@physics.uoc.gr).

In order to be considered, the application must include:

- ✚ Detailed CV and list of publications
- ✚ Names and contact details of three individuals who could provide letters of support
- ✚ Scanned copies of academic titles

Applications will be reviewed till the position is filled

Contact

For practical information and questions regarding the application and selection procedure, candidates are asked to contact the secretariat Ms. M. Papadaki (mariapap@iacm.forth.gr), tel. +30 2810-391800.

For information regarding the scientific goals of the advertised position and the potential of the research project in general, please contact Prof. V. Harmandaris (harman@uoc.gr), tel. +30 2810-393735 or Prof. V. Pavlidou (pavlidou@physics.uoc.gr), tel. 30 2810-394211.