POST-DOCTORAL RESEARCH ASSOCIATE

APPLICATION OF MACHINE LEARNING AND DATA VISUALISATION METHODS TO ASTEROID RESEARCH

Applications are invited at the Armagh Observatory and Planetarium for a full-time Research Associate to work in the areas of advanced data visualisation, statistical analysis and machine learning within the project "Decoding the asteroid belt, Rosetta stone of our solar system" led by Dr Apostolos Christou and funded by the Leverhulme Trust (Grant RPG-2023-266).

(**Left**) Artist's impression of a collision between asteroids in the region of space between Mars and Jupiter. The collision fragments will go on to form a new asteroid family. Credit: Don Davis, Southwest Research Institute. (**Right**) The *Elumenti Cobra* projector facility, used as part of the immersive data visualisation suite at Armagh (see Jarrett et al, 2021, *Astronomy & Computing*, **37**, 100502).

The post-holder will be working within the Armagh solar system group to develop, optimise and validate advanced Artificial Intelligence models (Neural Networks) and Data Visualisation protocols aimed to identify groups ("families") of asteroids created by collisions during the 4.6 billion-year history of the solar system. Use of these new techniques will push the state-of-the-art in family identification and may be of use for future observational survey products, such as the decadal Legacy Survey in Space and Time (LSST). Scheduled to commence in 2025, the LSST will discover some 6 million Main Belt asteroids (10x the present number) and enable the development of the most detailed chronology to-date of our solar system's evolution. In carrying out the research programme, the post-holder will avail of AOP in-house computing resources, including a shared high-performance computing server and a state-of-the-art Data Visualisation Laboratory facility, recently acquired as part of AOP's strategic investment in the use of immersive data visualisation as a research tool.

The role-holder will contribute to research excellence as a member of the faculty at AOP, with the role providing substantial scope for exercising academic judgement, originality, interpretation and presentation of results to national and international meetings. They will further disseminate their research findings via publications or other appropriate media, such as international workshops and conferences, and will be encouraged to participate in outreach activities.

Applicants must have a PhD in Data Science or a related field, or have satisfied the requirements for PhD by the starting date of the post. Successful candidates must be able to demonstrate a track record of experience in the application of Neural Networks to data

analysis, have excellent communication and computing skills and are expected to produce scientific articles for publication in peer-reviewed journals. Experience in working with astronomical data may be seen as an advantage. The salary will be on the Northern Ireland Civil Service (NICS) Staff Officer scale, £32,800-£34,011 per annum (currently under review). The project is funded by the Leverhulme Trust under Grant RPG-2023-266.

Armagh Observatory, located in the historical City of Armagh, Northern Ireland, UK, is an astrophysical research institute founded in 1789. It comprises 7 staff astronomers, 3 post-doctoral fellows, 10 PhD students and several visiting and emeritus astronomers. Research interests include Solar Physics, Solar-System Science, Stellar, Galactic and Extra-galactic Astrophysics. Facilities at Armagh include a high-performance computer centre (for theoretical modelling and high-volume data analysis) and a new data visualisation centre. AOP receives baseline support from the Northern Ireland Department for Communities (DfC), and its staff receive regular awards of telescope time and research grants from the Science and Technology Facilities Council (STFC) and other organisations. AOP is a full partner in the LSST-UK consortium and other international astronomy projects such DKIST, I-Lofar, GOTO, CTA and SALT. Further details about AOP and the research we do can be found at www.armagh.space.

To apply online for this vacancy visit: https://www.armagh.space. Please indicate the contact details of **at least two academic referees** and provide a full curriculum vitae (CV), list of publications, and a research statement (two pages max), including a description of how your skill set and expertise will be applied to the project. Please ensure that all your referees are contactable at any time during the selection process and are made aware that they may be contacted by AOP.

AOP holds Juno Practitioner status and the Diversity Mark NI Bronze award and we actively support equality, diversity and inclusion and encourage applications from all sections of society. Applications from underrepresented groups are particularly welcome. AOP has a responsibility to ensure that all employees are eligible to live and work in the UK.

The application deadline is **Friday 17th May 2024**. Applicants are asked to arrange for the letters of recommendation to reach AOP by the same deadline. The start date of the appointment is 1st July 2024 (negotiable).

For any queries regarding the application please contact Mrs Lisa O'Neill at hr@armagh.ac.uk. Informal enquiries may be addressed to Dr Apostolos Christou [(apostolos.christou@armagh.ac.uk](apostolos.christou@armagh.ac.uk)).

Please quote reference PDRA 2024 on your application and in any correspondence about this vacancy.