L-Università ta' Malta

Office for Human Resources Management & Development

University of Malta
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CALL FOR APPLICATIONS (Call ID: 119/2024)
Post/s of Full-Time Research Support Officer I or II

Project STRADA – "Self-supervised Transformers for Radio Astronomy Discovery Algorithms**"**
Funded by the Research Excellence Programme 2024 of Xjenza Malta

And any other projects undertaken by the Institute of Space Sciences and Astronomy

1. Applications are invited for a full-time Research Support Officer (RSO) to work within the Institute of Space Sciences and Astronomy of the University of Malta. The RSO may also be required to assist in several other research and development tasks related to various other research projects undertaken by the Institute.

2. Applicants must be in possession of an MSc in areas such as Artificial Intelligence, Computer Engineering, Astronomy and Physics. Applicants in possession of a BSc in these areas, and who are about to submit their MSc by the end of 2024 will also be considered and will be initially employed as RSO I.

3. Applicants would preferably have experience in one or more of the following areas: machine vision, deep learning, digital image processing, and radio astronomy. Experience in the Python programming language, popular machine learning frameworks such as TensorFlow and PyTorch, the HuggingFace API, as well as HPC environments will be considered an asset.

4. Applicants should have a demonstrable publication record at conferences and in journals, such as MNRAS, ML4Astro, CVPR, ICML, International Journal of Computer Vision, IEEE Transactions on Image Processing, Astronomy and Computing and others. Research topics the applicant should be familiar with include object detection and image semantic segmentation.

5. Applicants should be self-motivated and have the ability to work both independently and as part of a team, be able to organise and prioritise tasks within the project timeline to meet interim deadlines, and must possess good oral and written communication skills.

   The University of Malta is an Equal Opportunity employer.

6. **The selected candidate must be living in Malta for the period of employment.**

7. The post is for a period of up to 12 months, ending 31st January 2026. The candidate should preferably be available to start working as from 1st February 2025.

8. The initial remuneration per annum starting in 2025 (including any cost of living adjustment) shall be €26,458 (RSO I) or €29,578 (RSO II).

9. Candidates must upload their covering letter, curriculum vitae, and certificates (certificates should be submitted in English) and contact details of at least two referees through this form https://www.um.edu.mt/hrmd/workatum-projects by not later than **Sunday**, **1st December 2024.**

   Late applications will not be considered.

10. Further information may be obtained from http://www.um.edu.mt/hrmd/recruitments and should you have any queries, please send us an email on projects.hrmd@um.edu.mt.

Office of the University,
Msida, 20th August 2024

XJENZA MALTA

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Further Information

1. The STRADA Project: In the expanding field of radio astronomy, the exponential growth in data generated by radio telescopes presents both a significant challenge and a remarkable opportunity for astronomical discoveries. Traditional machine learning methods, while effective, often require extensive labelled datasets for training, a resource that is scarce and expensive to produce in the domain of astronomy. The STRADA project seeks to address this challenge by leveraging self-supervised learning with transformer models, an approach that promises to unlock the full potential of the vast, yet largely untapped, datasets in radio astronomy. Self-supervised learning, a subset of unsupervised learning techniques, enables models to learn rich representations of data without the need for explicit labels, by predicting parts of the input from other parts. When combined with the powerful transformer architecture, known for its success in understanding complex patterns in data, this approach offers a new pathway for the automated detection and classification of astronomical phenomena. By doing so, STRADA aims to significantly enhance the capability to discover and study transient events, pulsars, and other celestial sources in the radio spectrum, which are key to understanding the universe's most energetic processes. The scientific basis of STRADA lies in its innovative use of self-supervised transformers to interpret the inherently complex and noisy data produced by radio telescopes. This project will not only develop novel algorithms for data analysis but also contribute to the field of machine learning by adapting and refining transformer models for the unique challenges of radio astronomical data. The anticipated outcome is a set of robust, adaptable tools that can efficiently process large volumes of data, reduce the reliance on labelled datasets, and accelerate the pace of discovery in radio astronomy.

2. The RSO will be responsible for the execution of a number of tasks related to **STRADA** and a number of other research projects presently being undertaken at the Institute of Space Sciences and Astronomy. Further information may be obtained from Dr Andrea DeMarco (andrea.demarco@um.edu.mt).

3. The main duties and responsibilities of the appointee will consist of the following:
   a. produce software deliverables, write technical documentation, and prepare related reports within the stipulated time frames as specified in the project description;
   b. work with other research officers and students to jointly develop a pre-agreed work plan that apportions the project into a schedule of sub-tasks, which taken together, meet all the project objectives on time;

c. work flexible hours, so long as the pre-agreed sub-tasks are delivered on time and to acceptable standards, while keeping records of the actual time taken, on a task-by-task basis.
d. keep detailed progress reports and abide to all the conditions imposed by the project;
e. assist in the dissemination process with the relevant stakeholders via workshops/seminars and work with other research officers to jointly prepare publications and/or patents;
f. work with the University's Knowledge Transfer Office to protect any valuable intellectual property.
g. organise and attend regular project internal meetings and consortium meetings;
h. travel and attend meetings/conferences as the need arises; and
i. perform any other project related task as instructed by the project coordinator and key experts.

3. The appointee will be expected to work at such places and during such hours as may be determined by the University authorities.

4. The selection procedure will involve:
   a. scrutiny of qualifications and experience claimed and supported by testimonials and/or certificates (copies to be included with the application);
   b. shortlisting; and
   b. an interview and / or extended interview.

5. The post is for a period of up to 12 months until 31st January 2026, which will be subject to a probationary period and to the provisions of the Statutes, Regulations and Bye-Laws of the University of Malta which are now or which may hereafter be in force.

Office of the University
Msida, 20th August 2024