



Call for Expression of Interest
Marie Skłodowska-Curie Postdoctoral Fellowship
(HORIZON-MSCA-2024-PF-01-01)

The University of Malta (UM) is interested in hosting Marie Skłodowska-Curie Action fellows to work in its research teams and welcomes expressions of interest from excellent post-doctoral researchers to apply for the Postdoctoral Fellowship call.

University of Malta (UM) is the sole public and highest teaching institution in Malta, with its structures being in line with the Bologna Process and the European Higher Education area. UM has a 400-year history and there are over 11,500 students including 1,000 foreign/exchange students from nearly 92 different countries, following fulltime or part-time degree and diploma courses. Around 3,500 students graduate each year. UM is comprised of 14 Faculties and several other campuses: at Valletta, Marsaxlokk and Gozo. As of 2020, the UM employed a total of 2,848 employees including academics, administrative, technical and industrial staff (1,885 on a full-time basis and 963 on a part-time basis). Over the past ten years, the UM has been involved as coordinator and partner in numerous EU-funded projects under various Programmes including Horizon Europe, Horizon 2020, FP7, Erasmus+, Lifelong Learning Programme, INTERREG, National Funding and various other international and national programmes and initiatives. The UM is also represented in a number of European and International University networks and groups.

[Institute of Space Sciences and Astronomy](#)

The Institute for Space Sciences and Astronomy (ISSA) was set up in 2014 with members from the Faculties of Science, Engineering and ICT. ISSA explores and develops observational and theoretical facets of new physics. We are working in a number of collaborations that cross the globe, as well as building up in-house infrastructure for a broad range of disciplines such as supercomputing capacities and new theoretical physics.

This a fast-growing Institute with many new members, and with several events and outreach programs upcoming. We also have a number of publications and academic courses. Our aims are:

- to promote research in astronomy, astrophysics and cosmology as an interdisciplinary subject amalgamating science, engineering and ICT;
- to promote synergies between Faculties, Institutes and Centres in the teaching of astronomy, astrophysics and cosmology at the University, including supervision of dissertations in relevant areas;
- to promote the scientific method in engineering, science and ICT projects;
- to conduct research in engineering and ICT solutions for large science experiments including CERN and the SKA;
- to collaborate with individuals and institutions, both local and foreign - to raise public awareness in astronomy, astrophysics and cosmology, through public talks, evening courses and observing nights in conjunction with the Malta Astronomical society;
- to teach Engineering and ICT skills within a scientific environment at a postgraduate level including both taught Masters course and PhD.



One of the key competencies of the Institute of Space Sciences and Astronomy (ISSA) is the development of real-time digital and software backend for radio telescopes. Over the past decade we have deployed system on Square Kilometer Array (SKA) demonstrators, such as the Aperture Arrays Verification System (AAVS) and the Engineering Development Array (EDA), several backend at the Northern Cross in Medicina (Italy), the Mexican Array Radio Telescope (MEXART) and a 21-cm cosmological experiment in the Karoo, South Africa (REACH), among others.

We are currently entering a long-term project with the Istituto Nazionale di Astrofisica (INAF) where the Northern Cross will undergo a major upgrade funded through European funds. ISSA is co-leading the upgrade of the digital and software backend of this new telescope. The primary science cases driving this upgrade are Fast Radio Burst (FRB) detection and Space Debris (SD) detection and monitoring, fields in which the Northern Cross has demonstrated good capabilities even with the current limited sensitivity and field of view. The upgrade will refurbish all 64 cylinder in the North-South arms, with groups of 16 dipoles combined in analog to generate 256 single-pol receiving elements, and all of the East-West are that will yield another 192 elements. The analog signal will be digitised and pre-processed using Tile Processing Board, the digital board driving the real-time signal processing of SKA1-Low. The channelised output will be transmitted to a large compute cluster, consisting of approximately 25 GPU-nodes, a 8 PB storage array, 100Gb network and additional infrastructure. The high-performance nodes will be in charge of beamforming, correlating, dedispersing, and running the real-time science pipelines.

Prospective candidates will be involved in the design, implementation and testing of this system, together with ISSA and INAF researchers. This will be performed in phases, with commissioning on subsets of the chain conducted periodically. Most of the hardware resources will be hosted at Medicina, however ISSA has the required hardware for prototyping, testing and benchmarking.

Research Field: Information Science and Engineering (ENG)
Physics (PHY)

Keywords: radio astronomy, artificial intelligence,
high performance computing, signal
processing, space debris, fast radio bursts

The selected candidates will receive dedicated support from the supervisor [Prof. Alessio Magro](#) and the Research Support Services Directorate to write a successful proposal and submission.

Interested candidates must be in possession of a doctoral degree with not more than 8 years post PhD research experience and must not have resided in Malta for more than 12 the past during the past 3 years. Furthermore, their research interests should be relevant to the above project. Kindly send a covering letter and CV to the corresponding supervisor, [Prof. Alessio Magro](#), keeping in copy funding.rssd@um.edu.mt with 'MSCA-PF-2024 *'candidate name'*' as the email subject by **24 May 2024**.