



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.

[Faculty of Engineering](#)

[Department of Mechanical Engineering](#)

The Department of Mechanical Engineering carries out teaching and research in fundamental and advanced fields of Mechanical Engineering. The science, knowledge and understanding developed through teaching and research are applicable to a wide range of industrial sectors. The Department participates in various research projects carried out through industrial collaborations, national and EU research frameworks. It offers taught study-units in diverse degree programmes, ranging from the Bachelor of Engineering (Hons) to postgraduate and doctoral degrees. Labs under the direct management of the Department of Mechanical Engineering include a computational analysis lab comprised of a number of workstations and desktop computers running software packages in Finite Element Analysis, Computational Fluid Dynamics and Naval Architecture amongst others, a Fluid Dynamics lab having a number of wind tunnels, a wave tank and data acquisition equipment, a Thermodynamics lab having a number of engine dynamometers and data acquisition equipment, an Applied Mechanics lab having a number of universal testing machines, strain gauging equipment and fibre composite fabrication setups and a robotic systems lab having a number of robot arms together with associated controllers.

Fusion is a nuclear reaction that can be used to generate electricity. In contrast to fission, used in current nuclear power stations, fusion generates little but manageable radioactive waste and is inherently stable. Therefore the fusion nuclear reaction creates less safety concerns when compared to a nuclear fission reaction. Research in Nuclear Fusion is motivated by the search for a source of energy that does not contribute to increase carbon dioxide and other emissions. Developments in this area will therefore contribute to the development of sustainable energy sources essential for the fight



against climate change. Fusion research currently focuses on achieving net power output. The research area proposed here focuses on the engineering aspects of nuclear fusion, where the challenge is to develop technology that will make it possible to build a commercially viable power plant. This is an active and fast-growing area within UM, where our proven contribution focuses on engineering stress analysis for the structural integrity assessment of critical in vessel components. The work is highly interdisciplinary. The analysed components are interfaced with all aspects affecting their response, i.e. electromagnetic loads, seismic events, operational constraints etc. The current active researchers have, over the past 3 years, successfully led the UM to become part of the EUROfusion consortium, where it is now able to interface with the international key players in nuclear fusion research. Co-funding, however, remains a bottleneck for growth, hence this application. A funded post-doctoral researcher can work in the field of structural integrity assessment of the divertor sub-system of the DEMO reactor, the plant that will serve as the first demonstrator of a commercially viable nuclear fusion power station. The divertor is a critical sub-assembly responsible for absorbing energy within the reactor. Our work will focus on the structural integrity assessment and analysis required to design the various components, ensuring their suitability with regards to failure mechanisms. A very important aspect of the proposed research work will be in developing and augmenting existing design code of standards such as RCC MRx, DDC IC and SDC IC ITER for nuclear fusion reactors design. The work will be computational and will leverage the Department's investment in hardware and software infrastructure, needed to work within the EUROfusion consortium, hence enhancing the strong international component and exchange aspects. Hosting the post-doc will develop skills competence, and ultimately employability for academia and beyond.

Research Field: Information Science and Engineering (ENG)

Keywords: Nuclear Fusion, Structural integrity,
Stress Analysis, Finite Element Analysis.

The selected candidates will receive dedicated support from the supervisor [Prof. Ing. Pierluigi Mollicone](#), 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. Ing. Pierluigi Mollicone](#), keeping in copy funding.rssd@um.edu.mt with 'MSCA-PF-2024 'candidate name'' as the email subject by **24 May 2024**.