

Hosting offer for Marie Skłodowska-Curie Postdoctoral Fellowships (PF) 2022 at University of Rijeka

[MSCA Postdoctoral Fellowships](#) are individual research grants offering excellent postdoctoral researchers the chance to develop their skills by means of international mobility. Through the implementation of an original and personalised research project, MSCA Postdoctoral Fellowships aim to foster excellence through training and mobility and to equip researchers with new skills and competences in order to identify solutions to current and future challenges.

University of Rijeka, Croatia/precision engineering research group invites motivated postdoctoral researchers to jointly prepare an application for the [MSCA-PF-2022 call Marie Skłodowska-Curie Postdoctoral Fellowships](#) call ([MSCA-PF-2022](#)) with them as host organisation.

Description of Hosting organisation/group

Short description (preferably max. 0.5 page) of the host research group/host centre - strengths and scientific achievements and (if applicable) important infrastructure

Link to the webpage of the host group/host center

The Precision Engineering Laboratory (<http://precenglab.riteh.uniri.hr/>) research group of the Faculty of Engineering (RITEH - <http://www.riteh.uniri.hr/en/>) and the Centre for Micro- and Nano Sciences and Technologies (NANORI - <https://nanori.uniri.hr/>) of the University of Rijeka, Croatia (<https://uniri.hr/en/home/>), has a decades-long expertise in precision engineering and the micro- and nanosystems' technologies. In this frame, the research in the field of energy harvesting and wearable technology mainly deals with energy harvesters, primarily piezoelectric ones, and their application in both autonomous wearable medical devices as well as aerospace structural health monitoring. The research is conducted through complex numerical modelling and optimization using DoE methodology as well as through experimental assessments of optimized piezoelectric energy harvester performances. Our expertise is focused on the engineering design approach to energy harvester development considering the long term operation of the devices and ensuring realistic performance figure achievable in real life conditions. The experimental part of the research, mainly conducted at the RITEH laboratory premises, consists of modal and harmonic measurements using standard commercial equipment, e.g. dynamic shakers and various custom made setups, created using additive manufacturing (AM) technologies. The measurement of displacements and mechanical responses is in turn performed by using a high precision laser vibrometer. The mechanical properties of the utilized materials and structures are obtained via a micro-tensile machine, available at the NANORI laboratory premises. The production grade AM equipment, able to work with diverse materials, is available both at the RITEH as well as the NANORI premises. The combined use of these tools, both numerical and experimental, allows a deeper insight into the complex mechanism of harvesters' behaviour when subjected to different modes of excitation, allowing thus the development of EH systems optimized for different applications.

Your profile including Topics/expertise

Describe here in which research domains/topics you welcome postdoctoral candidates for an MSCA-PF application (preferably max. 0.5 page)

Upon joining our team, the MSCA postdoctoral candidate will be involved in an ongoing interdisciplinary project, i.e., the development of an autonomous wearable device aimed at medical applications such as health monitoring or telemedicine. The device is to be powered via energy harvesting (EH – a principle of collecting low-level ambient energy and transduce it into electrical energy) by random kinetic energy from human motion, transduced by using one or several optimized piezoelectric energy harvesters, which can, in turn, be combined with additional EH energy sources available from the human body as well as its environment, e.g. body heat or photovoltaics. Due to the intermittent availability of such energy sources, a suitable power management system is required, which should be able to combine multiple inputs from different energy sources, i.e. generated via different EH principles, and efficiently store it for later use, thus significantly increasing the efficiency and autonomy of the device. The final device will also comprise several sensing elements aimed at monitoring health parameters combined with a suitable signal conversion and processing systems, as well as a wireless communication module, able to transfer the collected data to the cloud or a local device, e.g. a smartphone, all to be done in predefined intervals in accordance with established medical practices. The ensuing wearable medical device will be tested both in laboratory as well as in real-life conditions in order to assess its functionality, power autonomy and overall performances.

Preferably you can list one or more potential supervisors and (a short) reference to their expertise

Prof. Saša Zelenika - <https://orcid.org/0000-0003-1536-0132>

Dr. Petar Gljušćić - <https://orcid.org/0000-0001-7936-6598>

- **Expected qualifications/expertise of the candidate:**

Advanced mechanical engineering modelling, mechatronics, basic electronics, experimental characterisation of complex mechatronics systems, power management, using of common SW tools for data collection and elaboration.

- **Please specify the required PhD degrees if applicable:**

Mechanical Engineering or, alternatively, Mechatronics, possibly even Physics

- You must have a completed PhD at the time of the call deadline (14 September 2022).
- Candidates must have a maximum of 8 years full-time research experience from the PhD award date until September 14, 2022. Periods of inactivity in research (e.g. unemployment, periods of employment outside research, parental or sick leave) do not count towards the time of research experience.
- For European fellowships, candidates can be of any nationality and must not have resided or carried out their main activity (work, studies, etc.) in Croatia for more than 12 months in the 36 months immediately before September 14, 2022.
- Highly motivated candidate with an excellent research track record appropriate to career stage, as evidenced by academic publications and other scientific output.

What we offer

- Support and guidance for the preparation of your MSCA PF proposal
- A stimulating, interdisciplinary environment for high-level research.

How to apply?

Indicate your interest by contacting the host institution as follows:

Please contact **Dr. Petar Gljušić** (pgljuscic@riteh.hr) (c.c. szelenika@uniri.hr, tea.dimnjasevic@uniri.hr) by email with a short CV and motivation to indicate your interest to prepare a MSCA-PF application with a supervisor /host group/

After the supervisor agrees to support you as a MSCA-PF candidate, you can start preparation of MSCA PF project proposal and will be supported further by the Research Support Office of the host university.

For more information please contact the MSCA coordinator of the host institution: Tea Dimnjasevic, tea.dimnjasevic@uniri.hr