

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, Department of Biotechnology /research group Kalafatovic lab (Design of short peptides) 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

We are an interdisciplinary team working at the interface of peptide chemistry and machine learning to develop new knowledge and ideas. In the last few years we attracted national and European funding to support the research ideas of the application of machine learning to peptide design. Our main strength is that we have researchers with different backgrounds covering both, chemistry and computer science. We have an excellent track record in the field of chemistry (Chemical Science, Nature Chemistry, Frontiers in Chemistry, ACS nano, Biomaterials, etc.) and in the field of computer science (Applied Soft Computing, Journal of Cheminformatics, Knowledge-based systems, Artificial intelligence in the Life Sciences, etc.)

Our laboratory is equipped with all the necessary tools for performing solid phase peptide synthesis and peptide purification. The organization has a mass spectrometry facility as well as instruments such as UV-vis, fluorescence and FTIR spectrometers and an advanced microscopy unit with atomic force microscope, fluorescent and confocal microscopes. There is also access to high performance computing infrastructure (supercomputer Bura).

Link to the webpage of the host group: <https://deshpetlab.uniri.hr/>

Link to the webpage of the host centre: <https://www.biotech.uniri.hr/en/>

Your profile including Topics/expertise

Little is known about the principles that govern the catalytic activity of short peptides at the sequence level. It appears that the residues that make up the sequence but also the order in which they appear are important when designing catalytic peptides. Many approaches tend to mimic the catalytic triad of a desired enzyme such as Ser-His-Asp. Remarkably, even very short peptides such as seryl-histidine (Ser-His) were shown to catalyze a number of hydrolytic reactions in water. Similarly to the serine protease chymotrypsin, which cleaves proteins and carboxyl esters, Ser-His dipeptide was found to cleave the p-NPA ester.

Even though several peptides have been shown catalytic activity as part of various supramolecular structures, the principles that govern their catalytic propensity at the sequence level have not been explored yet. It is our goal to understand how a particular peptide sequence acquires catalytic activity

and how can sequences evolve to reach function. We aim to gain information on monomers (combinations of amino acids) through a machine learning strategy and establish how to design better sequences in terms of their catalytic efficiency.

Applicants should have a background in Chemistry. Previous experience in the organic synthesis and characterization is preferable.

List of potential supervisors and (a short) reference to their expertise:

Assist Prof Daniela Kalafatovic: Peptide chemist with experience in peptide design, solid phase peptide synthesis, peptide self-assembly, smart peptide materials design and characterization.

Assist Prof Goran Mauša: Computer science expert with experience in development and application of machine learning algorithms, meta-heuristic search-based algorithms and generative models.

- Expected qualifications/expertise of the candidate: Applicants should have a PhD in Chemistry and previous experience in the organic synthesis and characterization of peptide nanostructures. Good knowledge of analytical and mass spectrometry methods is required (HPLC, UPLC-MS / MS, MALDI-TOF) and other characterization methods (CD, DLS, UV-Vis, fluorescence, NMR). Additionally, excellent written and spoken English is a must. The candidate is expected to conduct research, write reports, and articles.
- Required PhD degree: chemistry or equivalent
- 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 Assistant Professor Daniela Kalafatovic (daniela.kalafatovic@uniri.hr) and put in cc 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 preparing the 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