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Marie-Skłodowska Curie Postdoctoral Fellowship at the University of Ljubljana

University of Ljubljana, leading research institution in Slovenia, is looking for motivated candidates for the Marie Skłodowska-Curie actions (MSCA) Postdoctoral Fellowship Scheme applications with professor Tomaz Urbic, as s supervisor, in the field of chemical physics and physical chemistry. Please find details of prof Urbic expertize in the next few pages.

What is a MSCA PF?
The Marie-Skłodowska Curie Postdoctoral Fellowship is a post-doc research and training programme in which the fellow gains new skills and competences working on a specific research project in a new environment, collaborating with the academic and non-academic sector. Open to all fields of research. More information about the MSCA PF call will be available when the call opens in the middle of April.

WHO IS ELIGIBLE TO APPLY?
There are main requirements of eligibility:
1. Researcher must have a **PhD and maximum of 8 years full-time equivalent experience in research** (measured from the date that the researcher as in possession of a doctoral degree).
2. Mobility rule: Researcher can be of any nationality but must not have lived or worked in Slovenia for more than 12 months during the three years up to the closing date of the call (European Fellowships) or must not have lived or worked in the Third country (host in the outgoing phase) for more than 12 months during the three years up to the closing date of the call (Global Fellowships).
3. The applicants must choose University of Ljubljana, Slovenia, as their Host Institution.

If you decide to apply to the MSCA PF call in 2022 with University of Ljubljana, as your host institution, you will get a full support from University office for Research at UL and be guided throughout the whole process – from a two-day intensive workshop MSCA PF MASTERCLASS (workshop on proposal writing and info on experience of successful MSCA fellow, getting information on submission process and much more) and later on also a review of the project proposal from external experts.

PROFILE OF THE SUPERVISOR

NAME OF THE SUPERVISOR: prof. dr. Tomaz Urbic
MAIN RESEARCH FIELD: physical chemistry, chemical physics
E-MAIL address: tomaz.urbic@fkkt.uni-lj.si
LINK to SUPERVISOR's webpage: www.urbic.com

DESCRIPTION OF THE SUPERVISOR (max. 200 words)

EDUCATION

2004 - 2005 postdoc at University of California San Francisco, San Francisco, USA (supervisor Ken A. Dill. Density functional theories for associative fluids based on Wertheim's theory was developed and applied this to simple model of water in confined geometries. Work was published in Journal of Physical Chemistry B.)

1998 - 2003 Ph.D. in Chemistry, Faculty of Chemistry and Chemical Technology, University of Ljubljana. (supervisor Vojko Vlachy. Analytical theories for associative fluids based on Wertheim's thermodynamic perturbation theory and integral equation theory were developed and application made to simple model of water. The Ph.D. work resulted in five scientific publications, four in Journal of Chemical Physics and one in Journal of Molecular Liquids)

1993 - 1998 B.Sc. In Physics, Faculty for Mathematics and Physics, University of Ljubljana. (supervisor Professor Branko Borštnik. Hydration of electron was studied using quantum mechanical methods.)

EMPLOYMENT CURRENT POSITION

2018 - current Full professor for physical chemistry at FCCT, University of Ljubljana

PREVIOUS POSITIONS

2013 - 2018 Associate professor for physical chemistry at FCCT, University of Ljubljana
2008 - 2013 Assistant professor for physical chemistry at FCCT, University of Ljubljana
2001 - 2008 Teaching assistant for physical chemistry at FCCT, University of Ljubljana
1998 - 2001 Young researcher (Ph.D. student) at Faculty of Chemistry and Chemical Technology, University of Ljubljana

CURRENT AND PAST TEACHING ACTIVITIES

Undergraduate programs at the FCCT

- STRUCTURE OF ATOMS AND MOLECULES - (chemistry, biochemistry)
- QUANTUM MECHANICS - (chemical engineering)
- NUMERICAL METHODS - (chemistry, technical safety)
- PHYSICAL CHEMISTRY LAB COURSE - (chemistry, chemical engineering, microbiology)
- STATISTICS (technical safety)

RESEARCH FIELD OF THE SUPERVISOR

Main research field: To

Sub-fields:
hydrogen bonds in different substances
UV, VIS and near IR spectra calculation for different molecules
astro-chemistry
properties of water, liquids and solutions
integral equation theory, Wertheim's theory, density functional theory, for different liquids and solutions
phase diagrams
Monte Carlo and molecular dynamics methods
Lattice Boltzmann method
Microreactors
electrolytes, polyelectrolytes, colloids, absorption on the surfaces
statistical mechanics and analytical modelling
modelling of chemical reactions

RECENT TRACK-RECORD and other SIGNIFICANT ACHIEVEMENTS

[1] I. Pribec, A. Hubman, T. Urbic and I. Plazl. "A discrete reactive collision scheme for the lattice Boltzmann method." J. Mol. Liq., 332(2021), 115871 DOI: 10.1016/j.molliq.2021.115871.

[2] A. Perera and T. Urbic. "Clustering in complex ionic liquids in two dimensions." J. Mol. Liq., 265(2018), 307-315 DOI: 10.1016/j.molliq.2018.05.133.

[3] T. Urbic and K. A. Dill. "Water Is a Cagey Liquid." J. Am. Chem. Soc., 140(2018), 17106–17113 DOI: 10.1021/jacs.8b08856.

[4] T. Urbic. “Liquid-liquid critical point in a simple analytical model of water.” Phys. Rev. E, 94(2016), 042126 DOI: 10.1103/PhysRevE.94.042126.
[5] G. Munao and T. Urbic. “Structure and thermodynamics of core-softened models for alcohols.” J. Chem. Phys., 142(2015), 214508 DOI: 10.1063/1.4922164.
[6] M. Hus and T. Urbic. “Strength of hydrogen bonds of water depends on local environment.” J. Chem. Phys., 136(2012), 144305 DOI: 10.1063/1.3701616.
[7] M. Hus and T. Urbic. “Strength of hydrogen bonds of water depends on local environment.” J. Chem. Phys., 136(2012), 144305 DOI: 10.1063/1.3701616.
[8] T. Urbic and K. A. Dill. “A statistical mechanical theory for a two-dimensional model of water.” J. Chem. Phys., 132(2010), 224507 DOI: 10.1063/1.3454193.
[9] A. Bizjak, T. Urbic, V. Vlachy and K. A. Dill. “The three-dimensional ”Mercedes Benz” model of water.” Acta Chim. Slov., 54(2007), 532-537 DOI: .
[10] T. Urbic, V. Vlachy, Y. Kalyuzhnyi and K. A. Dill. “Orientation-dependent integral equation theory for a two-dimensional model of water.” J. Chem. Phys., 118(2003), 5516 DOI: 10.1063/1.1556754.

RESEARCH ENVIRONMENT

FACULTY/DEPARTMENT/LABORATORY

The University of Ljubljana is the first and the largest university in Slovenia; with 64,000 enrolled graduate and postgraduate students, it is among the largest universities in the world. The University of Ljubljana practices basic, applied and development research, striving for excellence and quality of the highest standard in all fields of science and arts, such as the humanities, social sciences, linguistics, arts, medicine, natural sciences and technology. The University is known for the quality courses in humanities, Science (especially Physics and Chemistry) and in technological fields, as well as in medicine, dentistry and veterinary science.

Faculty of Chemistry and Chemical Technology, University of Ljubljana, is committed to basic, applied and development research, trying to achieve excellence and highest quality standards in the areas of chemistry, biochemistry, chemical engineering, fire safety and occupational safety. The faculty co-operates with companies and promotes its own research and pedagogical achievements and contributes its share to the general social development. The University of Ljubljana has a consolidating role in the academic community of professors, researchers, students and other associates, and strives to establish its fine reputation both at home and around the world. The research, education and public activities, and relationships among members are built on the principles of professional excellence and ensure high quality standards and academic freedom of its associates and students, especially freedom of creativity.

Physical Chemistry Laboratory is part of Faculty of Chemistry and Chemical Technology. Physical Chemistry Laboratory is the only group in Slovenia doing research and providing education in physical chemistry. The research relates to educational process, which includes number of subjects from quantum chemistry and statistical thermodynamics on one side to colloid and surface chemistry on the other. This broad spectrum is reflected in the research. The individual researchers are collaborating with colleagues around the globe, seeking the »critical size« needed for quality research work. The joint research is currently conducted with the institutions worldwide.

RESEARCH INFRASTRUCTURE

The Department of Physical Chemistry (UL FCCT) has several laboratories, including a laboratory for computational modelling. The labs are equipped with high-tech instruments such as DLS, SAXS, Litesizer, rheometer, calorimeters, CD, UV/VIS, fluorimeter, instruments for handling GSO and measurements of the conductivity. We have two computer clusters and currently constructing new one that will have 3 work stations with two 32-core processors and 64 GB RAM and 6 work stations with two 24-core processors and 128 GB RAM. Two of the workstations will have two GPUs Nvidia A5000.

The Department of Chemical Process, Environmental and Biochemical Engineering (UL FCCT) has several laboratories, including a microfluidics laboratory. The labs are equipped with high-tech instruments such as HPLC (Shimadzu, Varian), GC (Hewlett Packard), UV-VIS spectrophotometers (Perkin Elmer Lambda, Varian Cary), laminar air flow cabinets (IskraPIO, TSS), programmable syringe pumps (Harvard Apparatus Pump 33 and PHD 4400), inverted laboratory microscope with fluorescence module (Leica DM IL LED Fluo), optical microscope (Olympus), centrifuge (Heraeus Sepatech) and autoclaves (216 L, 60 L, 28 L) equipped. Within the faculty there is also a workshop for the production of microreactors.

We have also access to other equipment at UL FCCT (https://www.fkkt.uni-lj.si/sl/organiziranost/enote-skupne-dejavnosti/#c172) and to supercomputer in Maribor (https://www.hpc-rivr.si/home_en/).

ACADEMIC AND NON-ACADEMIC COLLABORATION

SUPERVISION (COSUPERVISION) OF UNDERGRADUATE AND GRADUATE STUDENTS

2008 - current 7PhD Students, 15 Master Students, 23 B.Sc. students, 4 B.Sc. students old program

- Peter Ogrin's work (current PhD Student) was awarded the Prešern award by Faculty of Chemistry and Chemical Technology for the Best Student's Research Work in 2022. Results of this work were published in 4 papers in Journal of Molecular Liquids.
- Matej Huš was awarded the Prešeren award by University of Ljubljana for the Best Undergraduate Theses in 2012 (B.Sc.). Results were published in Journal of Chemical Physics and in Acta Chimica Slovenica.
- Jana Aupič's work was awarded the Prešern award by Faculty of Chemistry and Chemical Technology for the Best Student's Research Work in 2014. Results of this work were published in 2 papers in Journal of Chemical Physics.
- Matej Huš defended PhD Thesis in April 2015. Results of this work were published in 6 papers, 4 in Journal of Chemical Physics and 2 in Physical Review E. He got Pregel's award for best PhD in Chemistry.

FELLOWSHIPS AND AWARDS

2004 Fulbright Award (fellowship), U.S. Department of State's Bureau of Educational and Cultural Affairs

ORGANISATION OF SCIENTIFIC MEETINGS

2017 Member of local organizer for the 10th Liquid Matter Conference, Ljubljana, Slovenia, 17-21 July 2017

2004 Member of local organizer for 29th International Conference on Solution Chemistry, Portorož, Slovenia, 20–25 August 2005

2001 Member of local organizer for Fourth COST-D11 Workshop on Supramolecular Chemistry, Bled, Slovenia, September 20th-23rd, 2001. Bled, 2001

ON-GOING and PAST GRANTS

- Partner in project "Solvation modeling for next-gen biomolecule simulations", supported by National Institutes of Health (NIH), USA. P.I. K.A. Dill.; Grant No. RM1-GM135136 2020 - 2025.
- Member of the programme "Physical Chemistry", supported by Slovenian Research Agency. P.I. M. Lukšič.; Grant No.: P1-0201 Period: 1.1.1999 - 31.12.2026.
- Member of the project "Krožna sinteza trajnostnih (bio)kemijskih procesov na osnovi obnovljivih virov", supported by Slovenian Research Agency. P.I. Z. Kravanja; Grant No.: J7-1816 Period: 1.7.2019—30.6.2022.
- Member of the project "Raziskave agregacije proteinov v vodnih raztopinah soli in drugih topnih dodatkov", supported by Slovenian Research Agency. P.I. V. Vlachy; Grant No.: J1-1708 Period: 1.7.2019—30.6.2022.
- Member of the project "Večstopenjska sinteza z MIO-encimi v kontinuirnem mikroreaktorskem sistemu", supported by Slovenian Research Agency. P.I. I. Plazl; Grant No.: N2-0067 Period: 1.11.2017—31.10.2020.
- Member of the project "Structure and thermodynamics of hydrogen-bonded liquids: from pure water to alcohol-water mixtures", supported by Slovenian Research Agency. P.I. A. Jamnik.; Grant No.: N1-0042 Period: 1.1.2016—31.12.2018.
- Member of the project "Solvation and ion specific effects in biological systems", supported by Slovenian Research Agency. P.I. V. Vlachy.; Grant No.: J1—4148 Period: 1.7.2011—30.6.2014.
- Member of the project "Properties of ionic solutions and disperse systems", supported by Slovenian Research Agency. P.I. V. Vlachy.; Grant No.: J1—6653 Period: 1.7.2004—30.6.2007.
- Partner in project "Modelling Aqueous Solvation in Biology", supported by National Institutes of Health (NIH), USA. P.I. K.A. Dill and V. Vlachy.; Grant No. GM063592 2002 - 2014.
- Member of Management Committee in COST Action CM1401 "Our Astro-Chemical History" from November 2014 till 2018.
- Member of Management Committee in COST Action CM1405 "Molecules in Motion" from March 2015 till 2019.
- Participant in COST Action MP1305 "Flowing matter" from July 2014 till 2018.
- Coordinator in 'Uporaba računalniških orodij pri načrtovanju in optimizaciji procesov v kemiji in kemijskem inženirstvu ', project Po kreativni poti do praktičnega znanja, Javni sklad Republike Slovenije za razvoj kadrov in štipendije, for term from 1. 2. 2015 to 31. 7. 2015.

SPECIFIC REQUIREMENTS/PREFERENCES

- Required language: good to excellent knowledge of English language; ability to fluently communicate in English; ability to write in a proper English written language
- PhD in a relevant field, ideally in one of the following categories: (i) chemistry; (ii) physics; (iii) surface science; (iv) materials
- Research experience after PhD is not a prerequisite, but it is highly advantageous
- Ability to exercise original and critical thought
- Outstanding research potential or experience, exhibited by a letter of motivation, papers of a high quality in established international scientific journals, various awards (for instance for excellent study achievements, student poster / presentation awards, and similar)
- Established research interests

- Excellent communication skills
- Demonstrated ability to work collaboratively

OTHER

It is expected that the fellow will during her/his research stay at the host institution gain or improve or complement her/his existing knowledge that would help her/him in her/his development of the research career. The specific topic will be chosen in accordance with the fellow's interests in such a way that it would be complementary to the existing knowledge at the host institution. The research will be organised and led by the fellow her/himself, under supervision. This will contribute to his development into a leading independent researcher. A two-way transfer of knowledge is expected as the result of the work at the host institution. In addition, the fellow will be introduced into the international research network of the host.