Univerza v Ljubljani

Expression of supervisor's interest to host Marie Skłodowska-Curie Individual Fellows at the University of Ljubljana

Prof. dr. Vojko Kilar from University of Ljubljana (UL) is searching for a top-class experienced researcher of any nationality interested in **developing collaborative MSCA IF application** for the following EU Framework Programme for Research and Innovation **Horizon 2020** actions:

- Marie Skłodowska-Curie Individual Fellowships – European (MSCA-IF-2017-EF)
- Marie Skłodowska-Curie Individual Fellowships – Global (MSCA-IF-2017-GF)

H2020 Call MSCA-IF-2017

Planned opening date: 11 April 2017
Deadline: 14 September 2017

More info H2020-MSCA-IF-2017

ELIGIBILITY CRITERIA FOR MSC IF RESEARCHER

- The researcher must, at the deadline for the submission of proposals, be in possession of a doctoral degree or have at least four years of full-time equivalent research experience. The researcher may be of any nationality.
- Mobility rule: the researcher must not have resided or carried out his/her main activity (work, studies) in the country of the host organisation for more than 12 months in the 3 years immediately prior to the deadline for submission of proposals.

OPPORTUNITIES FOR POTENTIAL CANDIDATES – RESEARCHER´S CAREER DEVELOPMENT

The goal of MSCA Individual Fellowships is to enhance the creative and innovative potential of experienced researchers (post-doctoral or with 4 years of equivalent research experience) wishing to diversify their individual competence in terms of skill acquisition through advanced training, international and intersectoral mobility. The researcher and supervisor will develop the MSC IF application jointly. If the application will be successful, the grant provides an allowance to cover your living, travel and family costs. The research costs and overhead of the host organisation(s) are also supported. More information about the call may be found here.

University of Ljubljana offers stimulating environment for postdoctoral research providing modern core facilities in a supported environment with on-the-job training and supervision. In addition, postdoctoral researchers will have access to the generic and transferable skills trainings, they will have the possibility to be involved in educational process and if suitable, they will be seconded to industry all with the purpose for further development of their careers in the academic and non-academic sector.

Researchers who wish to cooperate with UL for the submission of a project proposal under the Marie S.-Curie Individual Fellowships should check that they fulfil the respective eligibility criteria and then send an Expression of interest, consisting of a CV and a summary presentation of their research proposal by email to: MSCA@uni-lj.si with the following reference: "MSCA prof. *name*". The deadline for submission is **15 March 2017**. Proposals will be pre-selected based on internal evaluation and the availability of suitable supervision. Candidates will be informed of the results of the pre-selection by 20 March 2017. **Selected candidates will be invited to meet the supervisor and visit the research environment of the University within a 2-day MSCA-IF Proposal writing Workshop in Ljubljana organised by the UL in June 2017.**

UNIVERSITY OF LJUBLJANA

University of Ljubljana (Univerza v Ljubljani, UL) is the oldest and largest higher education and scientific research institution in Slovenia. It encompasses 23 faculties and 3 art academies and has more than 40.000 undergraduate and postgraduate students and approximately 5.600 employees. UL is listed amongst the **top 500 universities** in the world according to the ARWU Shanghai, Times THES-QS and WEBOMETRICS rankings. UL is very active in national and international R&D and educational programmes, and creates almost half of the research results of Slovenia. In the period 2007-2013 UL cooperated in 163 FP7 projects, which places UL between **the leading organisations in the EU 13** member states. In 2016 UL cooperated in 54 Horizon2020 projects, including 2 ERC grants and is involved in over 300 other EU projects. The University of Ljubljana has close ties with many excellent Slovenian and foreign companies. In May 2015, UL founded the Slovenian Innovation Hub, which will operate mainly as a facilitator and promoter of development and research teams in the academic and business sphere. UL is also founder of the University incubator, the Institute for Research and Innovation, and recently the SMUL network - a global alumni and associates network. UL is committed to respect the principles of the European Charter for Researchers and the Code of Conduct for Recruitment of Researchers, which led to the right, from 2013, to use the logo *'HR Excellence in Research'*.

PROFILE OF THE UL SUPERVISOR

NAME OF THE SUPERVISOR: Vojko Kilar

MAIN RESEARCH FIELD: RISC, earthquake engineering

E-MAIL address: Vojko.kilar@fa.uni-lj.si

LINK to SUPERVISOR's CV:

http://www.sicris.si/public/jqm/rsr.aspx?lang=eng&opdescr=search&opt=2&subopt=300&code1=cmn&code2=auto&psize=10&hits=1&page=1&count=&search_term=10121&id=6897&slng=&order_by

DESCRIPTION OF THE SUPERVISOR (max. 200 words)

Email: Vojko.Kilar@fa.uni-lj.si
Ph.D., structural engineering, University of Ljubljana, Slovenia

Vojko Kilar was born in 1963 in Ljubljana. After diploma work on the Faculty of Civil and Geodetic Engineering in 1983, he worked as a researcher on the Faculty of Civil and Geodetic Engineering. He finished his master degree in 1991 and his doctoral degree in 1995. In 1993, he received a one year Fulbright grant for study on the Columbia University in New York. In 1998, he was elected for assistant professor, in 2005 for associate professor and in 2015 for full professor on Faculty of architecture at the University of Ljubljana. His professional research interests were primarily related to structural and earthquake engineering, design of structures and use of advanced structural systems and new materials in architecture and structural engineering. He was mentor of four doctoral students. In the last 20 years, he participated in several research projects oriented to development of advanced technological systems for increase of safety of building structures and in development of an energy efficient and earthquake resistant passive house building techniques. His recent research is oriented toward RISC management and research of necessary precaution measures from architectural and urbanistic point of view in order to minimize the damage extent after the strong earthquake event. His research work has been presented in. more than 150 research papers in original research journals with impact factor (44), book chapters (6) and scientific/professional conferences (approx. 100), as well as confirmed by 142 citations in Web of science and Scopus citation indexes up to the end of 2016. See also (http://izumbib.izum.si/bibliografije/Y20170210145108-A3243875.html).

RESEARCH FIELD OF THE SUPERVISOR

Main research field: architectural technology, structures in architecture, earthquake engineering
Sub-fields: seismic analysis of structures, seismic isolation, design of structures, seismic aspect of energy-efficient buildings, risk assessment, architectural heritage conservation

References http://izumbib.izum.si/bibliografije/Y20170210133304-10121.html:

- KOREN, David, KILAR, Vojko. Seismic isolation for asymmetric building structures. V: KAJFEŽ-BOGATAJ, Lučka (ed.), et al. Modern RISC-societies: towards a new paradigm for societal evolution, (Complexity design society, vol. 14). Vienna: Echoraum, cop. 2010, str. 403-431.
- PETROVČIČ, Simon, KILAR, Vojko. Seismic retrofitting of historic masonry structures with the use of base isolation - modelling and analysis aspects. International journal of architectural heritage, ISSN 1558-3058. [Print ed.], 2016. http://www.tandfonline.com/doi/full/10.1080/15583058.2016.1190881, doi: 10.1080/15583058.2016.1190881.
- KOREN, David, KILAR, Vojko. Seismic vulnerability of reinforced concrete building structures founded on an XPS layer. Earthquakes and structures(Online), ISSN 2092-7622. [Spletna izd.], 2016, vol. 10, no. 4, str. 939-963, ilustr. http://portal.koreascience.or.kr/browse/browseresult.jsp?kojic=TPTPJW&vn_cd=v10n4&maxyear=2016, doi: 10.12989/eas.2016.10.4.939.

- KILAR, Vojko, PETROVČIČ, Simon, KOREN, David, ŠILIH, Simon. Cost viability of a base isolation system for the seismic protection of a steel high-rack structure. International journal of steel structures, ISSN 1598-2351, Jun. 2013, vol. 13, no. 2, str. 253-263.
- SLAK, Tomaž, KILAR, Vojko. Parameterization and evaluation of seismic resistance within the context of architectural design. Modern applied science, ISSN 1913-1844, Jul. 2012, vol. 6, no. 7, str. 17-35.

RECENT TRACK-RECORD and other SIGNIFICANT ACHIEVEMENTS

Publications in major international/leading peer reviewed journals relevant for the scientific field:

- Structural Safety
- Reliability Engineering & System Safety
- Natural Hazards
- Cities
- Landscape and Urban Planning

Preferred main research goals for candidate:

- Assessment of urban system resilience to natural disasters
- Improvement of social preparedness and response to earthquakes and floods
- Development of computer programming tools for risk assessment
- Analysis of impact of open public spaces on urban resilience
- Applications to local RISC assessment.

RESEARCH ENVIRONMENT

FACULTY/DEPARTMENT/LABORATORY

Our team represents an academic, professional and research entity within the **Faculty of Architecture** at the University of Ljubljana (Slovenia). **The University of Ljubljana** (UL - www.uni-lj.si/university) is the central and largest educational institution in Slovenia. It is also the central and largest research institution in Slovenia with 30 percent of all registered researchers. UL implements and promotes basic, applied and developmental research and is pursuing excellence and the highest quality as well as the highest ethical criteria in all scientific fields and art. The offered position is foreseen in the department of structures at the Faculty of architecture.

RESEARCH INFRASTRUCTURE

- Advanced desktop PCs and all other up to date computer equipment/accesories.
- Software: structural design programs (Sap2000, RFEM, Tower), Mathematica, AutoCad, Archicad, 3d simulation programs.
- access to scientific journals
- laboratory work is not carried out due to limited resources

ACADEMIC AND NON-ACADEMIC COLLABORATION

Involvement in important networks and projects (http://www.sicris.si/public/jqm/rsr.aspx?lang=eng&opdescr=search&opt=2&subopt=303&code1=cmn&code2=auto&psize=10&hits=1&page=1&count=&search_term=vojko%20kilar&id=6897&slng=&order_by=):

- Safety of passive houses subjected to earthquake
- Implementation of advanced technologies for the increase of safety in the architecture of modern residential buildings
- The method for designing a controlled three-dimensional seismic response of structures (Slovene)
- Develop of consistent and transparent methodology for seismic design (Slovene)
- Towards effective presentation of eco-architectural values to general public
- Definition and evaluation of architectural renewal levels for social post war housing in Slovenia
- Urban renewal decision support system balancing energy efficiency and management of local resources in neighbourhoods in Slovenia

SPECIFIC REQUIREMENTS/PREFERENCES

- Language skills: English or Slovenian
- Degree field: architecture, urban planning, earthquake engineering, structural engineering, mathematics
- Research experience:
    - Good individual scientific research capabilities;
    - Preferably already the first author of several scientific research papers;
    - Versed in basic computer programming skills, acquainted with GIS, statistics, Mathematica, etc.

The focus of our intended research is socio-spatial resilience of urban system to natural disasters (especially earthquakes). The concept of socio-spatial resilience indicates the ability of a system exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner. It was found that urban system is a complex mix of interdependent networks. Networks are composed of individual components of the system (built volumes, infrastructure and social component) and the dynamic interaction between them that enable it function effectively. Resilience of a complex socio-spatial system can be assessed by a combination of different methods and approaches, considering all its components. Open space is part of the urban landscape and has a significant impact on the resilience of the system. The interdisciplinary research requires extensive knowledge from different scientific fields, such as architecture, urban planning, earthquake engineering, mathematics… Urban system resilience defines preparedness, response and recovery in the event of a natural disaster. A fundamental technique that illustrate this is a mathematical function of resilience. It is also possible to assess the resilience as the composite index or describe the system as graph and calculate the performance by mathematical algorithms. In further research, we want to graphically depict the urban system by abstraction of its components. Built volumes represent points, infrastructure links and surfaces between them, social networks can be shown as a basic layer that define a given space. Each component belongs the value obtained from its attributes. These are the properties of individual components, which have an impact on the resilience of the urban system in the event of natural disasters. Important public buildings are subcomponent of built volumes defined by parameters (such as height of the facility, structural system, structure material, purpose, density rate, the proportion of free space, number of users ...). In graph theory, it is possible to measure various properties of the system (accessibility, transition, complexity ...) and to compare the situation before and after the accident. The resulting value is transferred to the graph function of resilience, which describes the observed system in relation to natural disasters over a specified time interval. For the completion of study, we planned the implementation of the conceptual model on the real example.

KEYWORDS: Socio-spatial resilience, natural disasters, urban system, risk assessment, mathematical simulations