

## **Opis delovnega mesta mladega raziskovalca/ke** (*Description of the Young Researcher's position*)

1. Članica UL (*UL member*):

Fakulteta za arhitekturo

2. Ime, priimek in elektronski naslov mentorja/ice (*Mentor's name, surname and email*):

Simon Petrovčič e-mail: simon.petrovcic@fa.uni-lj.si

3. Raziskovalno področje (*Research field*):

arhitektura, gradbeništvo, potresno inženirstvo / *architecture, structural engineering, earthquake engineering*

4. Opis delovnega mesta mladega raziskovalca/ke (*Description of the Young Researcher's position*):

Vključuje morebitne dodatne pogoje, ki jih mora izpolnjevati kandidat/ka za mladega raziskovalca/ko, ki niso navedeni v razpisu za mlade raziskovalce.

*slo:*

Tema usposabljanja mladega raziskovalca bo usmerjena v raziskave arhitekturnih in konstrukcijskih značilnosti večstanovanjskih in drugih večetažnih stavb obstoječega stavbnega fonda v Sloveniji, zgrajenih v prvih desetletjih po drugi svetovni vojni. Stanovanjska in ekonomska kriza v Evropi sta v tem obdobju vodila v gradnjo po funkcionalističnih arhitekturnih vzorcih, ki se je odražala v nastanku prvih večjih strnjenih stanovanjskih naselji (npr. Savsko naselje, sosevska Prule in stanovanjsko naselje Litostroj v Ljubljani), katerih posamezne stavbne enote po večini predstavljajo podolgovate, geometrijsko pravilne, tri- do petetažne stavbe. Navpično nosilno konstrukcijo teh stavb običajno tvorijo opečni nosilni zidovi, stropne konstrukcije pa so iz polmontažnih stropnih plošč. Takšen konstrukcijski sistem pogosto ni vseboval zidnih vezi, prav tako velikokrat ni bila zagotovljena povezanost zidovja s stropnimi ploščami, kar precej zmanjšuje potresno odpornost teh objektov. Poleg tega so z današnjega vidika ti objekti tudi energijsko izredno potratni in posledično dragi za uporabo ter vzdrževanje, saj topotno niso izolirani.

V tem oziru bodo raziskave v okviru usposabljanja mladega raziskovalca usmerjene na enega ali več sledečih področij:

- identifikacija potresno ogroženih stavb povojne arhitekture v Sloveniji,
- prepoznavane arhitekturnih značilnosti takšnih stavb in preučevanje možnosti za njihovo ohranitev,
- preučevanje možnosti za protipotresno utrditev, z uporabo sodobnih metod in tehnologij,
- vrednotenje sanacijskih posegov v finančnem smislu,
- raziskave usmerjene k identifikaciji nabora ukrepov, vezanih na zmanjšanje posledic škode po potresu - nujni, srednjeročni, dolgoročni ukrepi,

- preučevanje možnosti za vzpodbujanje izvajanja sanacij najbolj ogroženega dela stavbnega fonda v luči prihajajoče Resolucije o krepitvi potresne varnosti,
- preučevanje možnosti in razvoj metod za združevanje arhitekturne, statične in energetske sanacije v skupnem projektu.

Raziskovalne metode bodo uporabljene na vzorcu stavb stavbnega fonda iz obdobja povojske gradnje v Sloveniji.

Delo kandidata bo predvidoma obsegalo tudi raziskave, ki temeljijo na uporabi numeričnih modelov. Zaradi tega je zaželeno, da ima kandidat za mladega raziskovalca praktične izkušnje s področja numeričnega modeliranja v gradbeništvu ter osnovno znanje programiranja. Kandidat mora imeti željo po spoznavanju in uporabi naprednih numeričnih modelov in principov modeliranja.

Kandidat mora izpolnjevati vse kriterije razpisa in imeti magistrsko izobrazbo na področju arhitekture, gradbeništva ali drugih tehničnih znanosti. Zahtevano je aktivno znanje angleškega jezika. Prednost bodo imeli kandidati z izkušnjami na področju potresnega inženirstva in z uspešno opravljenim razgovorom s predvidenim mentorjem.

Uspodbujanje kandidata bo potekalo v okviru raziskovalnega programa ARRS, št. P5-0068 - Trajnostno oblikovanje kvalitetnega bivalnega okolja.

*eng:*

The young researcher's training will focus on research into the architectural and structural characteristics of multi-residential and other multi-storey buildings of the existing building stock in Slovenia that was built in the first decades after the Second World War. The housing and economic crisis in Europe during this period led to construction based on functionalist architectural patterns, which was reflected in the emergence of the first major urban residential agglomerations (e.g. Savsko naselje, Prule neighborhood and Litostroj housing estate in Ljubljana), where individual building units adhere to common characteristics - most of them have regular geometry with low and horizontal massing that spans three- to five-storeys in height. The vertical load-bearing structure of these buildings is usually formed by masonry load-bearing walls, and the floor slabs are made of semi-prefabricated panels. Such structural system often does not contain wall ties, and the connection of the walls with the floor slab is often not ensured. This significantly reduces the seismic resistance of these buildings. In addition, from today's point of view, these buildings are also extremely energy consuming and consequently expensive to use and maintain, as they are not thermally insulated.

In this regard, the research will focus on one or more of the following areas:

- identification of buildings at risk of earthquake from post-war architecture in Slovenia,
- identifying the architectural features of such buildings and examining possibilities for their preservation,
- study the possibilities for seismic retrofitting, using modern methods and technologies,
- evaluation of retrofitting measures in financial terms,
- research aimed at identifying a set of actions for earthquake mitigation strategies - immediate, medium-term and long-term,
- examining the possibility of encouraging the rehabilitation of the existing building stock with the largest seismic risk in the light of the forthcoming Resolution on Earthquake

Safety Strengthening,

- study the possibilities and development of methods for combining architectural, seismic and energy retrofitting in a joint project.

Research methods will be used on a sample of buildings of the existing building stock from the period of post-war construction in Slovenia.

The candidate's work is also expected to include research based on the use of numerical models. Therefore, it is desirable that the candidate for the young researcher has practical experience in the field of numerical modelling in structural engineering and has basic programming knowledge. The candidate must show a willingness to learn about and use advanced numerical models and modelling principles.

The candidate must meet all the criteria of the tender and have a master's degree in architecture, civil engineering or other technical disciplines. Active knowledge of English is required. Preference will be given to candidates with experience in seismic engineering and a successful interview with the intended mentor.

The training of the candidate will take place within the scope of the research program funded by the Slovenian Research Agency (ARRS), grant no. P5-0068 - Sustainable planning for the quality living space.