

Opis raziskovalnega dela (Research work description)

1. Članica UL (UL member):

Fakulteta za gradbeništvo in geodezijo / Faculty of Civil and Geodetic Engineering

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

Matjaž Dolšek, mdolsek@fgg.uni-lj.si

3. Raziskovalno področje (Research field):

Gradbeništvo / Potresno inženirstvo, Civil Engineering / Earthquake Engineering

4. Opis raziskovalnega dela (Research work description):

Vključuje morebitne dodatne pogoje, ki jih mora izpolnjevati kandidat/ka za mladega raziskovalca/ko, ki niso navedeni v razpisu za mlade raziskovalce (It includes any additional conditions that the candidate for a young researcher must meet, which are not listed in the call to tender for young researchers.).

Slov.:

Izkušnje kažejo, da močni potresi ogrožajo blaginjo ljudi, če se na tovrstne ekstremne naravne dogodke neustrezno pripravimo. Majhne skupnosti na potresno nevarnih območjih so še posebej ogrožene, kar je v Sloveniji prepoznano z Resolucijo o krepitvi potresne varnosti do leta 2050 »Prehitimo potres«. Ker potresi ogrožajo praktično celotno grajeno okolje in vsa področja delovanja skupnosti, posredno pa vplivajo tudi na naravo, je tematika raziskovalnega dela mlade raziskovalke ali mladega raziskovalca lahko tudi interdisciplinarna, kar terja sodelovanje med različnimi strokami. Zato je razpisanih več različnih tem raziskovalnega dela, s tem pa so k prijavi vabljeni tudi kandidatke in kandidati z različnih strokovnih področji.

Možne teme raziskovalnega dela:

1. Potresna odpornost obstoječih in novih gradbenih konstrukcij

- Preverjanje in zagotavljanje potresne odpornosti gradbenih konstrukcij je osnova za zagotavljanje potresne varnosti grajenega okolja. To je še posebej povezano z negotovostmi pri potresni analizi objektov, zlasti pri analizah obstoječih stavb ter pri uvajanju novih tehnologij gradnje ali novih standardov v prakso.
- Ključne besede: stavbe, mostovi, vodne pregrade, drugi inženirski objekti, lesene konstrukcije, zidane konstrukcije, armiranobetonske konstrukcije, jeklene konstrukcije, nove gradbene tehnologije, Evrokod 8.
- Priporočena osnovna znanja: gradbeništvo ali konstrukcijsko strojništvo.
- Možno somentorstvo za specializirana znanja s področja gradbeništva oz. potresnega inženirstva.

2. Potresi v okviru sestavljenih nevarnosti

- Potrese spremljajo različne sočasne nevarnosti, ki so lahko odvisne od potresa (npr. plazovi, likvefakcija, tsunami), neodvisne (npr. pandemija, pluvialne poplave, nevihte) ali verižne potresu (eksplozije, požari, širjenje nevarnih snovi), ki se običajno ne upoštevajo pri analizah potresnega tveganja.
- Ključne besede: potresi, analiza sestavljenih nevarnosti, analiza tveganja sestavljenih nevarnosti, požar, eksplozije, širjenje nevarnih snovi, plazovi, poplave in druge nevarnosti.
- Priporočena osnovna znanja: gradbeništvo ali znanja iz področja druge sočasne ali verižne nevarnosti, ki bo upoštevana v raziskavi.
- Možno somentorstvo za področje druge izbrane nevarnosti.

3. Potresno tveganje grajenega okolja in modeliranje kriznih situacij

- Za razvoj strategije zmanjševanja potresnih tveganj in omejitve posledic po potresih je treba analizirati potresno tveganje, vključno s simulacijo potresnih dogodkov in odzivom civilne zaščite na takšne dogodke.
- Ključne besede: potresno tveganje mest, civilna zaščita, upravljanje v izrednih razmerah.

- Priporočena osnovna znanja: gradbeništvo ali okoljsko inženirstvo.
- Možno somentorstvo, če kandidat prihaja iz tujine.

4. Informacijsko modeliranje grajenega okolja ali posameznih objektov za potrebe potresnega inženirstva

- Čeprav obstaja precej različnih baz podatkov, te niso optimalne za potrebe potresnega inženirstva v povezavi z analizami potresnega tveganja grajenega okolja in razvojem strategije prenove grajenega okolja.
- Ključne besede: potresno tveganje grajenega okolja, BIM, GIS, GIS-BIM integracija, digitalni dvojček.
- Priporočena osnovna znanja: gradbeništvo, geoinformatika, geodezija, računalništvo, informacijska tehnologija.
- Predvideno somentorstvo s področja računalništva, IT ali geoinformatike.

5. Prometni tokovi v kriznih situacijah

- Potresi lahko povzročijo ustavitve prometnih tokov, kar upočasnjuje reševanje takoj po ekstremnih pojavih in oteži proces okrevanja skupnosti. Učinki tovrstnih ustavitvev še niso dovolj dobro raziskani.
- Ključne besede: potresna ranljivost cestne infrastrukture, potresna ranljivost mest, modeliranje prometnih tokov.
- Priporočena osnovna znanja: potresno inženirstvo, gradbeništvo ali prometno inženirstvo.
- Predvideno somentorstvo za področje prometnega inženirstva.

6. Potresi in prostorsko načrtovanje

- Zaradi kompleksnosti industrijsko-urbanega okolja je treba analize potresnega tveganja vključiti v prostorsko načrtovanje in razviti strategije za potresno odporno in trajnostno urbanizacijo.
- Ključne besede: potresno tveganje, strategija urbanizacije, integracija tveganj v prostorsko načrtovanje.
- Priporočena osnovna znanja: gradbeništvo, urbanizem ali prostorsko načrtovanje.
- Predvideno somentorstvo za področje urbanizma ali prostorskega načrtovanja.

7. Zavarovanje grajenega okolja pred škodo zaradi potresov

- Eden izmed načinov omiljenja posledic potresov je zavarovanje pred potencialno škodo, vendar pa je modeliranje premij zaenkrat slabo povezano s potresnim tveganjem, ocenjenim s sodobnimi analizami.
- Ključne besede: potresno tveganje grajenega okolja, potresno tveganje stavbe, zavarovanje, modeliranje škodnih zahtevkov, ocena premije, verjetnostni modeli škod.
- Priporočena osnovna znanja: gradbeništvo ali ekonomija – aktuarstvo.
- Predvideno somentorstvo za področje aktuarstva.

8. Predlog kandidata

- Kandidatka ali kandidat po svoji presoji predlagata raziskavo (lahko interdisciplinarno), pri čemer je treba tematiko opredeliti v motivacijskem pismu. Lahko se predloži priporočilno pismo potencialnega somentorja.

Mladi raziskovalec bo član programske skupine Potresno inženirstvo in se bo usposabljal v okviru doktorskega študija Grajeno okolje na Fakulteti za gradbeništvo in geodezijo, Univerza v Ljubljani, z možnostjo izpopolnjevanja na drugih uglednih institucijah doma in v tujini. Tema doktorske disertacije mladega raziskovalca bo usklajena z raziskavami programske skupine Potresno inženirstvo (P2-0185), ki sodeluje v mednarodnih projektih in združenjih, kar bo zagotavljalo, da bodo raziskave aktualne in usklajene z mednarodnimi raziskavami.

Kandidat si izbere eno izmed predlaganih tem in pri vlogi predloži motivacijsko pismo in potencialno predlaga somentorja. Dodatne informacije so možne po e-pošti: mdolsek@fgg.uni-lj.si.

Eng.:

Experience shows that strong earthquakes threaten the well-being of people if we are inadequately prepared for such extreme natural events. Small communities in earthquake-prone areas are especially vulnerable, which has

been recognized in Slovenia through the Resolution on Strengthening Earthquake Safety by 2050. Since earthquakes threaten practically the entire built environment and all areas of community functioning, and indirectly affect nature as well, the topic of the research work of a young researcher can be interdisciplinary, requiring cooperation among various disciplines. Therefore, several different research topics have been announced, and candidates from different professional fields are invited to apply for the call.

Possible research topics:

1. **Earthquake resistance of existing and new building structures**
 - Verifying and ensuring the earthquake resistance of building structures is essential for ensuring the earthquake safety of the built environment. This is particularly related to uncertainties in seismic analysis of buildings, especially for existing buildings, and the introduction of new construction technologies or new standards into practice.
 - Keywords: buildings, bridges, water dams, other engineering structures, timber structures, masonry structures, reinforced concrete structures, steel structures, new construction technologies, Eurocode 8.
 - Recommended foundational knowledge: structural engineering or structural mechanical engineering.
 - Possible co-supervision in specialized structural engineering or earthquake engineering.
2. **Earthquakes within the framework of compound hazards**
 - Earthquakes are accompanied by various dependent hazards (e.g., landslides, liquefaction, tsunamis), potential independent hazards (e.g., pandemics, pluvial flooding, storms), and cascading hazards (e.g., explosions, fires, hazardous material spread), which are often not considered in earthquake risk analyses.
 - Keywords: earthquakes, compound hazard analysis, compound risk analysis, fire, explosions, hazardous material spread, landslides, floods, and other hazards.
 - Recommended foundational knowledge: civil engineering or knowledge from other fields of concomitant or cascading hazards to be considered in the research.
 - Possible co-supervision in another selected hazard field.
3. **Earthquake risk of the built environment and modeling of crisis situations**
 - To develop strategies for reducing earthquake risks and mitigating post-earthquake consequences, it is necessary to analyze earthquake risks, including simulating earthquake events and responses from civil protection to such events.
 - Keywords: earthquake risk of cities, civil protection, emergency management, digital twin in crisis situations.
 - Recommended foundational knowledge: civil engineering or environmental engineering.
 - Possible co-supervision in the specific field of earthquake engineering or if the candidate is from abroad.
4. **Information modeling of the built environment or individual facilities for earthquake engineering purposes**
 - Although there are several existing databases, they are suboptimal for earthquake engineering related to built environment risk analysis and the development of strategies for the renovation of the built environment.
 - Keywords: earthquake risk of the built environment, BIM, GIS, GIS-BIM integration, digital twin.
 - Recommended foundational knowledge: civil engineering, geoinformatics, geodesy, computer science, information technology.
 - Expected co-supervision in computer science, IT, or geoinformatics.
5. **Traffic flows in crisis situations**
 - Earthquakes can cause the disruption of traffic flows, which delay immediate response and hinder recovery processes. The effects of such disruption are still insufficiently understood.
 - Keywords: seismic vulnerability of road infrastructure, earthquake vulnerability of cities, traffic flow modeling.
 - Recommended foundational knowledge: earthquake engineering, civil engineering or traffic engineering.
 - Expected co-supervision in traffic engineering.
6. **Earthquakes and spatial planning**
 - Due to the complexity of the industrial-urban environment, earthquake risk analyses need to be integrated into spatial planning, and strategies for earthquake-resistant and sustainable urbanization need to be developed.
 - Keywords: earthquake risk, urbanization strategy, risk integration in spatial planning.
 - Recommended foundational knowledge: civil engineering, urban planning, or spatial planning.
 - Expected co-supervision in urban planning or spatial planning.
7. **Insurance of the built environment against earthquake damage**
 - One way to mitigate the consequences of earthquakes is through damage insurance, but modeling premiums are still poorly connected to contemporary seismic risk analysis.

- Keywords: seismic risk of the built environment, seismic risk of buildings, insurance, damage claim modeling, premium assessment, probabilistic damage models.
 - Recommended foundational knowledge: civil engineering or economy – actuarial science.
 - Expected co-supervision in actuarial science.
- 8. Earthquake engineering and law**
- The construction law in Slovenia allows for the possibility that earthquakes can collapse buildings and consequently endanger lives, while other actions on civil structures should not cause their collapse and put people at risk. On the other hand, the Slovenian National Assembly has adopted the Resolution on Strengthening Earthquake Safety in Slovenia, as it has been realized that Slovenia is an earthquake-vulnerable community, which will not be solved without legislative changes.
 - Keywords: community earthquake resilience, construction legislation, law.
 - Recommended foundational knowledge: civil engineering or law.
 - Expected co-supervision in law.
- 9. Candidate proposal**
- The candidate may propose a research topic (which can be interdisciplinary) at their discretion, specifying the topic in the motivation letter. A recommendation letter from a potential co-supervisor may also be submitted.

The young researcher will be a member of the Earthquake Engineering Research Program and will undergo training within the doctoral program Built Environment at the Faculty of Civil and Geodetic Engineering, University of Ljubljana, with the possibility of further training at other prestigious institutions both domestically and internationally. The topic of the doctoral dissertation will be aligned with the research of the Earthquake Engineering Research Program (P2-0185), which participates in international projects and associations, ensuring that the research will be up-to-date and aligned with global research.

The candidate selects one of the proposed topics and submits a motivation letter with the option to suggest a potential co-supervisor along with the application. Additional information can be obtained via email: mdolsek@fgg.uni-lj.si.

5. Priloge, ki jih je treba priložiti ob prijavi (*Documents required to be submitted with the application*):

potrdilo o doseženi izobrazbi (*proof of completed education*)

- kandidat z zaključenim magistrskim študijskim programom (2. bolonjska stopnja) (*candidate who has completed a Master's degree (2nd Bologna level)*):
 - diplomska listina / potrdilo o zaključku študijskega programa (*diploma certificate / certificate of completion of the study programme*)
 - priloga k diplomi / potrdilo o opravljenih obveznostih (*diploma supplement / official transcript of records containing all grades obtained in the study programme*)
- kandidat, ki še ni zaključil študija na 2. stopnji (*candidate who has not yet completed a Master's degree*):
 - potrdilo o do sedaj opravljenih obveznostih z ocenami magistrskega študijskega programa, s katerim se bo kandidat prijavil na doktorski študij (*official transcript of records listing all courses and grades obtained so far in the Master's degree programme on the basis of which the candidate will apply for enrollment in a doctoral degree programme.*)

nagrade – univerzitetna Prešernova nagrada ali Prešernova nagrada članice Univerze v Ljubljani oz. druga enakovredna nagrada (*awards, e.g. Prešeren Prize of the University of Ljubljana, Prešeren Prize of a University of Ljubljana member and/or another equivalent award*)

bibliografija (*bibliography*)

življenjepis (*CV*)

motivacijsko pismo (*motivation letter*)

opis dosedanjega sodelovanja pri raziskovalnem delu (*description of the candidate's research work*)

osnutek idejne zasnove raziskovalnega dela (*preliminary research proposal*)

priporočilno pismo (*letter of recommendation*)

druge priloge (*other attachments*):

MOpis raziskovalnega dela (*Research work description*)

1. Članica UL (*UL member*):

Fakulteta za gradbeništvo in geodezijo / Faculty of Civil and Geodetic Engineering

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

Matija Gams, mgams@fgg.uni-lj.si

3. Raziskovalno področje (*Research field*):

2.01.04 Potresno inženirstvo / 2.01.04 Earthquake Engineering

4. Opis raziskovalnega dela (*Research work description*):

Vključuje morebitne dodatne pogoje, ki jih mora izpolnjevati kandidat/ka za mladega raziskovalca/ko, ki niso navedeni v razpisu za mlade raziskovalce (*It includes any additional conditions that the candidate for a young researcher must meet, which are not listed in the call to tender for young researchers.*).

Slov.: Usposabljanje mladega raziskovalca(e) bo potekalo na doktorskem študiju Grajeno okolje na Fakulteti za gradbeništvo in geodezijo Univerze v Ljubljani. Usposabljanje bo potekalo v okviru raziskovalnega programa P2-0185 Potresno inženirstvo.

Področje raziskovanja bo potresna odpornost zidanih konstrukcij. Odziv teh konstrukcij na potresno obtežbo je namreč razmeroma zapleten, saj je zidovje krhek, nehomogen in anizotropen material. Dodatno je arhitektura sodobnih stavb pogosto nepravilna in nesimetrična v tlorisu in po višini in z velikimi odprtini na južni strani stavbe. Te nepravilnosti so za zidane stavbe velik problem, saj povzročajo koncentracije napetosti in neenakomerne razporeditve obremenitev. Zato je težko zagotoviti enakomerno razporeditev potresnih sil in dobro potresno obnašanje z velikim sipanjem energije.

Kandidat se bo ukvarjal s potresno odpornostjo sodobnih zidanih stavb grajenih v tehnologiji povezanega zidovja iz zidakov iz porobetona. Ključna naloga bo raziskati interakcijo zidovja in zidnih vezi ter s pridobljenim znanjem izboljšati postopke projektiranja in gradnje.

V sklopu usposabljanja bo potrebno izvesti eksperimentalne raziskave potresne odpornosti zidov na vzorcih v naravni velikosti, odziv preučiti in ga simulirati z naprednimi računalniškimi simulacijami. Na podlagi pridobljenih znanj se bo pripravilo priporočila za boljše projektiranje (enačbe za oceno nosilnosti, napotki za položaje, velikost in armaturo zidnih vezi).

Za potrebe eksperimentalnega dela je zaželeno, da ima kandidat praktične izkušnje s področja gradbeništva, za potrebe numeričnega dela pa osnovno znanje programiranja/modeliranja in željo po spoznavanju in uporabi naprednih numeričnih modelov in principov modeliranja.

Kandidat(ka) mora izpolnjevati vse kriterije razpisa in imeti magistrsko izobrazbo na področju tehničnih znanosti. Zahtevano je znanje angleškega jezika. Prednost bodo imeli kandidati z izkušnjami na področju zidarstva in uspešno opravljenim razgovorom s predvidenim mentorjem.

Eng.: The training of the young researcher will take place within the doctoral program *Built Environment* at the Faculty of Civil and Geodetic Engineering, University of Ljubljana. The training will be carried out within the research program P2-0185 *Earthquake Engineering*.

The research field will be the seismic resistance of masonry structures. The response of such structures to seismic loading is relatively complex, since masonry is a brittle, heterogeneous, and anisotropic material. Additionally, the architecture of modern buildings is often irregular and

asymmetrical in plan and elevation, with large openings on the southern side of the building. These irregularities present a major problem for masonry buildings, as they cause stress concentrations and uneven load distribution. Consequently, it is difficult to ensure uniform distribution of seismic forces and good seismic performance with high energy dissipation.

The candidate will research seismic resistance of modern masonry buildings constructed using confined masonry technology with aerated concrete blocks. The key task will be to investigate the interaction between masonry and tie-columns and, based on the knowledge gained, improve design and construction procedures.

As part of the training, experimental research on the seismic resistance of walls will need to be carried out on full-scale specimens; their response will be analysed and simulated using advanced computer simulations. Based on the acquired knowledge, recommendations will be prepared for improved design (equations for estimating load-bearing capacity, guidelines for the placement, size, and reinforcement of wall ties).

For the experimental part, practical experience in civil engineering is desirable, while for the numerical part, basic knowledge of programming/modeling and an interest in learning and applying advanced numerical models and modeling principles are required.

The candidate must meet all the criteria of the call and hold a master's degree in a technical field. Knowledge of English is required. Preference will be given to candidates with experience in masonry construction and a successful interview with the prospective supervisor.

5. Priloge, ki jih je treba priložiti ob prijavi (*Documents required to be submitted with the application*):

potrdilo o doseženi izobrazbi (*proof of completed education*)

- kandidat z zaključenim magistrskim študijskim programom (2. bolonjska stopnja) (*candidate who has completed a Master's degree (2nd Bologna level)*):
 - o diplomska listina / potrdilo o zaključku študijskega programa (*diploma certificate / certificate of completion of the study programme*)
 - o priloga k diplomi / potrdilo o opravljenih obveznostih (*diploma supplement / official transcript of records containing all grades obtained in the study programme*)
- kandidat, ki še ni zaključil študija na 2. stopnji (*candidate who has not yet completed a Master's degree*):
 - o potrdilo o do sedaj opravljenih obveznostih z ocenami magistrskega študijskega programa, s katerim se bo kandidat prijavil na doktorski študij (*official transcript of records listing all courses and grades obtained so far in the Master's degree programme on the basis of which the candidate will apply for enrollment in a doctoral degree programme.*)

nagrada – univerzitetna Prešernova nagrada ali Prešernova nagrada članice Univerze v Ljubljani oz. druga enakovredna nagrada (*awards, e.g. Prešeren Prize of the University of Ljubljana, Prešeren Prize of a University of Ljubljana member and/or another equivalent award*)

bibliografija (*bibliography*)

življenjepis (*CV*)

motivacijsko pismo (*motivation letter*)

opis dosedanjega sodelovanja pri raziskovalnem delu (*description of the candidate's research work*)

osnutek idejne zasnove raziskovalnega dela (*preliminary research proposal*)

priporočilno pismo (*letter of recommendation*)

druge priloge (*other attachments*):

Opis raziskovalnega dela (*Research work description*)

1. Članica UL (*UL member*):

Fakulteta za gradbeništvo in geodezijo / Faculty of Civil and Geodetic Engineering

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

doc. dr. Robert Klinc, robert.klinc@fgg.uni-lj.si

3. Raziskovalno področje (*Research field*):

Računalniško integrirana graditev objektov / Operativno gradbeništvo (Computer integrated construction/
Construction management)

4. Opis raziskovalnega dela (*Research work description*):

Vključuje morebitne dodatne pogoje, ki jih mora izpolnjevati kandidat/ka za mladega raziskovalca/ko, ki niso navedeni v razpisu za mlade raziskovalce (*It includes any additional conditions that the candidate for a young researcher must meet, which are not listed in the call to tender for young researchers.*).

Slov.:

Mladi raziskovalec/-ka (MR) se bo usposabljal v okviru raziskovalnega programa E-Gradbeništvo ter Katedre za operativno gradbeništvo. Raziskovalna skupina razvija znanja na področju informacijskih in komunikacijskih tehnologij v gradbeništvu, informacijskega modeliranja, numeričnega modeliranja, komunikacijske in procesne infrastrukture, velikih jezikovnih modelov in tehnologij umetne inteligence, vodenja projektov, organizacije, tehnologije in ekonomike grajenja ter problemov prenosa znanja, vse s ciljem prispevati k bolj uspešnim procesom v grajenem okolju. Multidisciplinarnost skupine zagotavlja trdne temelje za raziskovalno delo mladega raziskovalca/-ke, ki se bo (tudi v skladu s svojimi interesi) vključil/-a v raziskave s področij Gradbeništva 4.0 in 5.0, sodobnih metod spremljave in vodenja projektov, upravljanja s sredstvi, digitalnih dvojčkov, gradbeniških platform in podobno.

Mentor in raziskovalna skupina nudita odlične delovne pogoje za študij in raziskovalno delo. Pričakovani profil MR je strokovna izobrazba na področju inženirskih znanosti ali naravoslovja. Kandidat/-ka bo potrebno osnovno znanje pridobil/a v okviru doktorskega študija, s študijem objav raziskovalne skupine, preteklih projektov, spremljanjem razvoja informacijsko-komunikacijskih tehnologij ter aktivnim vključevanjem v mednarodne raziskave.

Od kandidata/-ke se pričakuje odgovornost in samoiniciativnost, odprtost za delo v skupini, veselje za delo z informacijsko-komunikacijskimi tehnologijami ter aktivno znanje angleškega jezika.

Obvezna rezultata MR sta opravljen doktorat in objava vsaj enega ali več z njim povezanih člankov v reviji s primernim faktorjem vpliva. Pričakovane so tudi različne objave ter udeležba na strokovnih in znanstvenih domačih in mednarodnih kongresih.

Eng.:

The young researcher (MR) will be trained within the E-Construction research programme and the Chair of Construction Management. The research group develops knowledge in information and communication technologies in construction, information modelling, numerical modelling, communication and process

infrastructure, large language models and artificial intelligence technologies, project management, organisation, construction technology and economics, and knowledge transfer, all aimed at contributing to more successful processes in the built environment. The multidisciplinary nature of the group provides a solid foundation for the research work of young researchers, who will be involved (according to their interests) in research in the fields of Construction 4.0 and 5.0, modern methods of project monitoring and management, resource management, digital twins, construction platforms, and related areas.

The mentor and research group offer excellent conditions for study and research. The expected profile of the MR is a professional education in engineering or natural sciences. The candidate will acquire the necessary basic knowledge through doctoral studies, by studying the research group's publications and past projects, by following developments in information and communication technologies, and by actively participating in international research.

Candidates are expected to be responsible and proactive, open to teamwork, enthusiastic about working with information and communication technologies, and have an active knowledge of English.

The mandatory requirements for MR are a completed doctorate and the publication of at least one related article in a journal with an appropriate impact factor. Various publications and participation in professional and scientific domestic and international conferences are also expected.

5. Priloge, ki jih je treba priložiti ob prijavi (*Documents required to be submitted with the application*):

potrdilo o doseženi izobrazbi (*proof of completed education*)

- kandidat z zaključenim magistrskim študijskim programom (2. bolonjska stopnja) (*candidate who has completed a Master's degree (2nd Bologna level)*):
 - o diplomska listina / potrdilo o zaključku študijskega programa (*diploma certificate / certificate of completion of the study programme*)
 - o priloga k diplomi / potrdilo o opravljenih obveznostih (*diploma supplement / official transcript of records containing all grades obtained in the study programme*)
- kandidat, ki še ni zaključil študija na 2. stopnji (*candidate who has not yet completed a Master's degree*):
 - o potrdilo o do sedaj opravljenih obveznostih z ocenami magistrskega študijskega programa, s katerim se bo kandidat prijavil na doktorski študij (*official transcript of records listing all courses and grades obtained so far in the Master's degree programme on the basis of which the candidate will apply for enrollment in a doctoral degree programme.*)

nagrade – univerzitetna Prešernova nagrada ali Prešernova nagrada članice Univerze v Ljubljani oz. druga enakovredna nagrada (*awards, e.g. Prešeren Prize of the University of Ljubljana, Prešeren Prize of a University of Ljubljana member and/or another equivalent award*)

bibliografija (*bibliography*)

življenjepis (*CV*)

motivacijsko pismo (*motivation letter*)

opis dosedanjega sodelovanja pri raziskovalnem delu (*description of the candidate's research work*)

osnutek idejne zasnove raziskovalnega dela (*preliminary research proposal*)

priporočilno pismo (*letter of recommendation*)

druge priloge (*other attachments*):

Opis raziskovalnega dela (Research work description)

1. Članica UL (UL member):

Fakulteta za gradbeništvo in geodezijo / Faculty of Civil and Geodetic Engineering

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

Mitja Košir, mitja.kosir@fgg.uni-lj.si

3. Raziskovalno področje (Research field):

Gradbeništvo / Gradbena fizika (Civil engineering / Building physics)

4. Opis raziskovalnega dela (Research work description):

Vključuje morebitne dodatne pogoje, ki jih mora izpolnjevati kandidat/ka za mladega raziskovalca/ko, ki niso navedeni v razpisu za mlade raziskovalce (It includes any additional conditions that the candidate for a young researcher must meet, which are not listed in the call to tender for young researchers.).

Slov.:

Podnebna prilagodljivost, pasivna odpornost in sposobnost preživetja grajenega okolja

Obseg raziskave

Zaradi podnebnih sprememb postajajo stavbe, ki se zanašajo na aktivne sisteme kondicioniranja notranjega okolja, vse bolj ranljive. Ta raziskava se osredotoča na pristope bioklimatskega načrtovanja, strategije pasivnega prilagajanja in uporabno gradbene fizike z namenom oblikovanja robustnih odzivov stavb na pregrevanje. Glavni cilj je razširiti vrednotenje učinkovitosti stavb onkraj energijske učinkovitosti k celostni pasivni odpornosti. Raziskava bo sistematično preučila, kako je mogoče strateško načrtovanje stavb in pasivno podnebno prilagoditev uporabiti za povečanje odpornosti grajenega okolja ter s tem zagotoviti »sposobnost preživetja« stanovalcev med hudimi podnebnimi anomalijami.

Tema raziskave

Raziskava bo usmerjena v odpornost stavb na ekstremne podnebne dogodke, predvsem na hude in dolgotrajne vročinske valove, za katere se pričakuje, da se bodo v tem stoletju še okrepli. Za doseg tega se bo raziskava osredotočila na naslednje ključne cilje:

- Vrednotenje pasivne sposobnosti preživetja: Raziskovanje kritične meje med standardno energijsko učinkovitostjo in pasivno sposobnostjo preživetja v prihodnjih podnebnih scenarijih. To zahteva vrednotenje pogojev notranjega okolja v močno omejujočih pogojih za aktivno kondicioniranje, kot so dolgotrajni izpadi električne energije, visoke cene energije (energetska revščina) ali sistemsko pomanjkanje naprav za aktivno hlajenje.
- Ovrednotenje primernosti za bivanje: Modeliranje teh sočasnih stresnih dogodkov bo omogočilo kvantifikacijo pasivne sposobnosti zagotavljanja pogojev za preživetje z uporabo strogih fizioloških metrik toplotnega stresa ter preučiti možnosti za povečanje odpornosti na večplastne nevarnosti.
- Kontekstualizacija v urbanem okolju: Čeprav primarni analitični fokus ostaja na ravni stavbe, bo raziskava te objekte umestila v širši urbani prostor, z zavedanjem, da urbana mikroklima pomembno vpliva na nestacionarni toplotni odziv stavbe.
- Informiranje strateških politik: Pridobivanje na podatkih temelječih dognanj, ki presegajo zgolj inženirsko načrtovanje in služijo kot osnova za strateško odločanje urbanistov ter oblikovalcev politik, pri čemer se daje prednost dolgoročni podnebni odpornosti grajenega okolja ob hkratnem razogljčenju.

Želeni profil kandidata/ke in ugodnosti

Ponujamo spodbudno raziskovalno okolje z zagotovljenim financiranjem in podporo za mednarodno mreženje prek sodelovanja na konferencah. Izbrani kandidat/ka bo imel/a koristi od individualnega mentorstva, usmerjenega v obvladovanje naprednih simulacijskih delovnih tokov in objavljanje v vplivnih znanstvenih revijah, s čimer bo pridobil/a trdne temelje za prihodnjo kariero v akademskem svetu ali industriji.

Iščemo visoko motiviranega/no kandidata/ko z magisterjem iz gradbeništva, stavbarstva, arhitekture, gradbene fizike, strojništva ali sorodne discipline. Prednost imajo kandidati/ke z izobrazbo s področja gradbene fizike, s posebnim poudarkom na termodinamiki in mehanizmih prenosa toplote. Poleg tega morajo potencialni kandidati/ke pokazati močno zanimanje za uporabo orodij za simulacijo zmogljivosti stavb (BPS) ter programiranje in obdelavo podatkov, s čimer bodo lahko učinkovito upravljali in analizirali kompleksne rezultate simulacij. Za uspešno

pripravo znanstvenih publikacij in sodelovanje z mednarodno akademsko skupnostjo je nujno potrebno ustrezno znanje angleškega jezika (pisanje, govor).

Eng.:

Climate Adaptability, Passive Resilience, and Survivability of the Built Environment

Research Scope

As the global climate undergoes unprecedented shifts, buildings heavily reliant on active conditioning systems are becoming increasingly vulnerable. This research centres on advancing bioclimatic design, passive adaptation strategies, and applied building physics to formulate robust responses to overheating. The core objective is to expand the assessment of building performance beyond pure operational energy efficiency toward holistic passive resilience. The research will systematically investigate how strategic building design and passive climate adaptation can be leveraged to increase the built environment's resilience, thereby ensuring the "survivability" of occupants during severe climatic anomalies.

Research Topic

Specifically, the research will target building resilience against extreme climatic events, primarily the severe and prolonged heat waves anticipated to intensify throughout the present century. To achieve this, the investigation will focus on the following core objectives:

- Evaluate passive survivability: Explore the critical threshold between standard energy efficiency and passive survivability under future climate scenarios. This requires assessing indoor environmental conditions under severely limiting factors for active conditioning, such as prolonged power outages, elevated energy prices (energy poverty), or a systemic lack of active cooling devices.
- Quantify habitability: Modelling these concurrent stress events will enable quantification of passive survival capabilities using rigorous physiological heat stress metrics and explore opportunities to increase resilience to multiple hazards.
- Contextualise within the urban environment: While the primary analytical focus remains firmly on the building level, the research will contextualise these structures within their urban surroundings, acknowledging how the urban microclimate significantly dictates a building's transient thermal response.
- Inform strategic policy: Extract data-driven insights that transcend pure engineering design to inform strategic decision-making for urban planners and policymakers, prioritising long-term climate resilience of the built environment alongside decarbonization.

Desired Candidate Profile and Benefits

We offer a stimulating research environment with secured funding and support for international networking through conference participation. The selected candidate will benefit from dedicated mentorship focused on mastering advanced simulation workflows and publishing in high-impact scientific journals, establishing a solid foundation for a future career in academia or industry.

We are seeking a highly motivated candidate possessing a Master's degree in Civil Engineering, Architecture, Architectural Engineering, Building Physics, Mechanical Engineering, or a closely related discipline. The applicant with a background in building physics, with a specific emphasis on thermodynamics and heat transfer mechanisms, is preferred. Furthermore, prospective candidates should demonstrate a strong interest in utilising Building Performance Simulation (BPS) tools, alongside an aptitude for scripting and data science, to effectively manage and analyse complex simulation outputs. Full proficiency in written and oral English is strictly required to successfully draft scientific publications and engage with the international academic community.

5. Priloge, ki jih je treba priložiti ob prijavi (Documents required to be submitted with the application):

potrdilo o doseženi izobrazbi (proof of completed education)

- kandidat z zaključenim magistrskim študijskim programom (2. bolonjska stopnja) (candidate who has completed a Master's degree (2nd Bologna level)):
 - diplomska listina / potrdilo o zaključku študijskega programa (diploma certificate / certificate of completion of the study programme)
 - priloga k diplomi / potrdilo o opravljenih obveznostih (diploma supplement / official transcript of records containing all grades obtained in the study programme)
- kandidat, ki še ni zaključil študija na 2. stopnji (candidate who has not yet completed a Master's degree):

- potrdilo o do sedaj opravljenih obveznostih z ocenami magistrskega študijskega programa, s katerim se bo kandidat prijavil na doktorski študij
(official transcript of records listing all courses and grades obtained so far in the Master's degree programme on the basis of which the candidate will apply for enrollment in a doctoral degree programme.)

nagrade – univerzitetna Prešernova nagrada ali Prešernova nagrada članice Univerze v Ljubljani oz. druga enakovredna nagrada (*awards, e.g. Prešeren Prize of the University of Ljubljana, Prešeren Prize of a University of Ljubljana member and/or another equivalent award*)

bibliografija (*bibliography*)

življenjepis (*CV*)

motivacijsko pismo (*motivation letter*)

opis dosedanjega sodelovanja pri raziskovalnem delu (*description of the candidate's research work*)

osnutek idejne zasnove raziskovalnega dela (*preliminary research proposal*)

priporočilno pismo (*letter of recommendation*)

druge priloge (*other attachments*): Po lastni presoji lahko kandidat priloži tudi znanstveno bibliografijo, potrdila o prejetih nagradah, priporočilno pismo in informacije o drugih relevantnih dosežkih (*At their discretion, candidates may also attach a scientific bibliography, certificates of received awards, a letter of recommendation, and information on other relevant achievements*).

Opis raziskovalnega dela (*Research work description*)

1. Članica UL (*UL member*):

Fakulteta za gradbeništvo in geodezijo / Faculty of Civil and Geodetic Engineering

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

Robert Pečenko, robert.pecenko@fgg.uni-lj.si

3. Raziskovalno področje (*Research field*):

Mehanika (Engineering Mechanics)

4. Opis raziskovalnega dela (*Research work description*):

Vključuje morebitne dodatne pogoje, ki jih mora izpolnjevati kandidat/ka za mladega raziskovalca/ko, ki niso navedeni v razpisu za mlade raziskovalce (*It includes any additional conditions that the candidate for a young researcher must meet, which are not listed in the call to tender for young researchers.*).

Slov.:

Usposabljanje za pridobitev doktorata znanosti bo potekalo v okviru raziskovalne skupine Katedra za mehaniko in v sodelovanju z njihovimi industrijskimi in akademskimi partnerji v Sloveniji in tujini. Skupina proučuje mehanski ter toplotni odziv konstrukcij izpostavljenim požaru, kakor tudi stabilnost in dinamiko konstrukcij ter razvija nove modele in računske algoritme za reševanje aktualnih problemov na tem področju. Znotraj skupine gojimo široka znanja, uspešno izdelane metode in algoritme, ki predstavljajo dobro in trdno osnovo za raziskovalno delo mladega raziskovalca.

Mentor in raziskovalna skupina tako kandidatki ali kandidatu nudita odlične delovne pogoje za študij in raziskovalno delo, ustvarjalno, konkurenčno in prijateljsko ozračje in možnosti znanstvenih diskusij tudi z znanstveniki iz tujine ter primerno računalniško strojno in programsko opremo. Doktorsko delo bi bilo nadaljevanje in razširitev dosedanjih rezultatov raziskovalne skupine s poudarkom na aktualnih problemih pri modeliranju odziva lesenih konstrukcij izpostavljenim požaru.

Iščemo kandidatke in kandidate, ki jih zanima poglobljen študij in imajo ustrezna znanja na področju modeliranja, reševanja enačb in programiranja. Primerna izobrazba je zaključena druga stopnja gradbeništva, strojništva, matematike, fizike ali druge tehnične smeri z dovolj vsebin mehanike in modeliranja konstrukcij. Zaželeno je znanje programiranja, še posebej v okoljih kot sta Matlab in Python. Zahtevano je aktivno znanje angleškega jezika.

Eng.:

The PhD position is at the Research group Chair of Mechanics at Faculty of Civil and Geodetic Engineering, University of Ljubljana. The group investigates the response of structures exposed to fire as well as stability and dynamics of structures and develops new models and numerical formulations for structural mechanics. The wide knowledge and research results within the research group represent an excellent starting point for the early-stage researcher – doctoral student.

The supervisor and his research group offer the candidate excellent working conditions for study and research work, creative, competitive and friendly environment and opportunities for scientific discussions within the group and wider and appropriate research equipment and software. The doctoral thesis would be a continuation and extension of the previous results of the research group with an emphasis on the present challenges in modelling of timber structures exposed to fire.

We are looking for candidates who are interested in study challenges and have relevant knowledge in the field of modelling, equation solving and programming. Appropriate background is the completion of the second level studies in civil engineering, mechanical engineering, mathematics, physics or similar with sufficient content of engineering mechanics and structural modelling. Programming skills are highly desirable, in particular experiences with Matlab or Python. High standard of spoken and written English is required.

5. Priloge, ki jih je treba priložiti ob prijavi (*Documents required to be submitted with the application*):

potrdilo o doseženi izobrazbi (*proof of completed education*)

- kandidat z zaključenim magistrskim študijskim programom (2. bolonjska stopnja) (*candidate who has completed a Master's degree (2nd Bologna level)*):
 - o diplomska listina / potrdilo o zaključku študijskega programa (*diploma certificate / certificate of completion of the study programme*)
 - o priloga k diplomi / potrdilo o opravljenih obveznostih (*diploma supplement / official transcript of records containing all grades obtained in the study programme*)
- kandidat, ki še ni zaključil študija na 2. stopnji (*candidate who has not yet completed a Master's degree*):
 - o potrdilo o do sedaj opravljenih obveznostih z ocenami magistrskega študijskega programa, s katerim se bo kandidat prijavil na doktorski študij (*official transcript of records listing all courses and grades obtained so far in the Master's degree programme on the basis of which the candidate will apply for enrollment in a doctoral degree programme.*)

nagrade – univerzitetna Prešernova nagrada ali Prešernova nagrada članice Univerze v Ljubljani oz. druga enakovredna nagrada (*awards, e.g. Prešeren Prize of the University of Ljubljana, Prešeren Prize of a University of Ljubljana member and/or another equivalent award*)

bibliografija (*bibliography*)

življenjepis (*CV*)

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osnutek idejne zasnove raziskovalnega dela (*preliminary research proposal*)

priporočilno pismo (*letter of recommendation*)

druge priloge (*other attachments*):

Opis raziskovalnega dela (*Research work description*)

1. Članica UL (*UL member*):

Fakulteta za gradbeništvo in geodezijo / Faculty of Civil and Geodetic Engineering

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

Mateja Škerjanec, mateja.skerjanec@fgg.uni-lj.si

3. Raziskovalno področje (*Research field*):

2.20 Vodarstvo (2.20 Hydrology)

4. Opis raziskovalnega dela (*Research work description*):

Vključuje morebitne dodatne pogoje, ki jih mora izpolnjevati kandidat/ka za mladega raziskovalca/ko, ki niso navedeni v razpisu za mlade raziskovalce (*It includes any additional conditions that the candidate for a young researcher must meet, which are not listed in the call to tender for young researchers.*).

Slov.:

Mladi raziskovalec oz. raziskovalka (MR) se bo usposabljal/-a v okviru raziskovalnega programa Vodarstvo in geotehnika: orodja in metode za analize in simulacije procesov ter razvoj tehnologij (P2-0180). Program združuje inženirske (tehniške) in naravoslovne vsebine s področja voda in vodarstva ter zagotavlja interdisciplinarno raziskovalno okolje. MR bo imel/-a priložnost sodelovati tudi pri domačih in mednarodnih raziskovalnih projektih ter strokovnih nalogah, ki potekajo na Oddelku za okoljsko gradbeništvo UL FGG.

Raziskovalno delo MR bo usmerjeno na področje celostnega upravljanja voda, pri čemer bo vsebinsko prilagojeno predznanju, interesom in strokovnim usmeritvam kandidata oz. kandidatke. Obravnavane teme lahko vključujejo raziskave na področju zagotavljanja dobrega stanja voda, usklajevanja različnih rab vode ter varstva pred škodljivim delovanjem voda, ob upoštevanju podnebnih sprememb in človekovih vplivov. Osrednji poudarek raziskave bo na matematičnem modeliranju okoljskih procesov v povezavi z naprednimi metodami strojnega učenja, predvidene pa so tudi laboratorijske in/ali terenske meritve.

Prednostni profil MR je izobrazba magistrske stopnje s področja inženirskih znanosti (npr. vodarstvo, okoljsko inženirstvo, gradbeništvo, geodezija, strojništvo, gozdarstvo) ali naravoslovja (npr. uporabna fizika). Zaželeno so izkušnje s pisanjem znanstvenih člankov, poglobljeno znanje hidrologije, hidravlike in zaščite voda, poznavanje merilnih tehnik ter praktična znanja za izvedbo raziskave na izbrano temo disertacije.

Pričakujejo se motiviranost za raziskovalno delo, samostojnost, samoiniciativnost, inovativnost, komunikativnost ter sposobnost timskega dela. Kandidat oz. kandidatka naj ima dobro pisno in bralno znanje angleškega jezika, znanje programiranja (npr. Matlab, Python ali sorodni jeziki) ter zanimanje za uporabo metod umetne inteligence in strojnega učenja. Predviden je vpis na doktorski študijski program Grajeno okolje ali Varstvo okolja.

Zaželeno je tudi ustrezno dokazilo o aktivnem znanju angleškega jezika.

Eng.:

A young researcher (MR) will be trained within the research programme Water Science and Technology, and Geotechnical Engineering: Tools and Methods for Process Analyses and Simulations, and Development of Technologies (P2-0180). The programme integrates engineering (technical) and natural science topics in the fields of water and water science, providing an interdisciplinary research environment. The MR will also have the opportunity to participate in national and international research and applied projects at the University of Ljubljana, Faculty of Civil and Geodetic Engineering, Department of Environmental Civil Engineering.

The research work will focus on Integrated Water Resources Management and will be tailored to the candidate's prior knowledge, interests, and professional orientation. The topics addressed may include research in the fields of ensuring good water status, balancing different water uses, and protection against the negative effects of water, considering also climate change and the impact of human activities. The primary focus of the research will be on the mathematical modelling of environmental processes in combination with advanced machine learning methods. Laboratory and/or field measurements are also foreseen.

The preferred candidate profile includes a Master's degree in engineering (e.g., water science, environmental engineering, civil engineering, geodesy, mechanical engineering, forestry) or natural sciences (e.g., applied physics). Experience in scientific writing, in-depth knowledge of hydrology, hydraulics, and water protection, familiarity with measurement techniques, and practical skills needed for conducting research related to the chosen PhD topic are considered beneficial.

Candidates are expected to demonstrate motivation for research work, independence, self-initiative, creativity, good communication skills, and the ability to work in a team. Proficiency in written and reading English, programming skills (e.g., Matlab, Python, or similar languages), and an interest in artificial intelligence and machine learning methods are required. Enrolment into the PhD study programmes of Built Environment or Environmental Protection is anticipated.

Proof of active knowledge of the English language is also desirable.

5. Priloge, ki jih je treba priložiti ob prijavi (*Documents required to be submitted with the application*):

potrdilo o doseženi izobrazbi (*proof of completed education*)

- kandidat z zaključenim magistrskim študijskim programom (2. bolonjska stopnja) (*candidate who has completed a Master's degree (2nd Bologna level)*):
 - o diplomska listina / potrdilo o zaključku študijskega programa (*diploma certificate / certificate of completion of the study programme*)
 - o priloga k diplomi / potrdilo o opravljenih obveznostih (*diploma supplement / official transcript of records containing all grades obtained in the study programme*)
- kandidat, ki še ni zaključil študija na 2. stopnji (*candidate who has not yet completed a Master's degree*):
 - o potrdilo o do sedaj opravljenih obveznostih z ocenami magistrskega študijskega programa, s katerim se bo kandidat prijavil na doktorski študij (*official transcript of records listing all courses and grades obtained so far in the Master's degree programme on the basis of which the candidate will apply for enrollment in a doctoral degree programme.*)

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bibliografija (*bibliography*)

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opis dosedanjega sodelovanja pri raziskovalnem delu (*description of the candidate's research work*)

osnutek idejne zasnove raziskovalnega dela (*preliminary research proposal*)

priporočilno pismo (*letter of recommendation*)

druge priloge (*other attachments*):

Opis raziskovalnega dela (Research work description)

1. Članica UL (UL member):

Fakulteta za gradbeništvo in geodezijo / Faculty of Civil and Geodetic Engineering

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

Prof. dr. Žiga Turk, ziga.turk@fgg.uni-lj.si

3. Raziskovalno področje (Research field):

Gradbena informatika / Construction informatics

4. Opis raziskovalnega dela (Research work description):

Vključuje morebitne dodatne pogoje, ki jih mora izpolnjevati kandidat/ka za mladega raziskovalca/ko, ki niso navedeni v razpisu za mlade raziskovalce (It includes any additional conditions that the candidate for a young researcher must meet, which are not listed in the call to tender for young researchers.).

Slov.: Raziskovalno delo bo usmerjeno v nadaljnji razvoj integracije med velikimi jezikovnimi modeli (LLM) in okolji za informacijsko modeliranje gradenj (BIM), s posebnim poudarkom na razvoju in preizkušanju dvosmernih, pogovornih delotokov, ki izboljšujejo produktivnost načrtovanja ter interoperabilnost med različnimi platformami. Od raziskovalca se pričakuje znanje s področja umetne inteligence ter poznavanje programske opreme in standardov BIM (npr. Revit, IFC). Kandidat mora imeti ali pridobiti programerska znanja, zaželeno je poznavanje digitalnih gradbenih procesov ter sposobnost sodelovanja tako z akademskimi kot z industrijskimi partnerji. Zaželeno so predhodne izkušnje na področju raziskav AI-BIM, razvoja programske opreme za načrtovalska orodja ali na področju gradbene informatike.

Eng.: The research will focus on advancing integration between Large Language Models (LLMs) and Building Information Modeling (BIM) environments, with particular emphasis on developing and testing bidirectional, conversational workflows that improve design productivity and interoperability across platforms. The researcher will be expected to combine expertise in AI (natural language processing, model integration) with knowledge of BIM software and standards (e.g., Revit, IFC). Candidates are expected to have or be able to gain programming skills, familiarity with digital construction workflows, and the ability to collaborate with both academic and industry partners. Prior experience in AI-BIM research, software development for design tools, or applied construction informatics will be considered an asset.

5. Priloge, ki jih kandidat priloži k prijavi (Documents that the candidate submits with the application):

diplomska listina/potrdilo o zaključku študijskega programa (diploma certificate for study programme, with which the candidate has enrolled/ will enroll in a doctoral degree programme)

priloga k diplomi/ potrdilo o opravljenih obveznostih (official transcript of all the grades for study programme, with which the candidate has enrolled/will enroll in a doctoral degree programme)

potrdilo o do sedaj opravljenih obveznostih z ocenami študijskega programa, s katerim se bo kandidat prijavil na študij (*official transcript of all the grades the candidate has received so far for the study programme, with which the candidate will enroll to a doctoral degree programme*)

nagrade (*awards (e.g. Prešeren Prize of the University of Ljubljana, Prešeren Prize of a University of Ljubljana member and/or another equivalent award)*)

bibliografija (*bibliography*)

življenjepis (*CV*)

motivacijsko pismo (*motivation letter*)

opis dosedanjega sodelovanja pri raziskovalnem delu (*description of the candidate's research work*)

osnutek idejne zasnove raziskovalnega dela (*preliminary research proposal*)

priporočilno pismo (*letter of recommendation*)

druge priloge (*other attachments*)

Opis raziskovalnega dela (*Research work description*)

1. Članica UL (*UL member*):

Fakulteta za gradbeništvo in geodezijo / Faculty of Civil and Geodetic Engineering

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

Sara Zoubek, sara.zoubek@fgg.uni-lj.si

3. Raziskovalno področje (*Research field*):

2.01 Gradbeništvo (Civil Engineering)

4. Opis raziskovalnega dela (*Research work description*):

Vključuje morebitne dodatne pogoje, ki jih mora izpolnjevati kandidat/ka za mladega raziskovalca/ko, ki niso navedeni v razpisu za mlade raziskovalce (*It includes any additional conditions that the candidate for a young researcher must meet, which are not listed in the call to tender for young researchers.*).

Slov.: Sodobno gradbeništvo vse bolj vključuje uporabo metamaterialov, funkcionalno gradientnih materialov ter pametnih materialov in konstrukcij. Razvoj teh naprednih materialov je tesno povezan z metodami umetne inteligence, ki danes pomembno vplivajo na razvoj numeričnih orodij in simulacijskih pristopov. Hkrati pa napredek na področju 3D-tiska kovin odpira nove možnosti uporabe sodobnih tehnologij v gradbeništvu, zlasti pri načrtovanju namenske notranje strukture materiala, ki omogoča optimalne mehanske, fizikalne ali funkcionalne lastnosti konstrukcijskih elementov glede na njihov namen.

Raziskovalno delo bodočega mladega raziskovalca/ke bo obsegalo našete sodobne metode in tehnologije: od naprednega numeričnega modeliranja in integracije metod umetne inteligence, do eksperimentalnega dela v laboratoriju ter 3D-tiska jeklenih konstrukcijskih elementov.

Mladi raziskovalec/ka bo delo opravljal/a v okviru raziskovalne skupine Gradbene konstrukcije in gradbena fizika, ki pokriva področja numeričnega in eksperimentalnega modeliranja ter projektiranja jeklenih, masivnih in lesenih konstrukcij. Dolgoletno sodelovanje skupine z evropskimi tehničnimi univerzami omogoča izvedbo dela usposabljanja v tujini. Raznolikost numerično-eksperimentalnih pristopov ter široka interdisciplinarna znanja v programski skupini bodo kandidatu/ki omogočila, da si v dogovoru z mentorjem izbere konkretne raziskovalne cilje in poudarke, ki lahko nato predstavljajo izhodišče za njegovo/njeno nadaljnjo strokovno ali znanstveno kariero.

K prijavi so vabljeni kandidatke in kandidati s področij tehnike ali naravoslovja.

Eng.: Modern construction increasingly incorporates the use of metamaterials, functionally graded materials, and smart materials and structures. The development of these advanced materials is closely linked to methods of artificial intelligence, which today play an important role in advancing numerical tools and simulation approaches. At the same time, progress in metal 3D printing is opening new possibilities for applying modern technologies in construction, particularly in designing purpose-engineered internal material structures that enable optimal mechanical, physical, or functional properties of structural elements according to their intended use.

The research work of the future young researcher will encompass the listed modern methods and technologies: from advanced numerical modelling and the integration of artificial intelligence methods to experimental laboratory work and 3D printing of steel structural elements.

The young researcher will carry out their work within the research group Structural Engineering and Building Physics, which covers numerical and experimental modelling as well as the design of steel, concrete, and timber structures. The group's long-standing collaboration with European technical universities offers the possibility to complete part of the training abroad. The diversity of numerical-experimental approaches and the broad interdisciplinary expertise within the research programme will allow the candidate, in agreement with the supervisor, to define concrete research goals and focus areas that may later form the foundation of their future professional or scientific career.

Candidates from the fields of engineering or natural sciences are invited to apply.

5. Priloge, ki jih je treba priložiti ob prijavi (*Documents required to be submitted with the application*):

potrdilo o doseženi izobrazbi (*proof of completed education*)

- kandidat z zaključenim magistrskim študijskim programom (2. bolonjska stopnja) (*candidate who has completed a Master's degree (2nd Bologna level)*):
 - o diplomska listina / potrdilo o zaključku študijskega programa (*diploma certificate / certificate of completion of the study programme*)
 - o priloga k diplomi / potrdilo o opravljenih obveznostih (*diploma supplement / official transcript of records containing all grades obtained in the study programme*)
- kandidat, ki še ni zaključil študija na 2. stopnji (*candidate who has not yet completed a Master's degree*):
 - o potrdilo o do sedaj opravljenih obveznostih z ocenami magistrskega študijskega programa, s katerim se bo kandidat prijavil na doktorski študij (*official transcript of records listing all courses and grades obtained so far in the Master's degree programme on the basis of which the candidate will apply for enrollment in a doctoral degree programme.*)

nagrade – univerzitetna Prešernova nagrada ali Prešernova nagrada članice Univerze v Ljubljani oz. druga enakovredna nagrada (*awards, e.g. Prešeren Prize of the University of Ljubljana, Prešeren Prize of a University of Ljubljana member and/or another equivalent award*)

bibliografija (*bibliography*)

življenjepis (*CV*)

motivacijsko pismo (*motivation letter*)

opis dosedanjega sodelovanja pri raziskovalnem delu (*description of the candidate's research work*)

osnutek idejne zasnove raziskovalnega dela (*preliminary research proposal*)

priporočilno pismo (*letter of recommendation*)

druge priloge (*other attachments*):

Opis raziskovalnega dela (Research work description)

1. Članica UL (UL member):

Fakulteta za gradbeništvo in geodezijo (Faculty of Civil and Geodetic Engineering)

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

Prof. dr. Dejan Zupan, dejan.zupan@fgg.uni-lj.si

3. Raziskovalno področje (Research field):

Mehanika (Engineering Mechanics)

4. Opis raziskovalnega dela (Research work description):

Vključuje morebitne dodatne pogoje, ki jih mora izpolnjevati kandidat/ka za mladega raziskovalca/ko, ki niso navedeni v razpisu za mlade raziskovalce (It includes any additional conditions that the candidate for a young researcher must meet, which are not listed in the call to tender for young researchers.).

Slov.: Usposabljanje za pridobitev doktorata znanosti bo potekalo v okviru raziskovalne skupine Katedra za mehaniko in v sodelovanju z njihovimi industrijskimi in akademskimi partnerji v Sloveniji in tujini. Skupina proučuje stabilnost in dinamiko konstrukcij ter razvija nove modele in računske algoritme za reševanje aktualnih problemov na tem področju. Znotraj skupine gojimo široka znanja, uspešno izdelane metode in algoritme, ki predstavljajo dobro in trdno osnovo za raziskovalno delo mladega raziskovalca.

Mentor in raziskovalna skupina tako kandidatki ali kandidatu nudita odlične delovne pogoje za študij in raziskovalno delo, ustvarjalno, konkurenčno in prijateljsko ozračje in možnosti znanstvenih diskusij tudi z znanstveniki iz tujine ter primerno računalniško strojno in programsko opremo. Doktorsko delo bi bilo nadaljevanje in razširitev dosedanjih rezultatov raziskovalne skupine s poudarkom na aktualnih problemih pri modeliranju slojevitih konstrukcij z možnostjo delaminacij.

Iščemo kandidatke in kandidate, ki jih zanima poglobljen študij in imajo ustrezna znanja na področju modeliranja, reševanja enačb in programiranja. Primerna izobrazba je zaključena druga stopnja gradbeništva, strojništva, matematike, fizike ali druge tehnične smeri z dovolj vsebin mehanike in modeliranja konstrukcij. Zaželeno je znanje programiranja, še posebej v okoljih kot sta Matlab in Python. Zahtevano je aktivno znanje angleškega jezika.

Eng.: The PhD position is at the Research group Chair of Mechanics at Faculty of Civil and Geodetic Engineering, University of Ljubljana. The group investigates the stability and dynamics of structures and develops new models and numerical formulations for structural mechanics. The wide knowledge and research results within the research group represent an excellent starting point for the early-stage researcher – doctoral student.

The selected candidate will work in a stimulating and collaborative research environment, benefiting from excellent working conditions, access to cutting-edge computational tools, and opportunities for scientific discussions with both local and international researchers. The doctoral research will build upon the group's existing work, with a particular focus on modeling layered structures and addressing challenges related to delamination.

We are looking for highly motivated candidates with a strong academic background and a keen interest in structural modeling and computational mechanics. Appropriate background is the completion of the second level studies in civil engineering, mechanical engineering, mathematics, physics or similar with sufficient coursework in mechanics and structural modelling. Programming skills are highly desirable, in particular experiences with Matlab or Python. High standard of spoken and written English is required.

5. Priloge, ki jih kandidat priloži k prijavi (Documents that the candidate submits with the application):

diplomska listina/potrdilo o zaključku študijskega programa (diploma certificate for study programme, with which the candidate has enrolled/ will enroll in a doctoral degree programme)

priloga k diplomi/ potrdilo o opravljenih obveznostih (official transcript of all the grades for study programme, with which the candidate has enrolled/will enroll in a doctoral degree programme)

potrdilo o do sedaj opravljenih obveznostih z ocenami študijskega programa, s katerim se bo kandidat prijavil na študij (official transcript of all the grades the candidate has received so far for the study programme, with which the candidate will enroll to a doctoral degree programme)

nagrade (awards (e.g. Prešeren Prize of the University of Ljubljana, Prešeren Prize of a University of Ljubljana member and/or another equivalent award))

- bibliografija** (*bibliography*)
- življenjepis** (*CV*)
- motivacijsko pismo** (*motivation letter*)
- opis dosedanjega sodelovanja pri raziskovalnem delu** (*description of the candidate's research work*)
- osnutek idejne zasnove raziskovalnega dela** (*preliminary research proposal*)
- priporočilno pismo** (*letter of recommendation*)
- druge priloge** (*other attachments*)