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*):

David Antolinc, david.antolinc@fgg.uni-lj.si

3. Raziskovalno področje (*Research field*):

Gradbeništvo / Potresno inženirstvo (Civil and Structural 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.:
Mladi raziskovalec/ka se bo usposabljal/a na doktorskem študiju Grajeno okolje, Fakulteta za gradbeništvo in geodezijo, Univerza v Ljubljani, z možnostjo izpopolnjevanja na uglednih institucijah po svetu. Tema doktorske disertacije mladega raziskovalca bo usklajena z raziskavami raziskovalne programske Potresno inženirstvo (P2-0185), ki sodeluje v mednarodnih projektih in združenjih, kar zagotavlja, da bodo raziskave aktualne in usklajene na mednarodnem nivoju. Delovno mesto mladega raziskovalca/ke na področju gradbeništva/potresnega inženirstva vključuje interdisciplinarni pristop k raziskovanju, kar je v skladu z resolucijo o krepitvi potresne varnosti do leta 2050. Glavni cilj je pripraviti družbo na bodoče potrese in zaščititi ljudi ter grajeno okolje, ob upoštevanju raznolikosti obstoječega stavbnega fonda in hitrega razvoja novih konstrukcijskih sistemov in materialov.

Sodobna arhitektura narekuje večje transparentne steklene površine stavbnega ovoja, ki lahko v primeru potresne obtežbe na objekte predstavljajo večje tveganje za poškodbe krhkega stekla in posledično nevarnost za uporabnike stavbe. V pripravi je izdaja novega Evrokoda 10 namenjenega projektiranju konstrukcijskega stekla in steklenih fasad, ki ne predvideva uporabe konstrukcijskega stekla za prevzem dela potresne obtežbe. Kljub temu je potrebno preveriti obnašanje teh sistemov med potresno obtežbo in zagotoviti varovanje steklenih elementov pred njihovo krhko hipno porušitvijo. V prihodnosti bo potrebno nadgraditi in posodobiti nastajajoči Evrokod 10 in na določenih delih tudi Evrokod 8 v katerem bodo podana specifična pravila za projektiranje tovrstnih konstrukcij na potresnih območjih. V strokovni javnosti s tega področja je veliko odprtih vprašanj in tematik, mladi/a raziskovalec/ka pa bo imel/a priložnost sodelovati pri tovrstnih raziskavah. V splošnem so to teme, ki se uvrščajo tudi v enega izmed treh raziskovalnih stebrov programske skupine, ki so: (1) potresno-odporno projektiranje in utrditev obstoječih objektov, (2) metode in orodja za vzpostavitev potresno-odpornega grajenega okolja ter (3) nove tehnologije, materiali in konstrukcije za trajnostni razvoj z upoštevanjem vpliva potresnega tveganja.

Raziskave mladega raziskovalca/ke bodo usmerjene v eno izmed naslednjih tem:

- razvoj seizmičnih pritrdilnih elementov in detajlov za strukturne steklene fasade in steklene konstrukcijske elemente na osnovi eksperimentalnih in numeričnih analiz,
- izboljšanje in razvoj postopkov projektiranja konstrukcijskega stekla in steklenih fasad na potresnih območjih ali potresne utrditve obstoječih objektov,
- prispevanje k razvoju novega standarda za konstrukcijsko steklo Evrokod 10.

Kandidat mora izpolnjevati vse kriterije iz razpisa. Zaželena je magistrska izobrazba s področja gradbeništva ali strojništva, ni pa nujna, ter izkazan interes za raziskovanje s področja eksperimentalne in numerične analize konstrukcij, potresnega inženirstva, gradbeništva ali drugih ved, ki jih povezuje potresno inženirstvo.
Prednost imajo kandidati z izkušnjami na področju numeričnega modeliranja konstrukcij, laboratorijskih preiskav in razumevanjem projektiranja potresno odpornih konstrukcij. Dodatne informacije lahko dobite na naslovu david.antolinc@fgg.uni-lj.si.

Eng.:
The young researcher will be trained in the PhD study program of Built Environment at the Faculty of Civil Engineering and Geodesy, University of Ljubljana, with the possibility of additional training at reputable institutions

abroad. The topic of the young researcher's doctoral dissertation will be aligned with the research agenda of the Earthquake Engineering Research Programme (P2-0185), which participates in state-of-the-art research international projects and associations. The position of young researcher in the field of civil or earthquake engineering requires an interdisciplinary research approach, which is in line with the Resolution on Strengthening Earthquake Safety by 2050. The main goal is to prepare society for future earthquakes, protect people and the built environment, taking into account the diversity of the existing building stock and the rapid development of new structural systems and materials.

Modern architecture requires larger transparent façade glass surfaces, which can increase the risk of brittle glass failure during the event of an imposed earthquake load and represent hazardous structural behaviour for the occupants of the building. Currently, a new Eurocode 10 is being prepared for the design of structural glass and glass facades, which does not consider the use of structural glass as seismic structural elements and neither the specific rules for the protection of structural glass elements against the seismic loads. Nevertheless, it is necessary to verify the behaviour of these systems during seismic loading and to ensure the protection of glass elements against their nature of britlle failure. In the future, it will be necessary to upgrade and update the emerging Eurocode 10 and in particular sections Eurocode 8, which will provide specific rules for the design of such structures in seismic areas.

There are many open questions and topics in the professional community in this field, and the young researcher will have the opportunity to participate in mentioned research. In general, these topics also align with one of the three research pillars of the research group, which are: (1) earthquake-resistant design and strengthening of existing buildings, (2) methods and tools for establishing an earthquake-resistant built environment, and (3) new technologies, materials and structures for sustainable development taking into account the impact of seismic risk.

The research of the young researcher will be focused on one of the following main topics:

- improvement of design procedures for structural glass and glass facades in seismic areas or seismic strengthening of existing buildings,

- development of seismic connection details and structural details for structural glass facades and structural glass elements based on experimental and numerical analyses,

- contribution to the development of the new standard for structural glass Eurocode 10.

The candidate has to fulfil all the criteria from the public call. A master degree in civil or mechanical engineering is desirable, as well as demonstrated interest in research in the field of experimental and numerical analysis of structures, structural systems, earthquake engineering, civil engineering and sciences related to earthquake engineering. Preference will be given to candidates who have experience in numerical structural modelling, experimental laboratory work and understand earthquake-resistant design of structures. Additional information can be obtained at david.antolinc@fgg.uni-lj.si.

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)*:

UL FGG

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

Izr. prof. dr. Nataša Atanasova, natasa.atanasova@fgg.uni-lj.si

3. Raziskovalno področje (*Research field*):

Vodarstvo

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.:
Oddelek za okoljsko gradbeništvo Fakultete za gradbeništvo in geodezijo Univerze v Ljubljani (UL FGG) ima na voljo 4-letno delovno mesto mlade-ga raziskovalke-ca (MR) na področju čiščenja odpadnih voda. Kandidat-ka se bo usposabljal-a v okviru raziskovalnega programa Vodarstvo in geotehnika: orodja in metode za analize in simulacije procesov ter razvoj tehnologij.

Raziskovalna tema vključuje odstranjevanje mikroonesnaževal iz odpadne vode, ter tako prispeva k nadgradnji tehnologij obstoječih ČN za kvartarno čiščenje, kar je tudi zahteva prenovljene evropske Direktive o čiščenju odpadne vode. Naloga bo raziskala potencial algnih tehnologij za odstranjevanje mikroonesnaževal, oz. v kateri fazi čistilnega procesa je najbolj smiselno vključiti algne tehnologije. Učinkovitost odstranjevanja mikroonesnaževal bo ovrednotena tudi za kombinacije algnih tehnologij z različnimi fizikalnimi in kemijskimi postopki predhodne ali končne obdelave komunalne odpadne vode. Raziskovalno delo bo potekalo v laboratorijskem in pilotnem merilu. Na pilotnem merilu je postavljen algni bazen, za katerega bo vzpostavljen matematični model procesov čiščenja. Model bo uporabljen za simulacijo delovanja ČN pod različnimi pogoji in pri optimizaciji kvartarne stopnje čiščenja z algami. Na eksperimentih v laboratorijskem merilu bomo opazovali in karakterizirali algne procese čiščenja ter določali parametre modela.

Naloge kandidata-ke so naslednje:
1. Vpis na doktorski študijski program Grajeno okolje UL FGG ali Varstvo okolja na UL.
2. Zaključek doktorskega študija v štirih letih.
3. Izvedba raziskav na izbrano temo disertacije
4. Uporaba, testiranje in vrednotenje eksperimentalnih (in modelirnih) orodij na obstoječih in novih sistemih oz. reaktorjih ter vzpostavitev eksperimentov.
5. Laboratorijsko delo: merjenje parametrov kakovosti vode, upravljanje laboratorijskih reaktorjev in podobno.
6. Objava in predstavitev rezultatov na mednarodnih konferencah in v znanstvenih revijah.
7. Sodelovanje pri tekočih projektih raziskovalne skupine, povezanih s temo doktorata.
8. Sodelovanje s študenti pri nalogah, povezanih s temo doktorata.

Prednostna merila za izbor

Prednost bodo imeli kandidati s področja okoljskega/stanitarnega inženirstva, gradbeništva ali biotehnologije s poglobljenim teoretičnim znanjem na področju doktorske disertacije (algni sistemi za čiščenje odpadnih voda) in s praktičnimi znanji za izvedbo eksperimentalnega dela doktorske disertacije (eksperiment, laboratorijsko in terensko delo). Izkušnje na področju modeliranja okoljskih sistemov in delovanja algnih sistemov. Izkušnje z objavami v mednarodnih znanstvenih revijah in na konferencah se bodo štele za prednost. Zaželeno je dokazilo o aktivnem znanju angleškega jezika.

Eng.: The Department of Environmental Civil Engineering of the University of Ljubljana, Faculty of Civil and Geodetic Engineering (UL FGG) has a 4-year PhD position available in the field of wastewater treatment. The candidate 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.

The research topic involves the removal of micro-pollutants from wastewater, thus contributing to the upgrading of existing WWTP technologies for quaternary treatment, which is also a requirement of the revised European Wastewater Treatment Directive. The thesis will investigate the potential of algal technologies for the removal of micropollutants. It will investigate the stage of the treatment process at which including algal technologies is optimal. The removal efficiency of micropollutants will also be evaluated for combinations of algal technologies with different physical and chemical pre- or post-treatments of municipal wastewater. The research work will be carried out a laboratory and at a pilot scale algae pond. On the pilot scale a mathematical model of the treatment processes will be constructed, which will simulate treatment efficiency at various conditions and assist with the optimal establishment of quaternary algae treatment. Laboratory scale experiments will be used for verifying and characterising the algal treatment processess and for specifying process parameters.

The duties of the candidate are as follows:

1. Enrolment in the doctoral study program Built Environment of the UL FGG, or Environmental Protection at the UL.
2. Completing the PhD in 4 years
3. Conduct quantitative and qualitative research on the selected topic
4. Using, testing, and evaluating experimental (and modelling) tools on existing and new systems as well as setting up experimental sites.
5. Laboratory work: measuring water quality parameters, running a lab-scale reactors and similar
6. Publish and present results both at international conferences and in scientific journals
7. Collaborate in on-going projects of the research group related to the PhD topic
8. Working with students on topic related tasks.

Preferences
Priority will be given to candidates with educational background in environmental/sanitary/civil/ engineering or biotechnology and in-depth theoretical knowledge in the dissertation field (algal systems for wastewater treatment) and with practical skills to carry out the experimental work of the dissertation (experiment, laboratory, field work). Experiences in mathematical modelling of environmental systems and working with algal systems are desired. Experiences in publishing in international scientific journals and conferences will be considered an advantage. Proof of active knowledge of English language is desirable.

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 Gedetic 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*):

PE8 Produktno in procesno inženirstvo / Gradbeništvo / Interdisciplinarno PE8 Product and Process Engineering / Civil Engineering / Interdisciplinary

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.)*.

Slo:

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 vabljene tudi kandidatke in kandidati z različnih strokovnih področji (gradbeništvo, strojništvo, prometno inženirstvo, elektrotehnika, jedrska fizika, računalništvo, geoinformatika, urbanizem, prostorsko načrtovanje, ekonomija – aktuarstvo, pravo in druga področja).

Možne teme raziskovalnega dela:

1. **Zagotavljanje potresne varnosti jedrskih in sevalnih objektov**
   - Konstrukcije, sisteme in komponente jedrskih elektrarn je treba načrtovati potresno odporno, še posebej, če so locirane na potresno nevarnih območjih. Tema je aktualna za zagotavljanje odpornosti Slovenije in zaradi dejstva, da je načrtovana gradnja novih jedrskih elektrarn po svetu, kljub temu pa je je premalo razvoja na področju projektiranja in analiz potresnega tveganja jedrskih elektrarn.
   - Ključne besede: jedrska in sevalna varnost, potresno tveganje in projektiranje konstrukcij, sistemov in komponent, analiza potresne ranljivosti, verjetnostna varnostna analiza.
   - Priporočena osnovna znanja: gradbeništvo, strojništvo, jedrska fizika ali elektrotehnike.
   - Možno somentorstvo za področje strojništva, jedrske fizike ali elektrotehnike.

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. **Prometni tokovi v kriznih situacijah**

- Potresi lahko povzročijo ustavitev prometnih tokov, kar upočasni reševanje takoj po ekstremnih pojavih in oteži proces okrevanja skupnosti. Učinki tovrstnih ustavitev 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.

4. **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.

5. **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.

6. **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.

7. **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.

8. **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.

9. **Potresno inženirstvo in pravo**
   - Gradbeni zakon v RS Sloveniji dovoljuje, da potresi lahko porušijo objekte in s tem ogrozijo življenja ljudi, medtem ko se to ne sme zgoditi zaradi ostalih vplivov na objekte. Po drugi strani je Državni zbor RS sprejel Resolucijo o krepitvi potresne varnosti v Sloveniji, saj je prišlo do spoznanja, je Slovenija potresno neodporna, česar pa ne bo mogoče rešiti brez spremembe zakonodaje.
   - Ključne besede: potresna odpornost skupnosti, gradbena zakonodaja, pravo.
   - Priporočena osnovna znanja: gradbeništvo ali pravo.

- Predvideno somentorstvo za področje prava.

10. **Potresi in izbrano področje**
    - Kandidatka ali kandidat po svoji presoji predlagata interdisciplinarno raziskavo, pri čemer je treba tematiko opredeliti v motivacijskem pismu in priložiti 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. 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 (civil engineering, mechanical engineering, traffic engineering, electrical engineering, nuclear physics, computer science, geoinformatics, urban planning, spatial planning, economics – actuarial science, law, and others) are invited to apply for the call.

Possible research topics:

1. **Ensuring earthquake safety of nuclear and radiation facilities**
    - The structures, systems, and components of nuclear power plants must be designed to be earthquake-resistant, especially if they are located in earthquake-prone areas. This topic is relevant both for ensuring the resilience of Slovenia and because of the planned construction of new nuclear power plants worldwide, despite limited development in the field of earthquake risk assessment for nuclear power plants.
    - Keywords: nuclear and radiation safety, earthquake risk, and design of structures, systems, and components, seismic fragility analysis, probabilistic safety studies.
    - Recommended foundational knowledge: civil engineering, mechanical engineering, nuclear physics, or electrical engineering.
    - Possible co-supervision in mechanical engineering, nuclear physics, or electrical 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. **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.
4. **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.

5. **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.
6. **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.
7. **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.
8. **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.
9. **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.
10. **Earthquakes and selected field**
    - The candidate, based on their discretion, proposes an interdisciplinary research topic, which must be defined in the motivation letter and accompanied by a recommendation letter from a potential co-supervisor.

The young researcher will be a member of the Earthquake Engineering Research Programme 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 Programme (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 will choose one of the proposed topics and submit a motivation letter with the application. Additional information can be obtained via email: mdolsek@fgg.uni-lj.si.

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)*:

Univerza v Ljubljani, Fakulteta za gradbeništvo in geodezijo

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

Anka Lisec, anka.lisec@fgg.uni-lj.si

3. Raziskovalno področje (*Research field*):

2.17 Geodezija

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 se bo usposabljal/-a v okviru raziskovalnega programa P2-0406 Opazovanje Zemlje in geoinformatika (www.fgg.uni-lj.si/raziskovalna-dejavnost/programske-skupine/). Področje raziskovalnega dela je napredno 3D in 4D modeliranje mest in pokrajine v okoljih GIS za namene geoprostorskega digitalnega dvojnika, s posebnim poudarkom na optimizaciji procesa naprednega prostorsko-časovnega modeliranja na temelju integracije različnih podatkovnih virov. Raziskava bo usmerjena v razvoj koncepta geoprostorskega digitalnega dvojnika – tako s podatkovnega kot procesnega vidika. Pri razvoju koncepta geoprostorskega digitalnega dvojnika bomo sledili predvsem zahtevam glede funkcionalnosti, ki jih mora v sodobnih državah in skupnostih podpirati napredna uradna prostorska informacijska infrastruktura na področju upravljanja prostora. Raziskovalno delo bo vključevalo tudi razvoj metod pridobivanja in obdelave podatkov za vzpostavitev, delovanje in posodabljanje geoprostorskega digitalnega dvojnika, modeliranje prostora s temi podatki in uporabo metod prostorske analitike. Pričakovani profil kandidata je magistrska izobrazba na področju (geo)informacijskih ali širše tehničnih in naravoslovnih znanosti (geodezija in geoinformatika, informatika, računalništvo, fizika, matematika, geografija ...). Prednost pri izbiri bodo imeli kandidati z izkušnjami na področju geoinformatike in prostorske analitike, programiranja ter poznavanjem izzivov upravljanja prostora in s tem povezanim odločitvenim procesom. Predviden je vpis na doktorski študij Grajeno okolje.

Eng.: The young researcher will be trained as part of the research program P2-0406 Earth Observation and Geoinformatics (https://www.en.fgg.uni-lj.si/research/research-programmes/). The field of research is advanced 3D and 4D city and landscape modelling in GIS environment for the purpose of geospatial digital twin, with a particular emphasis on process optimisation of advanced spatial-temporal modelling based on various data integration. The research will focus on the development of the geospatial twin concept, where data and process views will be

considered. When developing the concept of a geospatial digital twin, the requirements and expected functionalities of an advanced geospatial information infrastructure will be considered as expected in modern states and societies. The research work will include the development of methods for data acquisition and modelling for the implementation and maintenance of the geospatial digital twin as well as the use of advanced geospatial analytical methods.

The expected candidate profile is a master's degree in the field of (geo)information or broader technical and natural sciences (geodesy and geoinformatics, computer science, physics, mathematics, geography ...). Priority will be given to candidates with experience in the fields of geoinformatics, spatial analytics, and programming, as well as candidates who are familiar with the challenges of spatial development and related geospatial decision making.

It is envisaged to enrol in the doctoral study Built Environment.

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)*

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☒ **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

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

Aleš Marjetič, amarjeti@fgg.uni-lj.si

3. Raziskovalno področje (*Research field*):

Geodezija

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 oziroma mlada raziskovalka (MR) se bo z raziskovalnim delom usposabljal v okviru raziskovalnega programa P2-0227 z naslovom Geoinformacijska infrastruktura in trajnostni prostorski razvoj Slovenije. Ožja raziskovalna skupina, ki raziskuje v okviru omenjenega raziskovalnega programa in v katero bo vključen kandidat, se ukvarja z raziskovanjem naprednih metod precizne terestrične geodetske izmere, deformacijske analize in inženirske geodezije.
Kandidat mora izkazovati željo po raziskovanju in razvoju novih pristopov za spremljanje premikov točk in deformacij različnih naravnih in grajenih objektov ter optimizacijo merskih postopkov pri klasični terestrični geodetski izmeri in terestričnem laserskem skeniranju. Cilj raziskovalnega dela bo tudi nadgradnja klasičnih terestričnih merskih postopkov in obdelav meritev s kombinacijo rezultatov meritev drugih merskih metod (fotogrametričnih in GNSS) ter vrednosti drugih merskih senzorjev (npr. IMU, inklinometri) kot podpora pri izboljšanju rezultatov za določitev kakovostnih informacij o deformacijskem stanju obravnavanega objekta. To bo vključevalo raziskovalno delo na deloma vsebinsko ločenih sklopih, ki jih bo kandidat v svojem zaključnem delu povezal v eno celoto.
Raziskovalno bo kandidat sodeloval pri naslednjih raziskovalnih tematikah:

- *Precizni terestrični geodetski izmeri za spremljanje premikov in deformacij naravnih in grajenih objektov s poudarkom na optimizaciji merskih in računskih postopkov v izravnavi meritev za določitev natančnih položajev in premikov točk v preciznih geodetskih mrežah oziroma sprememb geometrije deformabilnega objekta.*
- *Deformacijski analizi pri raziskovanju problematike koordinatnih osnov v geodetskih mrežah ter razvoju alternativnih pristopov k določanju stabilnih referenčnih točk.*
- *Optimizaciji merskih postopkov v inženirski geodeziji – preizkušanju in kalibraciji sodobne merske opreme ter razvoju inovativnih metod za izboljšanje natančnosti meritev.*
- *Morebitnih aplikacijah drugih merskih metod, kot so fotogrametrične metode, metode GNSS ter laserskega skeniranja pri inženirskih nalogah ter povezovanju z dodatnimi merskimi senzorji (IMU, inklinometri), odvisno od interesa kandidata.*

Prednost pri izbiri bodo imel kandidati, ki so dosegli nadpovprečne študijske rezultate, ima predhodno geodetsko izobrazbo, je vešč programiranja v enem od programskih jezikov (matlab, python…) in izkazujejo željo po samostojnem znanstveno-raziskovalnem delu, ki bo vključevalo kombinacijo terenskega dela, eksperimentalnih meritev, podatkovnih analiz in razvoj matematičnih modelov za interpretacijo rezultatov. Mladi raziskovalec bo imel pri svojem raziskovalnem delu tudi možnost sodelovanja pri znanstvenih objavah in projektih s praktičnimi aplikacijami v geodetskem inženirstvu.

Eng.:
A Young Researcher (MR) will undergo research training within the framework of the research program P2-0227, titled Geoinformation Infrastructure and Sustainable Spatial Development of Slovenia. The selected candidate will join a specialized research group within this program, focusing on advanced methods of precise terrestrial geodetic measurement, deformation analysis, and engineering geodesy.
The candidate should demonstrate a strong interest in research and the development of new approaches for monitoring point displacements and deformations of various natural and man-made structures, as well as optimizing measurement procedures in classical terrestrial geodetic surveys and terrestrial laser scanning. The

research will also aim to enhance traditional terrestrial measurement methods by integrating results from other measurement techniques (such as photogrammetry and GNSS) and incorporating data from additional sensors (IMU, inclinometers) to improve the quality of deformation analysis. The research will involve several interrelated subtopics, which the candidate will ultimately integrate into a cohesive final thesis.
The candidate will be involved in the following research areas:

- *Precise terrestrial geodetic measurement for monitoring displacements and deformations of natural and built structures, with a focus on optimizing measurement and computational procedures in measurement adjustment to determine accurate point positions and movements within geodetic networks or changes in the geometry of deformable objects.*
- *Deformation analysis, particularly addressing challenges related to reference coordinate frames in geodetic networks and developing alternative approaches for determining stable reference points.*
- *Optimization of measurement procedures in engineering geodesy, including testing and calibration of modern surveying equipment and the development of innovative methods to improve measurement precision.*
- *Potential applications of other measurement techniques, such as photogrammetry, GNSS, and laser scanning, for engineering tasks and their integration with additional measurement sensors (IMU, inclinometers), depending on the candidate's interests.*

Preference will be given to candidates who have above-average academic achievements, hold a prior geodetic education background, possess programming skills in one of the programming languages (e.g., Matlab, Python) and demonstrate a strong interest in independent scientific research, combining fieldwork, experimental measurements, data analysis, and mathematical modeling for result interpretation.
The Young Researcher will also have the opportunity to contribute to scientific publications and research projects with practical applications in geodetic engineering.

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 Piculin, sara.piculin@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.: Bodoči mladi raziskovalec/ka bo raziskovalno delo opravljal/a v okviru raziskovalne skupine Gradbene konstrukcije in gradbena fizika, ki pokriva področje numeričnega in eksperimentalnega modeliranja ter projektiranja jeklenih, masivnih in lesenih konstrukcij. Pristopi k načrtovanju konstrukcij bodo v prihodnosti zahtevali materiale oziroma konstrukcijske sisteme, ki se bodo aktivno odzivali v času in prostoru na dane obremenitve. Razvoj metod na področju 3D tiska kovin odpira nove možnosti aplikacije sodobnih tehnologij v konstrukcijah, zlasti v smislu namensko zasnovane notranje strukture, ki omogoča optimalne lastnosti konstrukcije in konstrukcijskih elementov glede na njihov namen. Sodobno gradbeništvo vključuje uporabo metamaterialov in funkcionalno gradientnih materialov ter pametnih materialov in konstrukcij. Razvoj novih materialov in konstrukcij je tesno povezan z metodami umetne inteligence, ki so trenutno v samem središču razvoja numeričnih metod, saj predstavljajo osnovo visokotehnoloških rešitev. Raziskovalno delo bodočega mladega raziskovalca/ke bo zajemalo zgoraj naštete sodobne metode in tehnologije, od uporabe naprednega numeričnega modeliranja ter metod umetne inteligence, do eksperimentalnega dela v laboratoriju in 3D tiska jeklenih konstrukcijskih elementov. Programska skupina je ena vodilnih raziskovalnih skupin na področju razvoja tehničnih standardov in eksperimentalnih metod pri analizi konstrukcijskih rešitev, kar bo dobra osnova za dosego zastavljenih ciljev. Dolgoletno sodelovanje z evropskim tehničnimi univerzami, kot so Univerzi v Pavii, Tehniška univerza v Delftu, Univerza v Budimpešti, Univerza v Stuttgartu, center za numerično modeliranje na Univerzi v Hannovru, idr. bo dalo kandidatu/ki možnost izvedbe dela usposabljanja v tujini. Splošnost uporabljenih numerično-eksperimentalnih metod ter široka znanja v programski skupini, bodo omogočala kandidatu/ki, da si, v dogovoru z mentorjem, izbere konkretne cilje in poudarke raziskav, ki bodo tako lahko osnova tudi za kandidatovo bodočo strokovno ali raziskovalno kariero. Vabljeni so kandidati/ke s področja tehnike ali naravoslovja.

Eng.: The future young researcher will carry out his/her research work in the research group Building Structures and Building Physics, which covers the field of numerical and experimental modeling and design of steel, concrete and timber structures. Future approaches to structural design require materials or structural systems that will actively respond in time and space to given loads. The development of methods in the field of 3D printing of metals opens up new possibilities for the use of modern technologies in structures, especially in the production of materials and structures whose internal structure is specifically designed to have optimal properties depending on their purpose. Today's construction industry includes the use of metamaterials, functionally gradient materials and intelligent materials and structures. The development of new materials and structural elements is closely linked to artificial intelligence methods, which are currently at the center of the development of numerical methods, as they represents the basis of high-tech solutions. The research work of the future young researcher includes the use of advanced numerical modelling, artificial intelligence methods, experimental work in the laboratory and 3D printing of metal. The research group is one of the leading research groups in the field of development of technical standards and experimental methods in the analysis of structural systems, which will be a good basis for achieving the set goals. Long-term collaborations with some of the leading European technical universities, such as the University of Pavia, Delft University of Technology, Budapest University of Technology and Economics, University of Stuttgart, the centre for numerical modeling at the University of Hannover and others will give the candidate the opportunity to complete part of the training abroad. The generality of the numerical-experimental methods used as well as the broad knowledge in the research group allow the candidate to choose specific goals and focuses of research in

consultation with the mentor. The mentioned can be the basis for the candidate's future professional or research career. Candidates in the field of engineering or natural sciences are invited.

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*):

Oskar Sterle, oskar.sterle@fgg.uni-lj.si

3. Raziskovalno področje (*Research field*):

Geodezija / Geodesy

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.:

Mlada raziskovalka (mladi raziskovalec) bo delovala (deloval) na Katedri za matematično in fizikalno geodezijo ter navigacijo Oddelka za Geodezijo UL FGG, znanstveno usposabljanje pa bo izvedeno v okviru raziskovalnega programa Dinamična Zemlja (P1-0419), ki ga sestavljajo raziskovalci Geološkega zavoda Slovenije in en raziskovalec Oddelka za geodezijo UL FGG. Znanstveno področje raziskovalne skupine je usmerjeno v spremljanje, analiziranje in modeliranje dinamičnih procesov Zemlje, od aktivne globalne, regionalne in lokalne tektonike, potresnih mehanizmov, pobočnih masnih premikov in drugih površinskih procesov.

Znanstveno-raziskovalno delo mlade raziskovalke (mladega raziskovalca) bo usmerjeno v poglobljen študij geodetskih metod za potrebe spremljanja deformiranja Zemeljskega površja in analize stanja Zemljine atmosfere. Za kakovostno določitev in opredelitev dinamičnih procesov Zemlje je potrebno kakovostno določanje položajev karakterističnih točk in njihovih sprememb skozi čas. Obravnava položaja mora biti opredeljena znotraj modernega časovno odvisnega referenčnega sistema, ki temelji na tehnikah satelitske geodezije in daljinskega zaznavanja. Kandidatka (kandidat) bo znanje pridobila (pridobil) v okviru doktorskega študija, pri sodelovanju v aplikativnih in znanstvenih projektih, sodelovanja v multidisciplinarni skupini raziskovalcev Oddelka za geodezijo in Geološkega zavoda Slovenije in pri vključevanju v mednarodno okolje znanstvenih raziskav.

Iščemo kandidatko ali kandidata, ki jo/ga zanima poglobljen študij geodetskih metod določanja položaja geodetskih točk in njihovih sprememb skozi čas, za spremljanje in modeliranje dinamičnih procesov Zemlje. Zaželeno je znanje programiranja za reševanje matematičnih in fizikalnih problemov, kot sta to Matlab in Python. Zahtevano je aktivno znanje angleškega jezika. Pričakuje se odgovornost in samoiniciativnost, predvsem pa odprtost za delo v skupini.

Eng.:

The Young Researcher will work at the Chair of Mathematical and Physical Geodesy and Navigation, Department of Geodesy UL FGG, however the scientific training will be carried out within the framework of the research programme Dynamic Earth (P1-0419), a programme that consists of researchers from Geological Survey of Slovenia and one researcher from Department of Geodesy UL FGG. Scientific field of the research group focuses on monitoring, analysing and modelling of the Earth's dynamic processes; i.e. active global, regional and local tectonics, earthquake mechanisms, slope mass movements and other surface processes.

The scientific work of the young researcher will be focused towards an in-depth study of geodetic methods for monitoring the deformation of the Earth's surface and analysis of the Earth's atmosphere. To determine and define dynamic processes of the Earth with high quality, one must determine the positions of characteristic points and their changes in time. Positions of points must be determined within a modern time-

dependent reference systems that are based on satellite geodesy and remote sensing. The candidate will acquire necessary background knowledge through doctoral studies, participation in applied and scientific projects, and participation in a multidisciplinary group of researchers of the Department of Geodesy and the Geological Survey of Slovenia, with an integration into the international environment of scientific research.

We are looking for a candidate who is interested in an in-depth study of geodetic methods for determining the position of geodetic points and their changes over time, for monitoring and modelling the Earth's dynamic processes. Programming skills, in particular Matlab and Python, for solving mathematical and physical problems are desirable. Higher level of spoken and written English is required. The applicant should be responsible, show initiative, and be open for working in a dynamic team.

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*):

Mojca Šraj, mojca.sraj@fgg.uni-lj.si

3. Raziskovalno področje (*Research field*):

2.20 Vodarstvo (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/mlada raziskovalka (v nadaljevanju MR) bo delal na raziskovalnem področju v okviru uveljavljenega raziskovalnega programa P2-0180 Vodarstvo in geotehnika: orodja in metode za analize in simulacije procesov ter razvoj tehnologij. Program pokriva inženirske (tehniške) in naravoslovne vsebine, povezane z vodo in vodarstvom. V okviru dela na doktorski disertaciji in podiplomskega študija bo MR sodeloval pri mednarodnih in domačih raziskovalnih projektih in strokovnih nalogah Katedre za splošno hidrotehniko UL FGG in pri aktivnostih Unesco katedre za zmanjševanje tveganj ob vodnih ujmah UL (www.unesco-floods.eu). *Doktorska disertacija bo v dogovoru z MR usmerjena v raziskovanje hidroloških procesov v naravnem okolju in na reševanje inženirskih problemov s širšega področja hidrologije in skladno s predznanji in željami kandidata. MR bo izvajal lastne meritve različnih meteoroloških in hidroloških spremenljivk ter se tako seznanil z različnimi hidrološkimi procesi in mersko opremo na že vzpostavljeni in dobro opremljeni eksperimentalni raziskovalni ploskvi (porečju), kar omogoča takojšen začetek raziskovalnega dela in kvalitetne raziskave na mednarodnem nivoju (tudi v sklopu obstoječih mednarodnih raziskovalnih projektov Katedre za splošno hidrotehniko). Z lastnimi meritvami bo kandidat ugotavljal povezave in zakonitosti med posameznimi merjenimi spremenljivkami, kar mu bo omogočilo boljše razumevanje hidroloških procesov in njihovih vplivnih dejavnikov ter s tem kakovostnejšo izdelavo hidroloških, vodno-bilančnih ali različnih statističnih modelov. Tema doktorske naloge bo predvidoma usmerjena v področje prestrezanja padavin in s tem povezanimi procesi, kot so npr. evapotranspiracija, odtok, erozija.* *Od kandidata se pričakuje magistrska izobrazba s področja inženirskih znanosti (npr. vodarstvo, (okoljsko) gradbeništvo, gozdarstvo, inženirska geologija) ali naravoslovja (npr. uporabna fizika). Predviden je vpis na podiplomski študijski program Grajeno okolje ali Varstvo okolja. Prednost pri izbiri bodo imeli kandidati s poglobljenim znanjem s širšega področja hidrologije in željo po izvajanju eksperimentalnega dela (terensko delo na obstoječi eksperimentalni ploskvi/porečju) ter razvoju naprednih modelov in statističnih analiz merjenih hidroloških in meteoroloških spremenljivk. Prednost bodo imeli tudi kandidati s predznanjem programskega jezika R (ali podobnih jezikov). MR mora biti samoiniciativen in imeti sposobnost za samostojno raziskovalno delo. Nujno je dobro pisno in bralno znanje angleškega jezika in zanimanje za raziskovalno delo. MR bo deloval pod mentorstvom izkušenih raziskovalcev in hkrati v sodelovanju z drugimi mladimi raziskovalnimi sodelavci v spodbudnem raziskovalnem okolju.*

Eng.: The Young Researcher (hereafter MR) will work in a research area within the established research programme P2-0180 Water Science and Technology, and Geotechnical Engineering: Tools and Methods for Process Analyses and Simulations, and Development of Technologies. The programme covers engineering (technical) and natural science topics related to water and water management. In the framework of PhD thesis and postgraduate studies, MR will actively participate in international and national research and professional projects of the Chair of Hydrology and Hydraulic Engineering at the Faculty of Civil and Geodetic Engineering, University of Ljubljana, and in the activities of the UNESCO Chair on Water-related Disaster Risk Reduction, University of Ljubljana (www.unesco-floods.eu). *The PhD thesis will be focused on the study of hydrological processes in the natural environment and on the solution of engineering problems in the broader field of hydrology, in agreement with the MR, and according to the candidate's background and preferences. The MR will carry out his/her own measurements of various meteorological and hydrological variables and thus become familiar with various hydrological processes and measurement equipment on an already established and well-equipped experimental research plot (catchment), which allows an immediate start of research work and high quality research at international level (also in the framework of existing international research projects of the Chair of Hydrology and Hydraulic Engineering). The candidate will use his/her own measurements to establish relationships and connections between individual*

measured variables, which will enable him/her to better understand hydrological processes and their influencing factors, and thus to produce hydrological, water balance or various statistical models of higher quality. The topic of the PhD thesis is expected to focus on rainfall interception and related processes, e.g. evapotranspiration, runoff, erosion.
The candidate is expected to have a Master's degree in an engineering science (e.g. water engineering, civil (environmental) engineering, forestry, engineering geology) or a natural science (e.g. applied physics). Enrolment in the 3rd cycle study programmes Built Environment or Environmental Protection is foreseen. Preference will be given to candidates with an in-depth knowledge in the wider field of hydrology and a desire to carry out experimental work (field work on an existing experimental plot/catchment) and to develop advanced models and statistical analyses of measured hydrological and meteorological variables. Preference will be given also to candidates with previous experience in the R programming language (or similar languages). The MR must be self-initiative and able to work independently in research. Good writing and reading skills in English and an interest in research are essential. The MR will work under the supervision of experienced researchers while collaborating with other young researchers in a stimulating research environment.

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

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)*

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☐ **priporočilno pismo** *(letter of recommendation)*

☐ **druge priloge** *(other attachments)*