

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 (algi 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 algi sistemov. Izkušnje z objavami v mednarodnih znanstvenih revijah in na konferencah se bodo šttele 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 diplomii/ 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*)