



As one of the incentive programmes of Profil⁹ the **Graduate Academy Education Society · Environment** aims to promote young scientists and to enhance the visibility of the university's research profile. The Project Profil⁹ implies an institution-wide strategy, which focuses on the university's three profile areas EDUCATION, SOCIETY and ENVIRONMENT and addresses three central goals of the University of Koblenz · Landau's general development lines (Agenda 2020): a strong profile in research, the promotion of young scientists and an increased internationalisation.



The Graduate Academy Education · Society · Environment provides its doctoral students with an education within a thematically focused point of research and a structured qualification programme. By being an active part of the Graduate Academy team with its various research areas the postgraduates also develop an interdisciplinary way of thinking and working. <http://bimuw.uni-koblenz-landau.de>

Within the research priority *Education-Society-Environment*, in the project *Ecological effects of stressors and measures improving the ecological status of freshwater ecosystems*, on October 1, 2016 it will be awarding

2 PhD Positions (0,5 EGr. 13 TV-L)

for a period of 3 years at the Landau and Koblenz campus. The position is subject to the German law on fixed-term contracts in science (WissZeitVG).

Natural and Environmental Sciences:

Space and Stress – Modelling the spatial distribution of aquatic invertebrates constrained by environmental stressors

Project leader: JProf. Dr. Ralf B. Schäfer (schaefer-ralf@uni-landau.de)

Landau campus

Reference: 74/2016

Mathematics:

Macroscopic modeling and forecasting of aquatic invertebrates distribution based on mathematical networks

Project leader: Prof. Dr. Stefan Ruzika (ruzika@uni-koblenz.de)

Koblenz campus

Reference: 75/2016

Freshwater ecosystems provide several ecosystem services to society. At the same time freshwater organisms, on which many of these services rely, are among the most threatened. Thus, active watershed management measures are required to protect or restore their habitats, also to fulfill the standards of the EU Water Framework Directive (WFD). To identify effective measures, managers need a thorough understanding of the effects of different measures on freshwater organisms. Understanding the role of environmental constraints such as stressors on the one hand and space on the other in structuring the distribution of organisms is pivotal to predict changes in their distribution following management measures. In this project, a dynamic mathematical model will be developed for several aquatic invertebrate species with different trait combinations related to dispersal and stressor tolerance. The model will be used to assess ecological impacts of management scenarios, i.e. a set of restoration measures, and to examine the role of space and stress as well as organisms' traits for species distributions. To this end, two mathematical models for the spatial and temporal distribution of invertebrates will be built: a detailed spatially-explicit microscopic model and a lean macroscopic network-based model, the latter representing a 'model of a model'. Both models are to be analyzed with respect to their accuracy, their complexity and the possibility of combining them into a coupled model. These models will also be employed in inverse simulation to determine management options leading to a desired freshwater status.

Tasks and Qualifications:

The holder of the position provides his/her thesis in this part project and concludes the doctorate within three years.

He/she takes part regularly in the qualification programme of the Graduate Academy and introduces the results of the research on (inter-)national conferences and magazines.

The Graduate Academy offers the integration in a research team, the attendance of national and international conferences as well as versatile support of publications and academic qualification.

Project Space and Stress:

Implementation of a project on ecological modeling of the distribution of aquatic invertebrates under the influence of land use, water and habitat quality in rivers. Planning and development of a dynamic ecological model and conducting related analyses is expected of the holder of the position. The graduate academy offers the integration in a research team, the attendance of national and international conferences as well as versatile support of publications and academic qualification. As a member of the working group Quantitative Landscape Ecology and in close cooperation with the Optimization Research Group, the holder of the position will be part of a young and interdisciplinary team at the Institute of Environmental Sciences Landau.

Qualifications:

A university degree (except for a Bachelor's degree) in the areas of biology, landscape ecology, environmental sciences, bioinformatics or other related natural sciences is mandatory. Expertise in at least one of the following areas is expected: model development and simulation, limnology, ecology. Very good programming skills (e.g. in Java or C) and application of statistical software (e.g. R) are expected. You should be highly motivated to independently develop and apply advanced scientific ecological models on the distribution of organisms and on the potential effects of landscape changes and other stressors. You are fluent in written and spoken English and German, are self-confident, show a friendly appearance and are willing to work in a team with other members of the project (see below) and for the implementation of the goals of the graduate academy.

For further inquiries, please contact JProf. Dr. R. B. Schäfer (schaefer-ralf@uni-landau.de).

Project Macroscopic modeling:

This project aims at a rigorous mathematical modelling and analysis of population dynamics for ecological scenarios. First, existing models should be studied in detail and, then, new macroscopic, dynamic models are to be developed. In particular, possibilities of inverse simulation and control of models based on the interplay of detailed, complex models and simplified, network-based models should be studied. It is expected that new ecological models are planned, developed, and analyzed. The graduate academy offers the integration in a research team, the attendance of national and international conferences as well as versatile support of publications and academic qualification. As member of the Optimization Research Group and in close collaboration with Quantitative Landscape Ecology Group, the holder of the position will be part of a young and interdisciplinary team at the mathematical institute in Koblenz.

Qualifications:

Successfully completed studies (except for a bachelor degree) of mathematics, computer science, physics or a related discipline (e.g. natural or engineering sciences) at a university or a comparable institution. Experience and expert knowledge in the areas of mathematical modeling, simulation and optimization (in particular in network optimization, discrete and multicriteria optimization). Very good programming skills in a programming language (e.g. Python, C++, Java). Experience in statistics software (e.g. R) as well as in environmental sciences is beneficial. Very high degree of motivation to develop independently and analyze scientifically mathematical models for the distribution of invertebrates. You are fluent in written and spoken English and German, are self-confident, show a friendly appearance and are willing to work in a team with other members of the project (see below) and for the implementation of the goals of the graduate academy.

In case of further inquiries, please contact Prof. Dr. S. Ruzika (ruzika@uni-koblenz.de).

Applications must include: Name of the project that the applicant is applying for (including the reference number); letter of application describing motivation and research interests of the applicant; curriculum vitae (including information on academic publications), copies of certificates of academic qualifications. It is possible to apply for several projects.

In cases of equal suitability, aptitude and academic record, female candidates will be given preferential treatment, providing females are underrepresented in the Graduate Academy. This is not valid if there are preponderant reasons to give preference to another candidate, in spite of taking into consideration equal opportunities.

Applications from severely disabled people with equal qualifications will be given preferential treatment.

Candidates must submit their application by **July 13, 2016 quoting the reference number** to the **President of the University of Koblenz-Landau, Präsidialamt, Rhabanusstr. 3, 55118 Mainz, Germany** or (in one single pdf-document) via e-mail to: **bewerbung@uni-koblenz-landau.de**.

Please submit your application and uncertified copies of your certificates without a folder/transparent envelope, as the documents will not be returned to you due to cost considerations. When the recruitment process has been completed, your documents will be destroyed in order to ensure data privacy. We will not send an acknowledgement of receipt.

www.uni-ko-ld.de/karriere