

PhD (m,f,x), 3 years with 65%, TV-L E13 in *Daphnia* hydrodynamics

The Department of Animal Ecology, Evolution and Biodiversity within the Faculty of Biology and Biotechnology at the Ruhr University Bochum has a major research focus on the eco-evolutionary basics of phenotypic plasticity. For example, the prerequisites and mechanisms relevant for the development of phenotypically plastic traits and their function in the reduction of predation are key aspects of our work. By comparing different systems, we get insights into the ecology and evolution of phenotypic plasticity.

Within a project funded by the German Research Foundation (DFG), the hydrodynamic costs of inducible morphological defences and defensive alterations of behaviour formed in *Daphnia* are investigated. Therefore, virtual simulations of the animals in various conditions as well as particle image velocimetry measurements will be conducted.

Project: Hydrodynamics of diverse inducible morphological defences in the model organism *Daphnia*: effects, costs and benefits

Predation is a major selective agent. In response to this predation, many organisms have evolved inducible defences, a special form of phenotypic plasticity. Well-known for this ability is the genus *Daphnia*, freshwater crustaceans, which form different morphological, behavioural and life-history responses in the presence of predators. A fundamental condition for defences to “stay” inducible and not become permanently expressed, is costs. Inducible defences are formed when needed, and these costs are saved if the predatory threat is not present. However, determining these costs of inducible defences is difficult. While costs for morphological defences can at least be estimated based on the gain of body surface area, operational costs for altered behavioural patterns are complex to measure. Additionally, the effects of defensive shapes on drag forces have rarely been investigated. As morphological defences often comprise elongated appendages or the formation of helmets, they potentially increase locomotion costs severely. Within this project, simulations of the locomotion process in different *Daphnia* species and instars will allow to estimate the operational lifetime costs of defences. Therefore, the shape of defended and undefended animals in different instars will be determined three-dimensionally. With a tracking setup for a three-dimensional examination of swimming paths, swimming velocity will be determined. Furthermore, potential stealth effects due to altered turbulence through body shape or antenna (beat) alterations will be investigated. Finally, the effect of water viscosity, which changes with temperature, and the efficiency of shape alterations against the drag elicited by suction-feeding predators, even carnivorous plants, will be examined. From *Daphnia* as a model organism, the insights generated on the operational costs of inducible defences will be transferable to a generally deepened understanding of the ecological and evolutionary framework.

Your profile:

- very good to good Master's degree/diploma in biology, ecology, physics or similar
- experience in the planning, execution and evaluation of laboratory experiments, especially in the generation and evaluation of fluid mechanical data
- knowledge and experience with programming languages (especially R/Matlab) and corresponding statistics
- general enjoyment of working with PCs and persistence in solving problems
- knowledge and experience with the model organism *Daphnia*
- experience in the creation of scientific figures and texts is an advantage

We offer:

- challenging and varied tasks with a high degree of personal responsibility
- support from and cooperation with competent colleagues
- a friendly and collegial environment
- opportunities for flexible working hours
- collaboration on an exciting research project at the interface of biology and engineering

The Ruhr-Universität Bochum stands for diversity and equal opportunities. For this reason, we favour a working environment composed of heterogeneous teams, and seek to promote the careers of individuals who are underrepresented in our respective professional areas. The Ruhr-Universität Bochum expressly requests job applications from women. In areas in which they are underrepresented they will be given preference in the case of equivalent qualifications with male candidates. Applications from individuals with disabilities are most welcome.

Additional information:

At the request of the applicant (m,f,x), the staff council may be involved in selection interviews. <https://www.wpr.ruhr-uni-bochum.de/>

If the position is funded by third-party funds the employee has no teaching obligation.

German language courses are offered by the University Language Center (ZfA) in the field of German as a Foreign Language (DaF).

<https://www.daf.ruhr-uni-bochum.de/sbgk/index.html.en>

You can find information about TVL at: <https://oeffentlicher-dienst.info/>

Contact details for your application:

<https://jobs.ruhr-uni-bochum.de/jobposting/7beb79433a56dbef0036cc7062c0c198b32014690?ref=homepage>

Martin Horstmann, Phone: +49 234 32 25577

Travel expenses for interviews cannot be refunded.

For information on the collection of personal data in the application process see: <https://www.ruhr-uni-bochum.de/en/information-collection-personal-data-application-process>.

We are looking forward to receiving your application with the specification ANR: 3373 until 01/07/2024, send by e-mail to the following address: martin.horstmann@rub.de