



I am looking for a PhD student to join my research group at the Max Planck Institute for Evolutionary Biology.

PhD position in Mathematical Biology (3 years)

Evolutionary dynamics of antibiotic resistance on plasmids

The evolution of antibiotic resistance poses a severe threat to modern healthcare. Clinically relevant resistance is often encoded on plasmids. Plasmids are extrachromosomal DNA elements that can be transmitted vertically or be transferred horizontally between cells. The location of resistance genes on plasmids can lead to special evolutionary dynamics. The aim of the project is to develop mathematical models for the evolution and spread of resistance on plasmids. On the mathematical side, the analysis will mainly be based on branching process theory, complemented by deterministic ODE systems and stochastic computer simulations.

The position is part of a DFG-funded Research Training Group (RTG) on “Translational Evolutionary Research”. The program brings together 14 research groups from several institutions to study how insights from evolutionary biology can be applied to solve problems in medicine, food production, and wildlife conservation. Projects are organised in tandems who work on related topics. The tandem partner of the proposed project is Professor Tal Dagan (University of Kiel). The student would hence closely interact with a research group that focuses on experimental evolution and data analysis.

The ideal student will be one who is interested in applying mathematical modeling to gain insights into biological problems and is enthusiastic about math as well as about biology. The successful student will learn how to set up and analyse theoretical models to describe biological processes and become skilled in using branching process theory as a modeling tool. Applicants should have a background in mathematics, physics, biology, computer science or a related field. Good quantitative skills are essential. Prior experience in mathematical modeling and knowledge of a programming language (C, C++, Java, R, Python...) is an advantage.

Working environment

The student will join a young group at the Max Planck Institute for Evolutionary Biology. In our group, we focus on exploring the role of stochasticity in evolution. In the context of resistance evolution, we closely collaborate with experimental microbiologists at the University of Kiel. The group is part of the Department of Evolutionary Theory. The student will hence be part of a larger community of researchers working at the intersection of mathematics and biology with many opportunities to take part in journal clubs, reading groups etc.

The Max Planck Institute is a lively institute with three departments (Evolutionary Theory, Microbial Population Biology, Evolutionary Genetics) and several additional research groups. It hosts several workshops per year and continuously welcomes international short-term and long-term visitors, creating a stimulating and positive research environment. We maintain close interactions with Kiel University and belong to the Kiel Evolution Center. The area is a center of evolutionary biology in Germany.

Plön

Plön is a small town, embedded into a beautiful landscape with innumerable lakes and close to the Baltic Sea. The area provides ample opportunity for free time activities such as swimming, canoeing, or biking in a stunning environment. At the same time, the cities of Kiel and Lübeck ($\geq 200,000$ inhabitants) are only half an hour train ride away. Hamburg (Germany's second largest city) can be reached within 1.5h by train.

Application

Interested students should send their application (motivation letter, CV, copies of certificates, contact details of two references) by email to uecker@evolbio.mpg.de. Please use the code PhD2019-2 in the subject line.

The Max Planck Society strives for gender and diversity equality. We welcome applications from all backgrounds. The Max Planck Society is committed to employing more disabled individuals and especially encourages them to apply. The Max Planck Society seeks to increase the number of women in those areas where they are underrepresented and therefore explicitly encourages women to apply.

For further questions, please get in contact with Dr. Hildegard Uecker. Application deadline is December 15, 2019. However, the position will remain open until filled by a qualified candidate.

Contact:

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