PhD student (m/f) in Computational Epidemiology

The University of Bonn is an internationally operating research institution with a broad spectrum of subjects. With 200 years of history, around 38,000 students, more than 6,000 employees and an excellent reputation at home and abroad: the University of Bonn is one of the most important universities in Germany. In the last excellence initiative, the University of Bonn was able to secure six Clusters of Excellence, more than any other German institution, for research topics including mathematics, immunology, dependency research, robotics, economics to quantum physics.

In this excellent scientific environment, the Interdisciplinary Research Unit Mathematics and Life Sciences (https://www.mathematics-and-life-sciences.uni-bonn.de/en) develops and applies novel mathematical approaches and software tools for data analysis and modeling. The spectrum of applications spans oncology, immunology, and epidemiology. We are intensively collaborating with world-leading experts for mathematics and immunology at the Hausdorff Center for Mathematics, ImmunoSensation², and the German Center for Neurodegenerative Diseases (DZNE). Currently, we are searching for three interested PhD students to complement our interdisciplinary team and to work on one of the following projects:

- **E2**: This project is located on the interface of epidemiology and (micro-)economics, and aims to understand the decision making of individuals and its influence on the current (and future) pandemics. Here, a novel mathematical modeling approach will be established with approaches from the different subfields.

- **ORCHESTRA**: The project establishes a multi-center cohort of COVID-19 patients – a unique data source – and aims to assess, for example, risk factors, comorbidities, and the effectiveness of intervention and vaccination strategies. Therefore, statistical and machine learning will be employed.

The different open projects will focus on:

- integrated mathematical modeling of epidemiological and micro-economic processes
- model-based analysis of complex data using sensitivity and uncertainty analysis
- federated and swarm learning to analyze comprehensive patient datasets


**Job description:**

- Mathematical modeling and/or statistical analysis of biological processes
- Development of statistical inference and machine learning methods
- Programming (Python, R or Julia)
- Interpretation of analysis results
- Collaboration with biologists, medical researchers, and economists (E2)
• Publication of scientific results at conferences and in journals

Your profile:

• Master degree in mathematics, computer science, physics, or related fields
• Strong experience in at least two of the following topics: Mathematical modeling (e.g. ODEs or Markov processes), statistics, numerical optimization, machine learning, bioinformatics of sequencing data, and high-performance computing
• Programming skills (e.g., Python, R or Julia)
• Proficiency in written and spoken English
• Passion for science and scientific work

Our offer:

• Working in an innovative, well-equipped and scientifically stimulating environment
• Further training opportunities
• Initial fixed-term employment contract for 3 years with a standard public service salary (75% TV EntgO Bund EG 13)

The University of Bonn is committed to diversity and equal opportunity. It is certified as a family friendly university. It aims to increase the proportion of women in areas where women are under-represented and to promote their careers in particular. It therefore urges women with relevant qualifications to apply. Applications will be handled in accordance with the Landesgleichstellungsgesetz (State Equality Act). Applications from suitable individuals with a certified serious disability and those of equal status are particularly welcome.

The deadline for the application round is March 30, 2021. Application documents (cover letter, CV, certificates and ideally two references) should be submitted as soon as possible as a single PDF file via email.

Contact: Prof. Dr. Jan Hasenauer, jan.hasenauer@uni-bonn.de