
Shaping change: this is what drives us at Forschungszentrum Jülich. As a member of the Helmholtz Association with some 7,600 employees, we conduct interdisciplinary research into a digitalized society, a climate-friendly energy system, and a sustainable economy. We focus on the natural, life, and engineering sciences in the fields of information, energy, and bioeconomy. We combine this with expertise in high-performance computing and artificial intelligence using unique scientific infrastructures.

You are looking for the opportunity to apply you data science skills and work with world-class HPC facilities, innovative software technologies, and fascinating scientific data to break new ground in the life sciences? At the Helmholtz School for Data Science in Life, Earth and Energy (HDS-LEE), we train the next generation of data scientists to tackle key global issues in domain sciences such as life, earth or energy. Learn more at https://www.hds-lee.de

**We are offering a**

# PhD position - Probabilistic Metabolic Flux Analysis within the HDS-LEE graduate school

**Your Job:**
This PhD project develops a Bayesian inference framework for hybrid model- and data-driven modeling of metabolism, with a particular focus on handling model misspecification. By combining Bayesian computational statistics, differentiable programming, and high-performance computing, the project aims to deliver robust, interpretable, and scalable methods for metabolic flux analysis.

You will:

- Design hierarchical models that explicitly capture misspecifications in metabolic models
- Develop differentiable and scalable inference algorithms using automatic differentiation
- Implement HPC-tailored sampling strategies in Python and C++
- Apply your framework to analyse real biological datasets to demonstrate robustness, interpretability, and practical impact
- Contribute to open-source software tools, helping to shape future research infrastructure
- Present your results on conferences in Germany and abroad

The job will be advertised until the position has been successfully filled. You should therefore submit your application as soon as possible. We look forward to receiving your application via our **Online-Recruitment-System!**

**Questions about the vacancy?**
Get in touch with us by using **our contact form.**
Please note that for technical reasons we cannot accept applications via email.
www.fz-juelich.de

**Your Profile:**

- Excellent Master's degree in statistics, physics, mathematics, or a related quantitative field, ideally with a strong focus on computational practice
- Strong mathematical and statistical background, with pronounced analytical and problem-solving skills
- Proven programming expertise in Python and C++, with solid experience in scientific computing and software development; familiarity with Linux environments
- Excellent collaboration and communication skills and enjoyment of working in an international, interdisciplinary research team
- Familiarity with Bayesian thinking is desirable
- No prior biological experience is required; curiosity for life science questions and willingness to collaborate with experimentalists is sufficient
- Prior research experience (e.g. internships, thesis projects, open-source contributions, or publications) is highly desirable
- Knowledge of German is beneficial

**Our Offer:**

We work on the very latest issues that impact our society and are offering you the chance to actively help in shaping the change! This HDS-LEE PhD position will be located at Forschungszentrum Jülich with strong links to DLR Cologne and RWTH Aachen. We offer ideal conditions for you to complete your doctoral degree:

- Outstanding scientific and technical infrastructures
- Working in an international and interdisciplinary environment at one of Europe's largest research institutes
- Continuous scientific mentoring by your scientific advisors and opportunity to mentor students
- Unique HDS-LEE graduate school program (including data science courses, soft skill courses and annual retreats): https://www.hds-lee.de/about/
- A qualification that is highly valued in industry
- 30 days of annual leave and flexible working arrangements, including partial remote work.
- Further development of your personal strengths, e.g. via a comprehensive training program; a structured program of continuing education and networking opportunities specifically for doctoral researchers via JuDocS, the Jülich Center for Doctoral Researchers and Supervisors: https://www.fz-juelich.de/judocs
- Targeted services for international employees, e.g. through our International Advisory Service

The position is limited to three years, with a possible one-year extension. Pay is in line with 75% of pay group 13 of the Collective Agreement for the Public Service (TVöD-Bund) and additionally 60 % of a monthly salary as special payment („Christmas bonus"). The monthly salaries in euro can be found on the BMI website: https://go.fzj.de/bmi.tvoed.entgelt

Further information on doctoral degrees at Forschungszentrum Jülich (including its various branch offices) is available at https://www.fz-juelich.de/en/careers/phd

We welcome applications from people with diverse backgrounds, e.g. in terms of age, gender, disability, sexual orientation / identity, and social, ethnic and religious origin. A diverse and inclusive working environment with equal opportunities in which everyone can realize their potential is important to us.

The following links provide further information on diversity and equal opportunities:

https://go.fzj.de/equality and on specific support options for women:
https://go.fzj.de/womens-job-journey