



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.

As a leading research institution for microbial biotechnology, the Institute of Bio- and Geosciences – Biotechnology (IBG-1) is committed to realising the potential of microbes in the development of sustainable production processes. Our interdisciplinary teams work closely together to develop biotechnological processes for tomorrow's bio-based industry, focusing strongly on increasingly automated and miniaturised experiments. Do you want to push the limits of live-cell microscopy by employing real-time computer vision and optical tweezers to study how microbial communities self-organize in space and time? Join us at the interface of machine learning, computer vision, biophysics and computer science to turn microfluidic live-cell imaging into a creative platform for microbial biotechnology.

We are looking to recruit a

## Scientist / Postdoc – Smart Vision-Based Control of Microbial Arenas

### Your Job:

In the Vi(MA)<sup>2</sup>C project, we are building a lab-on-chip system where structured “microbial arenas” are created and manipulated in real time. Microbes and tailor-made microgels are observed and moved by laser-based optical tweezers in a closed action–perception loop. Your work will help transform current observation-only live-cell imaging microscopy into actively controllable, automated vision-based platforms. You will work at Forschungszentrum Jülich, in close collaboration with bioimage analysis partners at Karlsruhe Institute of Technology.

Your tasks in detail:

- Develop and extend deep-learning–based segmentation, classification and tracking for microbes and microgels in phase-contrast and fluorescence images
- Optimise these models and pipelines for real-time performance and integrate them into an action–perception loop that drives the optical tweezers

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](http://www.fz-juelich.de)

- Use and further develop simulation tools to design and benchmark control strategies before deploying them on the microscope
- Integrate your software with the microfluidic live-cell imaging platform and provide Python/Jupyter-based tools for collaborators, contributing to FAIR datasets and open-source software
- (Co-)Supervise student projects at BSc, MSc, and PhD level
- Write research articles, as well as grant proposals, and present your own work at international conferences

#### **Your Profile:**

- Master / Diploma and excellent PhD in computer science, engineering, physics, biophysics, applied mathematics, computational biology or a related quantitative field
- Strong background in deep learning for image analysis / computer vision, ideally on microscopy time-lapse data
- Proven programming expertise in Python (scientific Python, PyTorch or similar); experience with C++ and Linux environments is an advantage
- Experience in at least one of the following is highly welcome:
  - Real-time or streaming pipelines
  - Control / robotics / feedback systems
  - Optical systems / optical tweezers / laser-based manipulation
  - Probabilistic modelling / tracking
  - Software in the loop (SiL)
- Strong mathematical / statistical skills and pronounced analytical problem-solving abilities
- Curiosity for microbial life science questions and enthusiasm for working closely with experimentalists (no wet-lab experience required)
- Excellent communication skills and enjoyment of working in an agile, international and interdisciplinary team
- Very good English skills; German is a plus but not mandatory

#### **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! We support you in your work with:

- **ENVIRONMENT:** A world-leading, interdisciplinary and international research environment at the interface of AI, microscopy and life sciences in a high-visibility Helmholtz Imaging project
- **INFRASTRUCTURE:** State-of-the-art experimental equipment, support from experienced PIs, and versatile opportunities to grow as a curious researcher
- **KNOWLEDGE & FURTHER TRAINING:** Comprehensive training offers and individual opportunities for personal and professional development
- **WORK-LIFE BALANCE:** Very good conditions for work-life balance and a family-friendly corporate policy
- **FLEXIBILITY:** Flexible working hours and the possibility to partly work remotely from home
- **VACATION & WORKING TIME MODEL:** Full-time position, with the option of slightly reduced working hours, and 30 days of annual leave
- **SUPPORT FOR INTERNATIONAL EMPLOYEES:** Our International Advisory Service makes it easier for international employees to get started
- **CAREER CENTER:** You will receive explicit support with regard to your career development opportunities: <https://go.fzj.de/careercenter>
- **FIXED-TERM CONTRACT:** The position is limited to 2 years
- **FAIR REMUNERATION:** Depending on your existing qualifications and the tasks assigned to you, you will be classified in pay grade 13 of the TVöD-Bund (Collective

Agreement for the Public Service). All information on the TVöD-Bund collective agreement can be found on the BMI website: <https://go.fzj.de/bmi.tvloed> . The monthly salaries in euros can be found on page 69 and following of the PDF download

In addition to exciting tasks and a collegial working environment, we offer you much more: <https://go.fzj.de/benefits>

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>