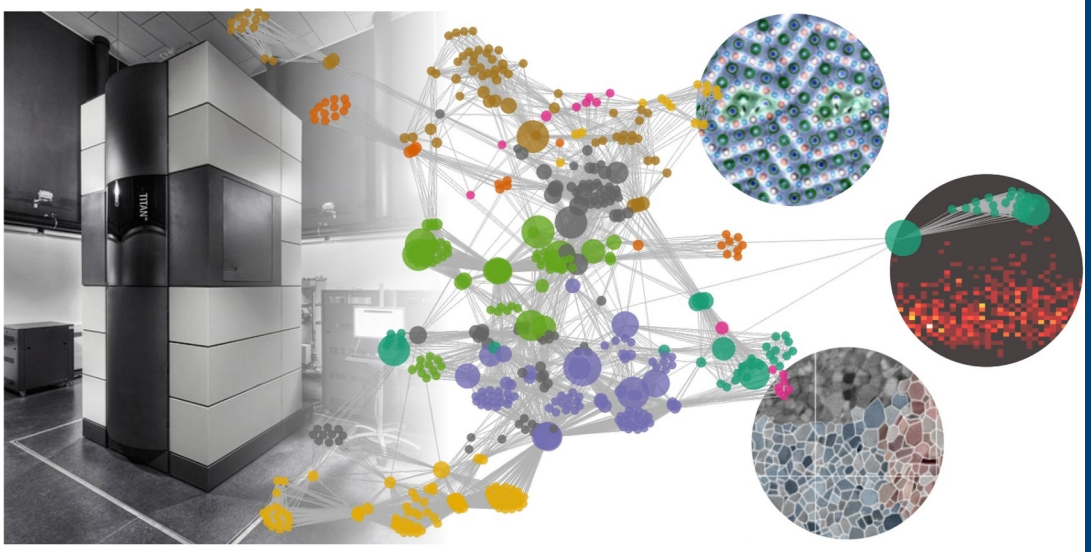
JÜLICH
Forschungszentrum



Conducting research for a changing society: This is what drives us at Forschungszentrum Jülich. As a member of the Helmholtz Association, we aim to tackle the grand societal challenges of our time and conduct research into the possibilities of a digitized society, a climate-friendly energy system, and a resource-efficient economy. Work together with around 7,500 employees in one of Europe's biggest research centres and help us to shape change!

The multidisciplinary Institute for Advanced Simulation - Materials Data Science and Informatics (IAS-9) brings together disciplines ranging from data analysis and machine learning to materials simulation, research data management and software development under one roof. In doing so, we extract new information from simulations and experiments, identify patterns, structure, and trends in microscopy data, and improve our understanding of why materials, processes, or general systems work the way they do. In addition, we benefit from a strong connection to the Ernst-Ruska-Centre for Electron Microscopy and to the Jülich Supercomputing Center. We are particularly interested in advancing electron microscopy through the development of foundational machine learning techniques. The research focuses on creating robust and transferable ML methods for analyzing lattice defects such as dislocations, which play a key role in determining material behavior and reliability. High-resolution microscopy data, acquired with a range of advanced imaging methods, will be used as the foundation for this work

We are offering a

PhD position – Deep Learning for Dislocation Analysis in Electron Microscopy

Your Job:

The PhD project is methodologically independent, with the opportunity to contribute to collaborative efforts at the interface of data science, imaging, and materials research. You will strengthen the data science and machine learning activities of the IAS-9 with exciting new topics. You will work in a multidisciplinary team of enthusiastic data scientists, software developers and domain scientists on, e.g.:

- Developing self-supervised learning frameworks to extract features from unlabeled high-resolution microscopy data
- Training and evaluating segmentation models for detecting and characterizing defects such as dislocations

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

- Applying generative models (e.g., GANs, diffusion models) to augment microscopy datasets
- Investigating domain adaptation techniques across different imaging modalities
- Collaborating closely with experimental partners to validate methods and integrate tools into existing workflows
- Disseminating findings through scientific publications, international conferences, and open-source contributions.licable enter further tasks of the position

Your Profile:

We are looking for a highly motivated colleague who is excited about new scientific endeavors with interdisciplinary approaches. For this you have:

- A completed university degree (Master or equivalent) in computer science, data science, applied mathematics, physics, materials science, or a related field
- Prior experience in computer vision, deep learning, or signal processing; familiarity with microscopy data is an asset but not required
- Interest in foundational machine learning research with applied impact in scientific imaging
- Demonstrated proficiency in Python and experience with ML/DL frameworks like PyTorch or TensorFlow
- Strong analytical and communication skills, creativity, and the ability to work independently while collaborating in a team-oriented environment

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 offer ideal conditions for you to complete your doctoral degree:

- A dynamic, interdisciplinary research environment at the forefront of materials informatics
- Comprehensive training courses and individual opportunities for personal and professional further development. 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/en/judocs
- The opportunity to attend national and international conferences
- Optimal conditions for work-life balance, including a family-friendly corporate policy, flexible working hours, the option for home office days, and 30 vacation days per year
- A creative work environment at a leading research facility, located on an attractive research campus at the TZA Aachen https://tza-aachen.de and the Forschungszentrum Jülich
- Flexible working hours in a full-time position with the option of slightly reduced working hours (https://go.fzj.de/near-full-time)
- Targeted services for international employees, e.g. through our International Advisory Service

Neben spannenden Aufgaben und einem kollegialen Miteinander bieten wir Ihnen noch viel mehr: https://go.fzj.de/Benefits

Place of employment: Jülich/Aachen

The position is for a fixed term of 3 years. Pay 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“). Pay higher than the basic pay

may be possible. 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 are looking forward to your application including a CV, university degree certificates, grade transcripts, two references and/or letters of recommendation (e.g. by a previous supervisor), and a motivation letter. Please ensure that relevant experience is clearly demonstrated and briefly highlighted in your motivation letter.

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.

Further information on diversity and equal opportunities: https://go.fzj.de/equality