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 ultimately 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. One part of our research activity is dedicated to pushing the boundaries of materials science and electron microscopy. Our work combines cutting-edge imaging techniques with deep learning to unravel the behavior of lattice defects, specifically dislocations, in functional materials under mechanical stress. This research is essential for advancing fundamental science and ensuring the reliability of materials used in energy transition.

We are looking to recruit a

**PhD position – Deep Learning for In Situ Electron Microscopy**

**Your Job:**
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.,

- Develop deep learning-assisted methods for in situ electron microscopy with enhanced time resolution using adaptive scanning
- Contribute to the development of self-supervised and unsupervised learning techniques for resolution enhancement, de-noising, and representation learning of electron microscopy images
- Implement supervised learning methods for the accurate detection and segmentation of dislocations in annotated electron microscopy images
- Collaborate on the development of domain adaptation methods for transferring

We look forward to receiving your application until 11.12.2023 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
learned representations to different experimental setups

- Design and implement active learning strategies to minimize the number of annotated images required for model training
- Work in close collaboration with the research team to enable real-time feature tracking with adaptive scanning during electron microscopy experiments
- Preparation of scientific publications and participation in international conferences and workshops

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 data science, computer science, mathematics, materials science, physics, engineering or a related subject
- Prior knowledge and experience in (electron) microscopy is highly desirable
- Prior experience in computer vision, image analysis, or machine learning
- Practical experience in the area of data analysis, data mining and ML/DL demonstrated through, e.g., a thesis, publications in peer-reviewed journals or open source projects
- Strong programming skills in Python and experience with deep learning frameworks such as TensorFlow or PyTorch
- Excellent communication skills and commitment to work as part of a team

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 highly motivated working group as well as an international and interdisciplinary working environment at one of Europe’s largest research institutions
- Outstanding scientific and technical infrastructure
- Opportunity to participate in (international) conferences and project meetings
- Continuous scientific mentoring by your scientific advisor
- Flexible work (location) arrangements, e.g. remote work
- Further development of your personal strengths, e.g. through an extensive range of training courses; 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
- Targeted services for international employees, e.g. through our International Advisory Service
- 30 days of annual leave and provision for days off between public holidays and weekends (e.g. between Christmas and New Year)

In addition to exciting tasks and the collaborative working atmosphere at Jülich, we have a lot more to offer (https://www.fz-juelich.de/en/careers/julich-as-an-employer/benefits).

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). In addition, an annual special payment is granted (“Christmas payment”), which amounts to 60 % of the monthly salary. Further information on doctoral degrees at Forschungszentrum Jülich (including its various branch offices) is available at https://www.fz-juelich.de/en/careers/phd.

Place of employment: Jülich/Aachen

We particularly welcome applications from people from a diverse range of backgrounds.
(e.g. regardless of age, gender, disabilities, sexual orientation/identity, as well as social, ethnic, and religious background). We strive to offer a diverse and inclusive working environment in which people enjoy equal opportunities and are able to fulfill their potential.