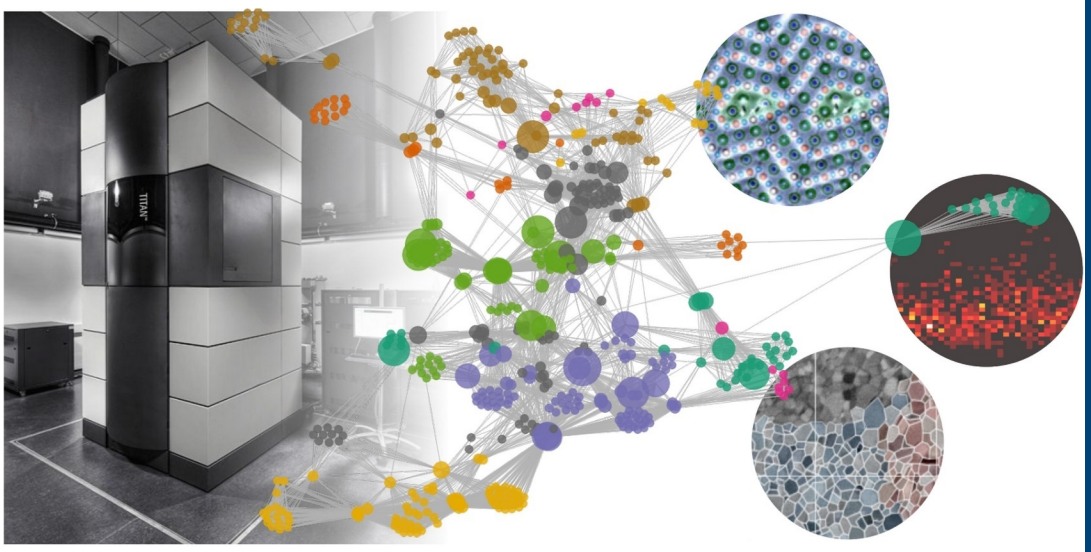

Conducting research for a changing society: This is what drives us at Forschungszentrum Jülich. As a member of the Helmholtz Association, we aim to tackle the grand societal challenges of our time and conduct research into the possibilities of a digitized society, a climate-friendly energy system, and 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 Materials Data Science and Informatics (IAS-9) brings together disciplines ranging from data analysis and machine learning to materials theory, materials simulation, research data management and software development under one roof. In doing so, it addresses the issue of "information" and research data as a way to extract valuable knowledge from simulations, experiments, and microscopy in a highly interdisciplinary and multidisciplinary approach. Methods from the field of computational engineering science are used together with approaches and concepts from computer science, data science and information science.

We are looking to recruit a

Master Thesis - Machine Learning Based Analysis of Grain Growth in Nanocrystalline Metals

Your Job:
In this master's thesis project, you will focus on the application of visual foundation models for the automated analysis of grain growth in nanocrystalline metals imaged by in situ transmission electron microscopy (TEM). This work aims to segment and track evolving grain boundaries using state-of-the-art unsupervised segmentation models, such as MatSAM, and to relate structural evolution to physical mechanisms of grain growth. Key responsibilities include:

- Implementing and optimizing segmentation pipelines based on MatSAM and other vision foundation models for high-resolution TEM video frames
- Performing frame-to-frame tracking of grain boundaries to quantify grain boundary migration and morphological evolution
- Analyzing how initial texture, grain size, and growth conditions (thermal vs. stress-driven) influence grain evolution
- Communicating results and contributing to collaborative research with partners at the Georgia Institute of Technology

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:

- Completed Bachelor's degree in Computer Science, Artificial Intelligence, Materials Science, or a related field
- Strong programming skills in Python, ideally with experience in image processing and deep learning using PyTorch or similar frameworks
- Familiarity with computer vision techniques; experience with segmentation, tracking, or video analysis is a plus
- Basic understanding of materials microstructures, grain growth, and electron microscopy would be a plus

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:
We work on highly relevant innovative topics and offer you the possibility to learn actively shape the change. Here is what we offer you:

- Intensive supervision of your thesis by an research employee
- Excellent technical equipment and the newest technology
- The chance to independently prepare and work on your tasks
- An exciting work with personal responsibility in the research field of machine learning for material sciences
- Opportunity to contribute to cutting-edge research with potential for publication
- Flexible working hours and a collaborative, inclusive work environment as well as a reasonable remuneration
- A creative working environment in a leading research institution, located on an attractive research campus of TZA Aachen https://go.fzj.de/TZA

In addition to exciting tasks and a collaborative working atmosphere at FZ Jülich, we have a lot more to offer: https://go.fzj.de/benefits

Place of employment: Aachen

As a student working on your thesis, you will be employed as a student assistant for the purpose of preparing or writing a master's thesis, or within the framework of a German state examination. Remuneration depends on whether you already have a degree and on your weekly working hours. The duration of the contract depends on the requirements of the university and may not exceed 12 months. To apply, please submit a complete CV, letter of motivation, university degree records and certificates. Please note that we can only accept applicants who conduct their Masters Degree at a German University.

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.

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