We are looking to recruit a

**PhD position – Computer Vision for Dislocation Analysis in Materials Science**

**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 and refine state-of-the-art image segmentation techniques to accurately identify dislocations within Transmission Electron Microscopy (TEM) micrographs
- Utilize deep learning methods, including ensemble techniques, to enhance image segmentation accuracy, and investigate the impact of training data quantity and quality
- Implement tracking algorithms to monitor the dynamic behavior of dislocations in...
TEM videos, extracting essential dynamic features such as dislocation velocities, movement directions, and interactions

- Utilize diffusion models to generate synthetic TEM images that replicate real-world dislocation behavior, providing training data for segmentation and tracking algorithms
- Design and implement innovative evaluation metrics that comprehensively capture the dynamic aspects of dislocations, moving beyond conventional metrics to assess segmentation and tracking performance
- Extend research to analyze dislocation dynamics in real-world materials, contributing to a deeper understanding of their role in material properties and performance
- Collaborate with experts in materials science and microscopy, computer vision, and machine learning to leverage diverse expertise and advance the understanding of dislocation behavior

**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
- Experience in image segmentation, deep learning, computer vision, with a focus on microscopy data analysis, is highly desirable
- Knowledge of the physics of dislocations is preferred
- Strong programming skills in Python and experience with deep learning frameworks such as TensorFlow or PyTorch
- Excellent communication and collaboration skills to work effectively in an interdisciplinary 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:

- The opportunity for a research stay at our partner lab at Université Toulouse, France
- The opportunity to conduct exciting research in an international and multidisciplinary environment with outstanding infrastructure and to strengthen your reputation in a dynamic and highly active research field
- A creative work environment at a leading research facility, located on an attractive research campus at the TZA Aachen https://go.fzj.de/TZA and the Forschungszentrum Jülich
- The opportunity to attend national and international conferences
- 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
- 30 days of annual leave and provision for days off between public holidays and weekends (e.g. between Christmas and New Year)
- Ideal conditions for balancing work and private life, as well as a family-friendly corporate policy
- Targeted services for international employees, e.g. through our International Advisory Service

Place of employment: Jülich/Aachen

To apply, please submit a complete CV, letter of motivation, university degree records
and certificates.

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).

We offer you an exciting and varied role in an international and interdisciplinary working environment. 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.

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.