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 development of complex materials with tailored properties, as well as the understanding of the underlying mechanisms require reliable high-throughput simulation tools, that can be combined with data analytics and material characterization. This will allow to predict the structure-property relation and to understand and evaluate experimentally obtained data sets. As a PhD student you will work at the Institute for Advanced Simulations – Materials Data Science and Informatics (IAS-9) that combines data analysis, materials simulation, research data management and software development under one roof. It also benefits from a strong connection to the Ernst-Ruska-Centre for Electron Microscopy and to the Jülich Supercomputing Center. As such, it provides a multidisciplinary environment during your research that will help to develop your competencies in a range of scientific fields.

We are looking to recruit a

PhD position - Inverse design of microstructures for novel sustainable structural metals

Your Job:
Digital methods for inverse materials design are essential to efficiently create new, sustainable and recycling-adapted structural metals. Alloys with a reduced number of elements, so-called lean alloys, and material systems with a high tolerance to impurities from the use of secondary raw materials are of particular relevance for improving recyclability and sustainability. Al-Ca is a promising lean alloy system for additive manufacturing, as the mechanical properties can be tailored through phase composition, distribution and morphology by tuning process parameters. The work is carried out within the DFG Priority Programme "DaMic - Data-driven Alloy and Microstructure Design of Sustainable Structural Metals" (SPP 2489), in close collaboration with a research partner responsible for the manufacturing and characterization of material samples.

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

As such, the position offers the opportunity to be involved in fruitful national collaborations. In this exciting job you can expect:

- to develop automated workflows for descriptor based microstructure reconstruction
- to identify material parameters for crystal plasticity simulations from experimental data through inverse analysis
- to establish structure–property linkages based on numerical simulations and to transform them into AI- and ML-ready information
- to develop and implement an indirect inverse optimization framework to identify microstructures that exhibit desired macroscopic properties
- to publish and present research results in relevant journals and at international conferences

Your Profile:

- A completed university degree (Master or equivalent) with excellent grades in the field of mechanical engineering, material science, physics, computational science or similar, preferably with a specialization in the field of theory and/or simulation
- Strong understanding of the (computational) mechanics of solids and the finite element method and/or spectral solvers
- Practical experience in at least one programming language (preferably Python) and experience with the use of Unix/Linux operating systems
- Structured and analytical thinking as well as a systematic, careful, independent, and reliable working method
- Interest in working closely with experimentalists
- Strong cooperation and communication skills and the ability to work as part of a team
- Excellent written and spoken English skills

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 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
- The opportunity to gain your reputation in a dynamic and highly active research field
- 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
- The opportunity to attend national and international conferences
- Flexible working hours and various opportunities to reconcile work and private life-life, such as the option of slightly reduced working hours and 30 days of annual leave
- Targeted services for international employees, e.g. through our International Advisory Service
- Part-time position with 19,5 hours per week and flexible working hours

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 80% of pay group 13 of the Collective Agreement for the Public Service (TVöD-Bund). Further

information on doctoral degrees at Forschungszentrum Jülich including our other locations is available at: https://www.fz-juelich.de/gp/Careers_Docs . Please note that only applications including a motivation letter, CV, and university degree certificates and grade transcripts can be accepted.

Place of employment: Aachen/Jülich

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.

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