The Institute for Advanced Simulation – Materials Data Science and Informatics (IAS-9) focuses on innovative computational methods, combining machine learning/AI with high-performance computing to address a broad range of scientific challenges. We are looking for a motivated Postdoctoral Researcher to join our team, with the goal to revolutionize applications of the physical sciences through tailored large language models (LLMs) and intelligent agentic systems.

Join our team to the next possible date as

Postdoctoral Researcher – Fine-tuning Large Language Models and Agentic Systems for Physics and Materials Science

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 Job:

- Lead the development and fine-tuning of AI models and LLMs specifically tailored for data mining in the physical sciences and engineering
- Fine-tuning and evaluation of open-source LLMs (e.g., Teuken 7B, Llama 3, Mistral 7B) specifically for physics and materials science applications scenarios as well as for related research data management tasks
- Developing LLM-driven agents that integrate domain knowledge to support structured chain-of-thought processes
- Benchmarking and validating models against domain-specific tasks such as retrieval, summarization, metadata extraction, and structured problem-solving
- Investigating advanced strategies for model adaptation, including in-domain pre-training, domain adapters, task-specific instruction tuning, and retrieval-augmented generation (RAG)
- Collaboration with interdisciplinary teams to enhance model performance, adaptability, and usability within physics and materials science communities
- Publication and dissemination of research findings in scientific journals and

conferences

Your Profile:

- A doctoral degree in Physics, Materials Science, Computer Science, Data Science, or related fields
- Proven experience with large language models (LLMs), natural language processing (NLP), and fine-tuning techniques
- Familiarity with structured reasoning, chain-of-thought processes, and agent-based systems is beneficial
- Strong programming skills (preferably Python); experience with high-performance computing (HPC) infrastructures is advantageous
- Excellent analytical and problem-solving capabilities
- Proven track record of publishing in reputable scientific journals and at the leading conferences
- Ability to effectively work in interdisciplinary and international teams
- Good communication and writing skills in English

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:

- Secure employment in a dynamic, international and multidisciplinary environment of scientists from different domains and software developers
- A creative environment, with an open-minded team (local and across Germany) with heterogeneous backgrounds and expertise
- Ideal conditions for balancing work and private life, as well as a family-friendly corporate policy supported by our Equal Opportunities Bureau
- Flexible working hours in a full-time position (39 hours/week) with the option of slightly reduced working hours
- Flexible work arrangements, e.g. working from home
- 30 days of annual leave and provision for days off between public holidays and weekends (e.g. between Christmas and New Year)
- Capital-forming benefits and an employee pension scheme
- Targeted services for international employees, e.g. through our International Advisory Service

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

Place of employment: Jülich/Aachen

You will be initially employed for a fixed term of 2 years with the prospect of longer-term employment. Salary and social security benefits will conform to the provisions of the Collective Agreement for the Public Service (TVöD-Bund), pay group 13, depending on your current qualifications and the precise nature of the tasks assigned to you. All information about the Collective Agreement for the Public Service (TVöD-Bund) can be found on the BMI website: https://go.fzj.de/bmi.tvoed. The monthly salaries in euros can be found on page 66 of the PDF download.

We are looking forward to your application including a motivation letter, CV, and relevant certificates. Relevant experience must be proven and be briefly highlighted in the mandatory letter of motivation. We are looking to fill this position as soon as possible – the job advertisement will be taken offline once the position is filled.

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