

PhD student in the area of Scientific Computing/HPC (f/m/x)

We are one of the largest and oldest universities in Europe and one of the most important employers in our region. Our broad range of subjects, the dynamic development of our main research areas and our central location in Cologne make us attractive for students and researchers from around the world. We offer a wide range of career opportunities in science, technology, and administration.

The research group *Numerical Mathematics and Scientific Computing* of Professor Dr. Axel Klawonn (<https://numerik.uni-koeln.de>) is looking for a PhD student in the area of Scientific Computing/HPC. The research of the group is focused on the analysis and scalable implementation of robust domain decomposition methods, efficient solution methods for discretized partial differential equations, scientific machine learning, and scalable homogenization approaches with applications in engineering and life science.

YOUR TASKS

- » Work in the research unit FOR5134 „Solidification cracks in laser beam welding – High performance computing for high performance processing“ (<https://www.for5134.science/en/>) funded by the German Research Foundation (DFG). A focus of the project is to develop a process understanding on the formation of solidification cracks and their correlation to process parameters during laser beam welding. High-performance simulations and experiments as well as the effect on three different scales are considered in the different sub-project. In the research unit, Bundesanstalt für Materialforschung und -prüfung, University of Erlangen-Nuremberg, University of Duisburg-Essen, and university of applied science in Karlsruhe are involved as further partners.
- » Work on the sub-project “Efficient, robust, and highly scalable implicit solvers for the simulation of thermoplastic solidification processes”
- » Extension of the highly scalable computational homogenization software FE2TI (based on FE² method) to carry out micro-macro simulations of the thermo-elasto-plastic processes at the solidification front
- » Implementation of time-dependent representative volume elements in FE2TI based on the dendritic growth on the microscale during solidification
- » Development and implementation of scalable nonoverlapping domain decomposition solvers for thermo-elastic and thermo-elasto-plastic problems

YOUR PROFILE

- » Excellent university degree (master or diploma) in mathematics, computational science & engineering or comparable studies
- » Good skills in the area of parallel implementation
- » Solid command of C/C++ as well as MPI

- » Good knowledge in the area of discretization of partial differential equations, ideally with finite elements
- » Experience in the area of homogenization approaches, ideally with the FE² method
- » Solid command of German and English, both written and spoken
- » Good communication and teamwork skills

WE OFFER

- » A diverse working environment with equal opportunities
- » Support in balancing work and family life
- » Flexible working time models
- » Extensive advanced training opportunities
- » Occupational health management offers
- » Opportunity for remote work

The University of Cologne is committed to equal opportunities and diversity. Women are especially encouraged to apply and will be considered preferentially in accordance with the Gender Equality Act of the State of North Rhine-Westphalia (LGG NRW). We also expressly welcome applications from people with disabilities / special needs or of equal status.

The position is available from the earliest possible starting date on a part-time basis (29,87 working hours per week). The position is to be filled for a fixed term until 31 August 2025. An extension is sought. If the applicant meets the relevant wage requirements and personal qualifications, the salary will be based on remuneration group 13 TV-L of the pay scale for the German public sector.

Please send your application (without a photo) with proof of the required qualifications to <https://jobportal.uni-koeln.de> with the reference number Wiss2304-07. The application deadline is 28 May 2023.

If you have any questions, please contact Professor Dr. Axel Klawonn (axel.klawonn@uni-koeln.de)