Ph.D. position: Machine Learning Enhanced Multi-Scale Modeling of Ice Deformation and Melting

Do you want to apply your data science knowledge to the basic research questions and societal challenges of our modern world? Our scientists in HDS-LEE address some of the most pressing issues of our time, such as energy transition, climate change, and resource scarcity, brain function, drug design, identification of diseases at very early stages. At Helmholtz School for Data Science in Life, Earth and Energy (HDS-LEE), we aim to educate and train the next generation of data scientists during their doctoral thesis in close contact to domain-specific knowledge and research in three application domains: Life and medical science, earth science, energy systems, and material science. Visit HDS-LEE at: https://www-hds-lee.de

The mission of the MPIE is to understand and design materials from macroscopic down to atomic and electronic scales. In this spirit, we conduct basic research on structural and functional materials, mostly metallic alloys, embracing synthesis and processing, characterization and properties, as well as their response in engineering components exposed to real environmental conditions. We work interdisciplinary, with intense mutual stimulation among experimentalists and theoreticians as well as among different groups and departments.

This is a joint position between Helmholtz School for Data Science in Life, Earth and Energy (HDS-LEE) and Max-Planck-Institute für Eisenforschung (MPIE). The place of work will be at MPIE in Düsseldorf, Germany.

Your job

Accurate prediction of ice melting will be crucial for policymaking and evaluating the effects of global warming. In this project, numerical and machine learning methods will be applied to make realistic predictions of ice melting. Effects of microstructure and deformation on phase transformation will be studied using a combination of crystal plasticity, phase-field method, and machine learning.
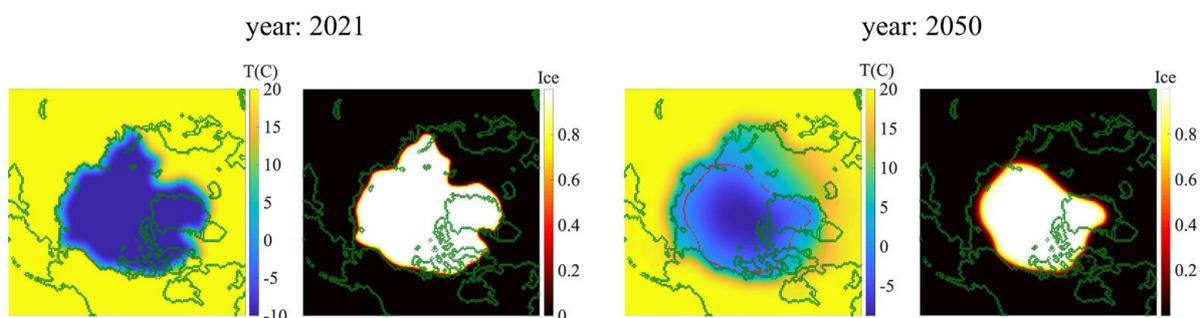
Your profile

We look for excellent and highly motivated candidates to work on modeling arctic ice cap melting using full-field methods enhanced with satellite maps and machine learning.

- Master's degree (M. Sc.) in computational science, physics, mechanics, materials science, or a related field
- Strong background in simulation and modeling
- Strong background in programming C++, Python, and Fortran
- Experience in machine learning and phase-field methods
- Fluent in English (written and spoken): TOEFL or equivalent evidence of English-speaking skills
- Outstanding organizational skills and the ability to work independently
- Very good cooperation and communication skills and ability to work as part of a team in an international and interdisciplinary environment
- A high level of scholarship as indicated, for example, by bachelor and master study transcripts and two reference letters

Our offer

The Ph.D. student will be hosted in the Computational Sustainable Metallurgy (Dr. Jaber R. Mianroodi j.mianroodi@mpie.de) in the Department Microstructure Physics and Alloy Design at Max-Planck-Institut für Eisenforschung (MPIE), Düsseldorf, Germany within the Helmholtz School for Data Science in Life, Earth School and Energy (HDS-LEE). Strong collaboration with the group of Prof. Julia Kowalski at RWTH Aachen is expected. We offer you

- Outstanding scientific and technical infrastructure – ideal conditions for completing a doctoral degree
- An international, open-minded and interdisciplinary working environment with a diverse crowd of early-career scientists
- Continuous scientific mentoring by your scientific advisors
- Chance of participating in (international) conferences
- Unique HDS-LEE graduate school program
- The qualification that is highly welcome in the industry
- Further development of your strengths, e.g., via a comprehensive further training program
- Ph.D. at RWTH Aachen University upon successful dissertation

The position is for a fixed term of 3 years. The salary is in line with 65 % of pay group 13 of the Collective Agreement for the Public Service (TVöD).

The Max-Planck-Institut für Eisenforschung GmbH is committed to employing more handicapped individuals and especially encourages them to apply. The Max Planck Society strives for gender and diversity equality. We welcome applications from all backgrounds. The job will be advertised until the position has been successfully filled. You should therefore submit your application as soon as possible.

Send complete application to:
Dr. J. Mianroodi j.mianroodi@mpie.de Max-Planck-Institut für Eisenforschung, Düsseldorf, Germany