

PhD project: Hybrid Data Assimilation for Applications in Cryosphere Physics

The Helmholtz School for Data Science in Life, Earth and Energy (HDS-LEE) provides an interdisciplinary environment for educating the next generation of data scientists in close contact to domain-specific knowledge and research. All three domains – life & medical sciences, earth sciences, and energy systems/materials – are characterized by the generation of huge heterogeneously structured data sets, which have to be evaluated in order to obtain a holistic understanding of very complex systems.

Project overview

Nowadays, a huge variety of data are available in the earth sciences that capture different physical, geochemical, or biological processes across a wide range of scales. In cryosphere physics, for instance, we have global-scale remote sensing data, regional-scale airborne and groundbased geophysical surveys, and invasive local-scale measurements through ice coring or other direct sampling efforts. Since a couple of years, also in-situ autonomous exploration robots are on the rise. Yet to date, data interpretation is often restricted to one (family of) data set(s), or one scale of interest. Only few studies aim at fusing and assimilating data sources across scales to generate an integrated, holistic picture of the ice body of interest. This would, however, create value-add for the science community, as it promises to yield new perspectives for cryospheric ecosystems research, or insight into cross-scale feedback mechanisms. This project will be devoted to on particular aspect of vast field 'hybrid data fusion and assimilation for cryosphere physics'.

Your profile

We are looking for a candidate with a background in computational geosciences / geophysics / geophysical fluids dynamics / environmental engineering, or alternatively with a background in computational engineering science / applied mathematics / scientific computing and strong interest in the geoscientific research (that should be motivated in the application). Experience in coding and with large scientific software is a definite plus.

- a completed master's degree in mathematics, computer science, natural sciences or engineering
- TOEFL or equivalent evidence of English-speaking skills
- a high level of scholarship as indicated, for example, by bachelor and master study transcripts and two reference letters
- good programming skills, e.g. experience with any of the following would be a plus: Python, C++
- excellent communication and organizational skills

Our offer

The PhD project will be located at the Aachen Institute for Advanced Study in Computational Engineering Science (AICES). The candidate is jointly supervised by Dr.-Ing. Achim Basermann (DLR Cologne, Simulation and Software Technology) and Priv.-Doz. Dr. Julia Kowalski (AICES, Geofluidynamics). We offer

- 3 year position with a salary amounting to TVL 13 100%.
- program at the graduated school with comprehensive training courses, e.g. in parallel computing, machine learning and deep learning, visualization, and scientific computing
- PhD students are encouraged to attend international conferences and can be selected for a period to stay abroad

Apply to and contact for further information: Priv.-Doz. Dr. Julia Kowalski kowalski@ices.rwth-aachen.de

Apply until: 31th May 2019

Starting date: 1st July 2019