**POSTDOCTORAL RESEARCHER
IN THE FIELDS OF GEOSCIENCES AND/OR MACHINE LEARNING
(m/f/d, 100%, TVL-E13, temporary for the duration of 1.5 years; extension possible)**

Dr. Anneli Guthke, leader of the research group on "**statistical model-data integration"**, seeks an enthusiastic postdoctoral researcher for her project "**GeoMod4Future: Sustainable modeling for the geosciences**". Geomodelling is a valuable tool for answering urgent questions about environmental systems, e.g. with respect to climate change or flood protection. Models are typically constructed with a specific purpose in mind, which limits their range of applicability. The aim of this project is to develop a fundamentally different, open-purpose type of model through an innovative combination of machine learning (ML) methods: neural stars. They can also be applied to unforeseen questions, thus saving resources in model (re-)building and modification, and enable an efficient handling of knowledge. This is a fundamental research idea in a very early phase which has received start-up funds by the Vector Stiftung in the call "MINT Innovationen 2024". Join our group and contribute to a change in modeling practices in the Earth and Geosciences!

Your tasks (supported by a diverse team of experts):

- Develop a new ML model architecture in MATLAB, R or Python that learns relevant system behaviour in a compressed manner
- Develop and test a new model training scheme that focuses on "system understanding" instead of "modelling purpose"
- Demonstrate and evaluate the developed methods on a hydrological case study of a catchment in Luxembourg/Belgium
- Collaborate closely with Dr.-Ing. Uwe Ehret and his group "Information-based Hydrology" at the Karlsruhe Institute for Technology (KIT) in Karlsruhe, Germany, as well as with the Analytic Computing Group at the Institute of Artificial Intelligence at the University of Stuttgart and the Junior Research Group for Machine Learning and Artificial Intelligence at HITS in Heidelberg, Germany
- Publish research results in high-ranked open-access journals
- Present and discuss research results at international conferences

Your qualifications (don't hesitate to apply – enthusiasm can compensate some gaps):

- Very good PhD degree in computer or data science, hydrology, geosciences, environmental engineering, or related fields
- Demonstrated interest in research questions focused on at least one of the following: physics-based or data-driven modelling, innovations in ML, model training and evaluation
- Previous experience in at least one of the following: coding ML algorithms, model building (physics-based, conceptual or data-driven), model calibration/uncertainty assessment, application of information-theoretic concepts
- Previous experience in at least one programming language common in quantitative fields (e.g., MATLAB, R, Python, Julia, or C++)
- Proficient English skills (spoken and written, C1 level); German skills are an asset (B1/B2 level)

We offer (looking for anything else? Ask us!):

- Internationally renowned expertise in environmental/hydrological modelling, machine learning, uncertainty quantification and information theory
- An inspirational and supportive research environment at the Cluster of Excellence SimTech and the KIT with ample networking opportunities
- A nationally and internationally well-connected research group
- Fully funded conference visits
- A growing interdisciplinary and intercultural team
- Coaching to support further steps in your academic/professional career

The University and the Cluster of Excellence:

The University of Stuttgart represents outstanding, world-renowned research and first-class teaching in one of Europe's most dynamic industrial regions. As a reliable employer, the university supports and promotes the academic careers of its researchers. It is proud of its employees, who currently come from over 100 different countries. The university is a partner for knowledge and technology transfer and focuses on multidisciplinarity.

The Cluster of Excellence "Data-Integrated Simulation Science" (EXC 2075) is an interdisciplinary research center with more than 200 scientists of different ages, gender identities, nationalities and different subject areas, jointly performing research towards a common goal: We target a new class of modeling and computational methods based on available data from various sources, in order to take the usability, precision and reliability of simulations to a new level.

Diversity and work-life balance:

At the University of Stuttgart and the Cluster of Excellence EXC 2075, we actively promote diversity among our employees. We have set ourselves the goal of recruiting more women scientists and employing more people with an international background, as well as people with disabilities. We are therefore particularly pleased to receive applications from such people. Regardless, we welcome any good application.

Women who apply will be given preferential consideration in areas in which they are underrepresented, provided they have the same aptitude, qualifications and professional performance. Severely disabled applicants with equal qualifications will be given priority.

As a certified family-friendly university, we support the compatibility of work and family, and of professional and private life in general, through various flexible modules. We have an employee health management system that has won several awards and offers our employees a wide range of continuing education programs. We are consistently improving our accessibility. Our Welcome Center helps international scientists get started in Stuttgart.

Application procedure:

Please apply via the career portal of the University of Stuttgart and submit your complete application, including one-page motivation letter, academic CV, one letter of reference, as well as academic certificates, **until August 31st, 2024**. Ideally, the selected candidate will start this position on **October 1st, 2024**; at the latest, this position will be filled by the end of 2024. If you have any questions regarding this application, please contact us via anneli.guthke@simtech.uni-stuttgart.de.

Information in accordance with Article 13 DS-GVO on the processing of applicant data can be found here.