

**Postdoctoral Position Opening: Scientific Staff E13 TV-L (100%) (w/m/d)**

We are currently looking for a Postdoctoral researcher (full-time E13 TV-L, starting from 2024 and limited for two years) as scientific team member for a project at the Department of Stochastic Simulation and Safety Research for Hydrosystems (LS3: <https://www.iws.uni-stuttgart.de/ls3/>). The LS3 department is part of the Institute for Modelling Hydraulic and Environmental Systems (IWS: <https://www.iws.uni-stuttgart.de/en/>), University of Stuttgart.

**Research project**

Modeling hydro-morphodynamic processes in river ecosystems is complex due to their dynamic and variable nature. This complexity leads to uncertainty when reproducing these processes for long spatio-temporal scales, such as climate change analysis. Input data for these models, like sediment grain size and surface elevation, often contain gaps and uncertainties. This modeling process involves data acquisition, processing, and simplifications, leading to various types of uncertainty. Therefore, hydro-morphodynamic modelling can benefit from rigorous and statistical methods for model selection, calibration and justification. To tackle these challenges efficiently, our project proposes a machine learning approach based on Bayesian analysis, information theory, and active learning that will enable to emulate non-linear hydro-morphodynamic models. This approach aims to emulate non-linear hydro-morphodynamic models, considering sparse measurement data and reducing computational demands. The postdoctoral researcher is expected to concentrate on two primary areas: (I) the development of a surrogate emulator using stochastic approaches based on information theory and (II) on the stochastic routines to leverage model selection, calibration and model justification.

The open postdoc position at the LS3 is part of a broader project in collaboration with the Department of Hydraulic Engineering and Water Resources Management (LWW: <https://www.iws.uni-stuttgart.de/en/lww/>). In this project, the research staff from LWW department is primarily responsible for data collection, developing a hybrid modeling chain for deterministic modeling, and implementing real-world scenarios. The close collaboration between these two departments will enable us to transfer these concepts into practical applications.

**Local research networks**

This project will be embedded in the research network of the cluster of Excellence “Data Integrated Simulation Science” (EXC 2075) and its permanent foundation, the Stuttgart Centre for Simulation Technology ([www.simtech.uni-stuttgart.de](http://www.simtech.uni-stuttgart.de)). The local network is complemented by the Collaborative Research Centre SFB 1313 (see [www.sfb1313.uni-stuttgart.de](http://www.sfb1313.uni-stuttgart.de)). The current project will benefit a lot from the exchange of experiences and codes with these networks and forms a critical mass of researchers that work on this problem.

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### Tasks description

- Research in the field of the surrogate modelling, information theory and stochastic approaches.
- Publication of research results in scientific journals.
- Supervision of student bachelor's, research, and master's theses.
- Collaboration with all other scientists from LS3, LWW, IWS and SimTech.
- Support in English or German teaching (e.g., exercises).
- Involvement in team organization.

### We expect from you

- Completed PhD in simulation technology, (computational) fluid mechanics, applied mathematics, stochastic modeling, machine learning or related fields.
- Passion for abstraction, algorithms, and modeling.
- Interest in interdisciplinary research and development.
- Enjoyment of research, both independent and as part of a team.
- Fluent English language skills.

### Application

Your documents should include your resume with certificates, your research and teaching experience (if applicable), and a brief description (max. 1 page) of your own research interests. Please send these documents in a **PDF format via E-mail** to apl. Prof. Dr.-Ing. Sergey Oladyshkin at [Sergey.Oladyshkin@iws.uni-stuttgart.de](mailto:Sergey.Oladyshkin@iws.uni-stuttgart.de) by **November 1, 2023**.

The University of Stuttgart aims to increase the proportion of women. Therefore, women are explicitly encouraged to apply. Full-time positions are generally divisible. Disabled individuals will be given priority in case of equal qualifications. The hiring process is conducted by the central administration.

### Contact Details

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