

**University of Stuttgart**

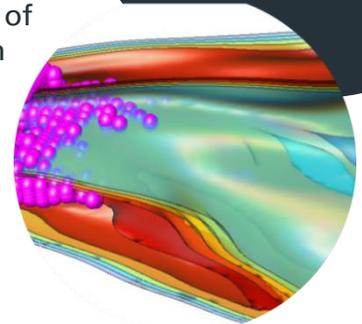
Germany

Department for Stochastic Simulation  
and Safety Research for Hydrosystems (LS<sup>3</sup>)

## Sensitivity Analysis for River Model

### B.Sc. Topic

Hydro-morphodynamic modelling has been considered as a powerful tool to assess the hydraulic regime and sediment transport processes in open flow systems. River management and river engineering activities (e.g. constructing groynes, lowering the floodplain or dredging the main channel) should be reliable and help to control the transport of water and sediment through a river. However, flow in an open channel represents a complex process, where various physical parameters play a role and where many of them are uncertain, such as roughness coefficients or sediment grain sizes. Understanding the general role of physical parameters in models and the impact of varying model parameters on the response of prediction models is a relevant subject in various fields of science and engineering.



Characterizing the impact of parameter variations is known as sensitivity analysis. In many cases of practical interest, we wish to perform a sensitivity analysis in order to analyze a model as such or to investigate, quantify and rank the effects of parameter variation or parameter uncertainty on the overall model uncertainty. The current work will be focused on investigation of sensitivity analysis for a river model.

### Prospective Tasks

- Set up a test case scenario for hydro-morphodynamic simulation using a simple river model
- Identify an appropriate automated calibration algorithm that is efficient, robust and can include soft information into the calibration procedure
- Implement and test the identified calibration algorithm on the test scenario

### General Information

- Theoretic study
- Cooperation between *Department of Stochastic Simulation and Safety Research for Hydrosystems* and *Department of Hydraulic Engineering and Water Resources Management* at the University of Stuttgart.
- Supervision by Dr.-Ing. Habil. Sergey Oladyshkin, Prof. Dr.-Ing. Wolfgang Nowak and Dipl.-Ing. Felix Beckers

### Desireable Skills

- Knowledge of river hydraulics
- Affinity with numerical simulations, statistics and programing (MATLAB)



**Apply now!**

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