



## Master Thesis

# Bayesian Inference on Data of Varying Quality

A cooperation with the Institute for Modelling Hydraulic and Environmental Systems.

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### Description:

Different measurement techniques lead to data of different quantity and quality. One for example often lacks the scale of a data set or only has information about monotonous behaviour. This thesis aims to answer the following research questions:

1. How does the quality and quantity of measurement data and other prior information affect the posterior parameter distribution?
2. Can expert knowledge overcome the information loss induced by poor data?
3. How can Likelihood functions be defined in the context of different kinds of parameter inference problems?

During a initial literature review phase, you will familiarize with current approaches of Bayesian parameter inference. Afterwards, you implement an artificial test-bed system and use it to generate data of different kinds. The subsequent implementation of basic Bayesian inference methods then allows to target the desired research question.

### Prerequisites:

- Sound mathematic background
- Programming skills (e.g. in Python)
- Helpful: Experience with Bayesian statistics

### Supervisor:

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### Keywords:

Parameter Estimation  
Bayesian Statistics  
Data Analysis

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### Thesis Aspects:

20% Literature  
30% Implementation  
30% Simulation  
20% Analysis

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### Language:

Deutsch/Englisch

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### Start:

Starting Now

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