



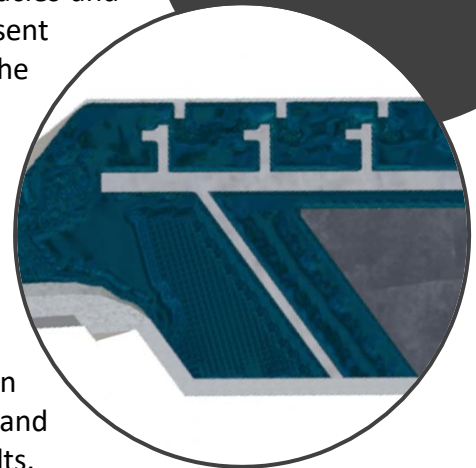
## M.Sc. Topic

Three-dimensional (3d) hydrodynamic simulation optimization of a fishpass

## Background

The application of computational fluid dynamics (CFD) in the numerical modeling of fishpasses presents several challenges, including accurately capturing the complex flow patterns and turbulence around obstacles and structures. Additionally, ensuring a high mesh quality to represent small-scale features present in the model while complying with the available computational resources is also a substantial challenge. Moreover, achieving stable and realistic simulations requires careful calibration of the boundary conditions and turbulence models. The model stability is also influenced by other factors such as the selected numerical scheme and solver settings. To this end, this Master's Thesis has the objective of optimizing an already-existing numerical model of a technical fishpass and evaluate different turbulence models. For this purpose, the student will learn and apply the open-source software OpenFOAM for meshing and running the simulations, and ParaView for postprocessing the results.

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## Thesis Overview

1. Literature review on hydrodynamic numerical modeling and turbulence modeling.
2. Familiarize with the mesh generator and OpenFOAM.
3. Refine the setup of a 3d hydrodynamic model of a fishpass OpenFOAM
4. Run simulations at different mesh resolutions and with different turbulence models.
5. Interpret and provide a comprehensive overview of the simulation results.

## Required Skills

Interest in hydrodynamics and willingness to complete a numerical modeling challenge to gain better understanding of such models.



**Apply now!**

[federica.scolari@iws.uni-stuttgart.de](mailto:federica.scolari@iws.uni-stuttgart.de)

The thesis can be written in German or English.

Examiner: Prof.-Dr. Ing. Silke Wieprecht (LWW) | Supervisors:

M.Sc. Federica Scolari

Dr. sc. Sebastian Schwindt