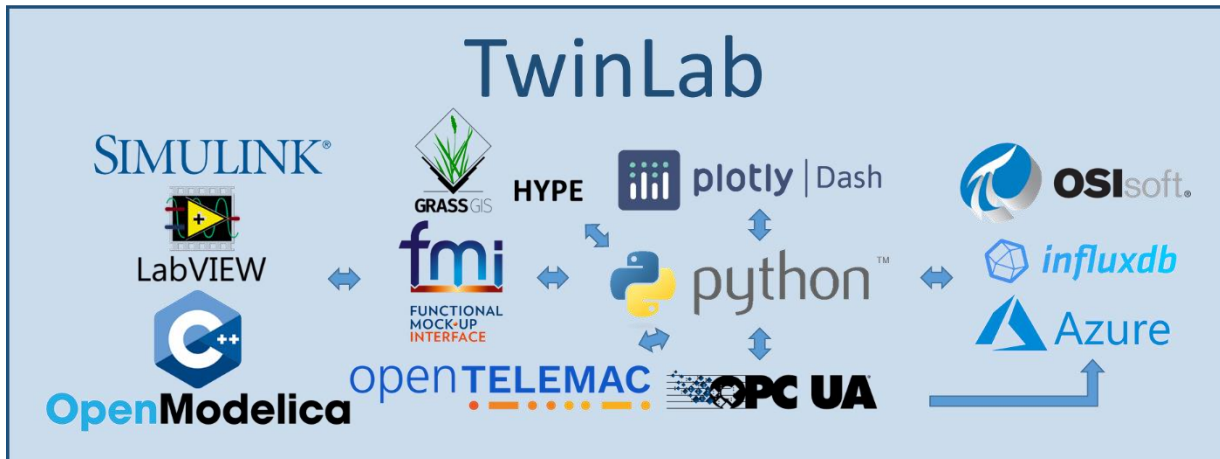# Master thesis –TwinLab for environmental modelling of a hydropower river

TwinLab is a digital platform for integrating measurement data (real-time or historical) and different models of the hydropower system. It is being developed under HydroCen (link) and has been recently expanded with environmental tools TwinLab includes GIS (GRASS, Google Earth Engine), the hydrological model HYPE, the hydraulic model openTELEMAC and it can be accessed via JupyterHub. The platform allows using concatenate data and different models.

In the thesis, we propose to use TwinLab to simulate the unregulated flow in the Lundesokna River, downstream of a hydropower system. The candidate should calibrate and validate the hydrological model HYPE for the reaches with available streamflow data in Gaula, and simulate the flow for the entire Lundesokna catchment, including tributaries. This step allows to reconstruct unregulated flows before the construction of the hydropower system. Once this information is available, it could be used to test and evaluate potential environmental flows, focusing on mitigating undesired hydropeaking effects. Different scenarios with different environmental flows values will be then tested in openTELEMAC to quantify the effect on hydraulic variables (depth, velocity) and consequently on fish habitat. The student could have a visiting exchange of a week to EDF (France) with the developers of openTELEMAC.

Objectives:
1. Set up HYPE and calibrate for the unregulated period
2. Improve and test the connection between hydrological and hydraulic models in TwinLab
3. Test different environmental flows in openTELEMAC and analyse habitat conditions

Requirements: *The candidate should be proficient in Python.*

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