NC Internship Programme 2026

NC Programme

Hydro-JULES

Project Title

National-scale flood forecasting – what can distributed hydrological models bring to Wales?

Supervisors

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UKCEH Site

Wallingford

Project Overview

Wales is vulnerable to flooding from rivers, surface water, and the sea. Over the last few years there have been several notable floods causing significant damage and disruption. During February 2020, a sequence of heavy rainfall from Storm Ciara (8-9 February), Storm Dennis (15-17 February 2020) and Storm Jorge (28 February to 1 March) led to the flooding of 3,130 properties across Wales – the most significant event for over 40 years.

A post-event review of the 2020 floods by Natural Resources Wales (NRW) has recommended exploring how the Grid-to-Grid (G2G) hydrological model, developed by UKCEH, could improve flood forecasting capabilities in Wales to help mitigate the impacts of these events - particularly for small rivers that currently have no forecast service. To help address this important recommendation, the project intern will work with UKCEH and NRW experts to provide a detailed performance analysis of the latest G2G model version that became operational at the Flood Forecasting Centre (FFC) in early 2026. The analysis will make use of a long 20-year period of past simulations, assess ungauged catchments, and look at major past events and consider ensemble flood forecasts.

Key tasks

- Meetings with NRW and UKCEH staff to understand the project and operational flood forecasting problem
- Data analysis of distributed hydrological model outputs from G2G and comparison with NRW gauged observations
- Detailed post-event analysis of significant past events (e.g. Feb 2020, Nov-Dec 2024)
- Potential to assess ensemble forecasts for these events
- Presentation and discussion of results with project team
- Engagement in the wider Internship programme of activities

Expected Outcomes

- Short presentation/report on the analysis of G2G for supporting improved flood forecasting in Wales
- Present findings to NRW and UKCEH project team and wider Internship cohort
- Code base (where appropriate) for the analysis (e.g. notebooks, Git Repository)

Required Skills and Background

Essential skills and experience

- Code knowledge of a relevant programming language (e.g. Python or R)
- Data analysis and plotting skills

Desirable skills

- Knowledge of code repository tools (e.g. Git) or collaboration notebook tools (e.g. Google Colab, Jupyter Notebooks)
- Working in teams

Technical, professional, or transferable skills

- Communication skills (e.g. presentations or report writing)

Benefits this internship offers for the intern

- Advanced Technical Expertise: You will gain hands-on experience with the Grid-to-Grid (G2G) model and Ensemble NWP, learning to use cutting-edge, operational national-scale forecasting modelsHigh-Level Data Analysis: You will develop professional skills in processing "big data" by analyzing 20 years of past simulations for gauged and ungauged catchments (areas without physical sensors).
- Direct Policy Impact: Your work contributes directly to Welsh Government recommendations, helping to build flood forecasting solutions for small rivers and underserved communities.
- Professional Networking: You will work alongside experts from both Natural Resources Wales (NRW) and the UK Centre for Ecology & Hydrology (UKCEH), bridging the gap between research and real-world emergency management.