

## The environmental impact of tidal energy devices

### HPC-Competence Center

High Performance Computing (HPC) Wales is Wales' national super-computing service provider. Host to the UK's largest national distributed supercomputing network, HPCWales provides businesses and researchers with local access to world-class technology and the support to fully exploit it.



### Enterprise

Xodus Group offers engineering and advisory support for oil and gas upstream operators and renewable energy developers worldwide. Capable of meeting the most acute needs in the rapidly evolving marine renewables sector, Xodus Group works with developers as well as utility and development companies who are looking towards commercial scale projects.

### How HPC makes the difference

The tidal range of the Welsh coast is the second largest in the world with tides offering untapped opportunities for energy generation. However, the deployment of devices necessary to realise these opportunities introduces complex environmental challenges that need to be understood and carefully considered.

Due to the extensive environmental impact assessments required to develop even modest sized tidal stream arrays, the objective of this study was to help accelerate the large-scale deployment of offshore renewable energy, while ensuring that such arrays do not have a negative impact on natural coastal processes.

In collaboration with the expert coastal modellers at Bangor University's School of Ocean Sciences, the project made use of a combination of capability and capacity computing, using MPI and Fortran to compile

the ROMS and SWAN model source codes. Using [repetition of 'using'] HPC, the team were able to identify a compromise between performance and model resolution and were able to run simulations for up to a decade to investigate feedbacks and inter-annual variability.



*Fig: Dr Simon Neil of Bangor University, who led the collaborative project between Xodus Group, Bangor University and HPC Wales.*

