

BWR Hub

Boiling Water Reactor Research Network



Imperial College

HITACHI





Llywodraeth Cymru Welsh Government



www.bwrhub.ac.uk



"The purpose of the BWR Research Hub and Network is to enable the academic and industrial communities of Wales and the wider UK to deepen and enhance their understanding of BWR technology, and participate in research and development relating to this and future generation of BWRs."

- Facilitate the transfer of BWR Technology from Japan to Wales and the wider UK.
 - Deepen and enhance our understanding of BWR Technology.
 - Participate in research and development relating to Boiling Water Reactors.
 - Create and Develop nuclear research capacity in Wales.
 - Publically-accessible education in BWR Technology.

www.bwrhub.ac.uk



BWR Hub Conferences













Feasibility Studies





- Modelling of film dryout critical heat flux (CHF) for BWR Applications *Imperial College London*
- Integrated III-As/Sb compound semi-conductor for gamma-ray spectrometry *Cardiff University*
- Possibility of using mixed peridynamics and finite element methods to model accident tolerant fuel performance *Imperial College London*
- A microfluidic setup for safe and low-cost modelling of boiling water reactor coolant purity Bangor University
 - Virtual Reality Demonstrator of an Advanced Boiling Water Reactor (VRABWR) Bangor
 University
- Laser coating of ordered Y₂O₃ layer on Zircaloy-4 surface for enhanced accident tolerance Bangor University
 - Nuclear Communities *Bangor University*
- Laser welding of SiC ceramic to SiC ceramic composites for Nuclear Applications *Coventry University*



Outreach Activities













Other Activities







Workshop 3

Showcasing the BWR Network

Dr Norman Waterman & Dr Debbie Jones





The North West Nuclear Arc Science and Innovation Audit

A Science and Innovation Audit Report sponsored by the Department for Business, Energy & Industrial Strategy.





BWR Hub Workshop







The aim of the workshop was to discuss the research needs of BWR Technology with an aim of generating a clear list of project ideas/research proposals which could be taken forward.

> BWR Research Roadmap

The BWR Hub has been tasked with producing a roadmap that will enable the nationwide effort to provide the necessary personnel and skills to safely and economically build and operate boiling water reactors. This roadmap aims to provide Horizon Nuclear and Hitachi-GE with a UK-focused research effort to support the new build plant at Wylfa Newydd and the rest of the UK.



BWR Hub Workshop





The effort has been split into five work-packages (WPs):

- **1.** Component performance in reactor environments
- 2. New component manufacture and development
- 3. Safety and performance of BWRs
- 4. Reactor operation monitoring and control
- 5. Security and safeguards

Within the work-packages the following general cross cutting themes are targeted:

- Structural integrity
- Fuel performance and design
- Thermal hydraulics
- Neutronics
- Monitoring and control
- Advanced manufacture methods
- Economics and policy

The **aims** of the projects outlined in the work-packages are the following:

- To solve current problems with needs-based research.
- Train students to be employable in the UK BWR industry.
- Reduce costs by investigating new technologies.

Simon Middleburgh – Background and Interests

