

SPH-SIG/CCP-WSI Joint Meeting 1
University of Bristol (& online), 3rd November 2023



The CCP-WSI (a brief overview)

Dr Edward Ransley
University of Plymouth



Science and
Technology
Facilities Council



Engineering and
Physical Sciences
Research Council

Background (to the CCP-WSI)

a Collaborative Computational Project in Wave Structure Interaction

- **Began:** October 1st 2015
- **Funded by:** EPSRC (EP/M022382/1)
- Original Working Group of 5 academic institutions (led by the University of Plymouth) plus STFC
- **Supported by:** 34 project partners – international group of academics and industry experts
- **Over-arching Aims:**
 - Develop and maintain a robust and efficient computational WSI modelling tool
 - Build and grow a community of researchers, data, code and expertise around WSI
 - Provide a framework for innovation and development of strategic software
- **CCP-WSI Code Repository** - hosted on GitHub via the CCP-WSI Organisation
- **CCP-WSI Data Repository** – hosted on the CCP-WSI Website (<http://ccp-wsi.ac.uk>)
- **Networking Activities:**
 - CCP-WSI Repository Workshops and Training Events
 - CCP-WSI Code Developers' Workshops and the 1st CCP-WSI Hackathon
 - CCP-WSI Focus Group Workshops and industrial engagement events
 - CCP-WSI Blind Test Workshops

The CCP-WSI+ Project

- **Began:** October 1st 2020 (5 year duration)
- **Funded by:** EPSRC (EP/T026782/1) and awarded 2.0FTE of COSEC support (each year for 5 years)
- Working Group expanded to 7 academic institutions (led by the University of Plymouth) plus STFC
- **Supported by:** 62 (28 new) project partners



The CCP-WSI+ Working Group

- **Prof. Deborah Greaves** University of Plymouth
- **Dr Edward Ransley** University of Plymouth
- **Dr Yeaw Chu Lee** University of Plymouth
- **Prof. Ling Qian** Manchester Metropolitan University
- **Prof. Qingwei Ma** City University London
- **Prof. Shiqiang Yan** City University London
- **Prof. Jun Zang** University of Bath
- **Prof. Gavin Tabor** University of Exeter
- **Prof. Lee Margetts** University of Manchester
- **Dr Mohamed Rouainia** University of Newcastle
- **Dr Stephen Longshaw** STFC (Daresbury Laboratory)
- **Dr Xiaohu Guo** STFC (Daresbury Laboratory)
- **Dr Gemma Poulter** STFC (Rutherford Appleton Laboratory)
- **Dr Omar Ahmed Mahfoze** STFC (Daresbury Laboratory)



**UNIVERSITY OF
PLYMOUTH**



**Science and
Technology
Facilities Council**

CCP-WSI+ Aims & Objectives

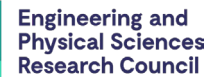
- **Build** on the impact generated by the CCP-WSI and extend it by **connecting** the computational fluid dynamics (CFD) and computational structural mechanics (CSM) communities
 - **CCP-WSI website** – expand and maintain <http://ccp-wsi.ac.uk>
 - **Networking and industry workshops** - designed to share good practice and exchange advances across disciplines
- **Support** and **accelerate** the development, utilisation and implementation of next-generation, fully-coupled wave structure interaction (WSI) modelling tools
 - **CCP-WSI Code Repository** – maintain and expand with user support & training in software engineering
 - **CCP-WSI Data Repository** – expand, maintain and enhance with database visualisation and archiving
 - **Training and workshops** – to support community code development and the co-creation of code-coupling methodologies and libraries in an open-source environment
 - **Blind testing** – extend the CCP-WSI Blind Test series and establish best-practices
 - **Parallel optimisation** – support optimisation and implementation on emerging HPC architectures
- Provide a **focus** for strategic software development and code rationalisation
 - **Road-mapping exercises** – for industry-informed, strategy-setting
 - **Software audit** – on WSI codes

SPH-SIG/CCP-WSI Joint Meeting 1
University of Bristol (& online), 3rd November 2023



The HEC-WSI (a brief overview)

Dr Edward Ransley
University of Plymouth



High end computing consortium for wave structure interaction (HEC-WSI)

- **Started:** 3rd January 2023
- **Ends:** 2nd January 2027
- **Funded by:** Engineering and Physical Sciences Research Council (EPSRC) [EP/X035751/1]
- **Motivation:** A new/emerging consortium to support the WSI community which is seeing rapidly increasing benefit from the use of HPC for modelling and simulation
- **Aims to:**
 - **Build a network** of computational researchers, and wider WSI community members, to **facilitate** world-class high end computing research in the field of WSI;
 - **Provide leadership** in developing strategic agendas for the WSI community;
 - **Enhance** the suitability of WSI software for high end computing;
 - **Provide a forum** to share knowledge and expertise;
 - Provide central core resource and **maximise community involvement** through inclusive and flexible access, opportunities and support.

HEC-WSI Project Partners



Swansea
University
Prifysgol
Abertawe



Maynooth
University
National University
of Ireland Maynooth

Lancaster
University



CIMNE^R
INTERNATIONAL CENTRE
FOR NUMERICAL METHODS
IN ENGINEERING

HYDR  WING

 engys[®]



National Research
Council of Italy

 AquaSpira

ARUP



CARDIFF
UNIVERSITY
PRIFYSGOL
CAERDYDD

UNIVERSITY OF
OXFORD



CCFE
CULHAM CENTRE FOR
FUSION ENERGY



University of Stuttgart
Germany



UNIVERSITY OF
CAMBRIDGE

UK **acm**
UK Association for Computational Mechanics

CATAPULT
Offshore Renewable Energy


WARWICK
THE UNIVERSITY OF WARWICK



University of
Strathclyde
Glasgow



University of
Southampton



Imperial College
London

Open  CFD[®]



UNIVERSITY OF
EXETER



CITY
UNIVERSITY OF LONDON
EST. 1894

MANCHESTER
1824
The University of Manchester



Science and
Technology
Facilities Council

 Engineering and
Physical Sciences
Research Council

HEC-WSI Management Group



**UNIVERSITY OF
PLYMOUTH**

HEC-WSI Chair: Prof. Deborah Greaves (University of Plymouth)



HEC-WSI Activities

- **Website:** <https://hec-wsi.ac.uk/>
- **Mailing List:** <https://hec-wsi.ac.uk/contact/> (combined CCP-WSI, HEC-WSI, SIG-WSI list)
- **Events:** HEC-WSI Annual Workshop, training events, ...
- **Programme of Work:**
 - WP1: Porting, Optimisation and code developments for WSI (lead by CoSeC)
 - WP2: Scientific use case development and sharing
 - Fully-coupled use case – floating offshore wind turbine (FOWT)
 - Showcase and provide a demonstrator for developments made in WP1
 - Openly accessible and shared as a benchmark
 - Used to explore machine learning techniques for low-cost surrogate model solutions
 - WP3: HPC Access Management
 - WP4: Dissemination

The HEC-WSI offers access to the ARCHER2 Service!

HEC-WSI Access Modes

- The HEC-WSI currently offers 3 access modes (plus a dedicated allocation for early career researchers (ECRs) incl. training and support):
 - Porting & Benchmarking (PB);
 - Code Development (CD), and;
 - Project Access (PA)

****Winter '23 call open – deadline 15th Dec. 2023****
- Open to international and industry collaborators provided the ARCHER2 usage aligns with the aims of the HEC-WSI



<https://hec-wsi.ac.uk/access-resource/access-modes/>

Thanks for listening!

Keep up to date – Join the combined CCP-WSI and HEC-WSI Community Mailing List

<https://ccp-wsi.ac.uk/contact/>

