

The State of the Art in Scientific Coupling Technology for HPC Workshop

Integrated Simulation at the Exascale: coupling, synthesis
and performance

ExCALIBUR Programme

3 December 2021

<https://excalibur-coupling.github.io/>



UK Research
and Innovation



Engineering and
Physical Sciences
Research Council



ExCALIBUR (Exascale Computing Algorithms and Infrastructures Benefitting UK Research) is a £45.7m programme led by the Met Office and UK Research and Innovation to deliver research and innovative algorithmic development to harness the power of Exascale HPC.

ExCALIBUR is a five year programme and consists of five themes:

1. knowledge integration;
2. high priority use cases;
3. emerging requirements for high-performance algorithms;
4. **cross-cutting research**; and
5. proof-of-concept hardware.



<https://www.jiscmail.ac.uk/EXCALIBUR-KE-ANNOUNCE>

Integrated Simulation at the Exascale: coupling, synthesis and performance

Objective

Develop **mathematical methods** and **software tools** that will support coupled simulations at exascale to solve challenging and urgent problems, the solution of which will lead to significant social and industrial benefits.

3 year project, started 1st August 2021

<https://excalibur-coupling.github.io/>

Project members



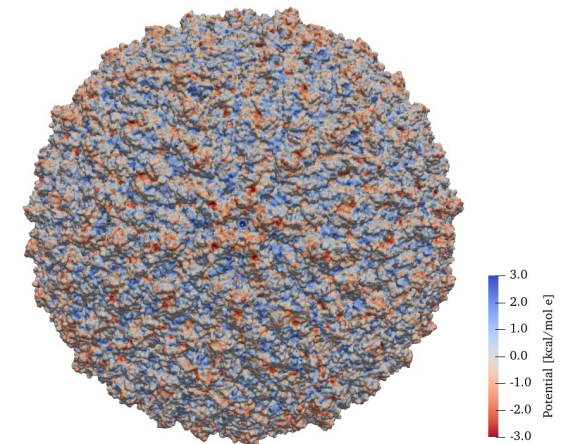
Project partners



Work programme

Mathematically rigorous methods and **efficient software** for stable, accurate and efficient coupled simulations on exascale systems

1. Stability and accuracy of coupling at high-order
2. Coupling libraries with support for heterogeneous architectures
3. Portable and reproducible deployments
4. High impact demonstrator applications



Workshop schedule

- 13:00 - 13:15: Opening and project overview (Garth Wells; Cambridge)
- 13:15 - 13:45: [preCICE](#) (Benjamin Uekermann; University of Stuttgart)
- 13:45 - 14:15: [Point Location Exchange \(PLE\)](#) (Yvan Fournier; Électricité de France)
- 14:15 - 14:30: Break
- 14:30 - 15:00: [Multiscale Universal Interface \(MUI\)](#) (Stephen Longshaw; UKRI-STFC)
- 15:00 - 15:30: [Multiscale Coupling Library and Environment \(MUSCLE\)](#) (Peter Coveney; UCL)
- 15:30 - 16:00: [Coupling With Interpolation Parallel Interface \(CWIPI\)](#) (Bastien Andrieu; ONERA)
- 16:00 - 16:30: Round-up discussion and close

<https://excalibur-coupling.github.io/workshop1/>



For updates and future project events

<https://excalibur-coupling.github.io/>

To follow wider ExCALIBUR activities

<https://www.jiscmail.ac.uk/EXCALIBUR-KE-ANNOUNCE>