Guidance

The ExCALIBUR Steering Committee, have requested an update on the science and research currently funded by the programme.

Please provide up to two slides sharing the focus of your grant and highlight any significant and interesting developments or connections made so far in your project

Please use the ExCALIBUR themes provided in this document.

Submit updates to elizabeth.bent@epsrc.ukri.org and Lydia.dumore@epsrc.ukri.org by close of play on 26th January.

ExCALIBUR-HEP

Team details

What is the focus of your grant/project?

- Development of software tools for the experimental high energy physics (HEP) community

- Four work packages
  - Data management. Towards the creation of a UK data lake storing in excess of 100 PB
  - Real time applications. Development of software tools to exploit real-time reduction algorithm on FPGA for the Large Hadron Collider experiments.
  - Simulation. Development of a prototype to simulate the interaction of electrons and photons (EM showers) on GPU architectures
  - Parallel portable strategies. Test of tools that allow software to be written for multiple parallel architectures.
- Good progress so far on all the areas
  - Leading to new collaborations (e.g. with EPC and CCE in the USA) and with industry (Intel, NVidia, …)
  - Strengthening existing links, e.g. with the HEP Software foundation and CERN

Update on interesting connections and development

- Participation in the ExCALIBUR working groups and interaction with other communities that rely on research software
- We developed links with the ExaLat project.
  - We share a lot of technical challenges (data management, parallel programming, accelerator code). We organised a few joint discussion and a school
- FPGA platforms
  - We held technical discussions with Intel on the use of their FPGA platforms for real-time applications. This is a new collaboration made possible thanks to a new hire at Imperial (part funded by ExCALIBUR).
  - Further discussions with other FPGA vendors (Xilink).
  - We supported two H&SE applications for the deployment of an FPGA testbed
- Simulation
  - We are active participants of the AdePT project.
  - Ben Morgan (Warwick) part-funded by ExCALIBUR was appointed convener of the HWP simulation working group (20-30 participants internationally)
  - Contributing to the development of the GEANT4 software for the simulation of high energy radiation. This toolkit used also for medical, nuclear and space applications
- Collaboration with the USA
  - With the Exascale Computing Project (ECP) on the Celeritas simulation package
  - Possibile collaboration with the Centre for Computational Excellence (CCE)