

Centre of Excellence in Physics at Extreme Scales

Richard Kenway

Purpose

- computational and data science that stretches enabling technologies to explain how the Universe works at the largest and smallest length and energy scales
 - what should be the scientific scope?
 - lattice field theory, cosmology, CFD/turbulence, LHC, SKA,...
- co-design: algorithms and implementations, hardware and software, data generation and exploration must evolve together in order efficiently to solve the most challenging physics problems
 - is co-design sufficient socio-economic impact?
 - can we involve industry end users?
- the Centre brings physicists, computer scientists and data scientists from academia and industry together to develop new technologies to discover new physics
 - who leads and how many physical centres?

Work Programme

- WP1. Community software development and data management
- WP2. New algorithms for large-scale simulation and data analytics
- WP3. Languages and programming models for heterogeneous architectures
- WP4. Energy-efficient processor, memory and interconnect architectures
- *WP5. High speed data streaming, real-time analysis and data ingest*
- *WP6. Emerging and disruptive technologies*
- WP7. Dissemination and training

Structure & Composition

- **CoE = federation of centres each leading a work package + virtual organisation + administration**
 - 2 Co-Directors per centre (physicist + computer scientist) + Director + Manager = Executive
 - public-private partnership
 - funds staff and meetings, not equipment or computer time
- **Partners: contribute resources (in-kind)**
 - labs and universities: offices, staff, students
 - HPC centres and services: access to facilities, technical support
 - industry: software, test and development hardware, staff
- *Affiliates: pay a modest subscription (~€1k pa cash)?*
 - access to all results and events
- **International Collaborators: outside Europe**
 - share community code development and maintenance
 - share costs

Next Steps

- Do we have the basis for a proposal?
 - are you willing to put more effort in?
- Identify Director and Co-Directors
 - overall vision + work package summaries
- Identify partner organisations
 - lightweight collaboration agreements
- Partners' meeting
 - soon
 - agree plan and assign tasks