



# Kelvin-2 - a High Performance Computing Facility for increased AI-focused research

Vaughan Purnell

1. EPSRC bid proposal
2. Objectives
3. Existing Kelvin-1 Capacity
4. New Kelvin-2 Capacity
5. Kelvin-2 service
6. Training
7. Timescales and current work

- ❑ Consortium involving Queen's University Belfast and Ulster University
- ❑ Facility is called NI-HPC, cluster is called kelvin-2
- ❑ Key personnel:
  - ❑ Roger Woods, PI, QUB
  - ❑ Damien Coyle, PI, UU
  - ❑ Seamus Doyle, Centre Director

- Focus on six specialist research areas:-  
computational neuroscience, advanced chemistry, innovative drug delivery, precision medicine, food fingerprinting and hydrogen deflagration
- Focus on AMD technology and add to AI-based tier2 capacity
- Refresh in 4 years planned to come from Belfast Region City Deal
- A tier-2 facility for Northern Ireland

- Reduce some load from other tier-2s, e.g JADE
- QUB continued support of Thomas
- Hub for industry-academia research
- Strengthen link with ICHEC

- Two tenders run for hardware and managed service in Oct-Nov.
- Dell were awarded on hardware from SSSNA Lot 3b framework.
- Esteem were awarded as managed service providers from Further Competition under Crown Commercial Services Framework - Technical Services 2 (RM3084) Lots 2 and 3b Framework.

- To encourage research into key research areas of strategic importance to UK
- To gain broader engagement by encouraging more research that is new to HPC

- Commissioned in 2015
- Intel based CPUs
- 60 Compute Nodes (HPE)
- 1/2 Petabyte scratch storage
  
- 2018 – addition of a GPU Node – 4xV100, 2 x High Memory nodes (1.5 TB)
- Scheduler - Slurm
- Currently support 600 users, circa 100 active users



- EPSRC Tier-2 award circa £2m + investment from QUB
- 8000+ AMD Rome cores
- Compute nodes dual 7702 64core CPU with 768GB RAM
- 32 x GPU v100 (32GB)
- 2 PB of usable scratch storage – Lustre
- 4 x 2TB RAM nodes
- EDR Infiniband 100Gb/s (Mellanox) network

- 65% available for NI based researchers
- 35% available to UK based researchers
- Fast allocation process for new users
  
- Support of dedicated Research Support Engineer in each institution. (posts are currently advertised)

- Prospective researchers will prepare a short outline for the research project for submission
- Proposals assessed by Resource Allocation Panel with external HPC expertise
- Priority given to 'new to HPC' and 'new communities'
- Individual users able to get up to 20,000 wall-clock hours with simple, fast-track approval process

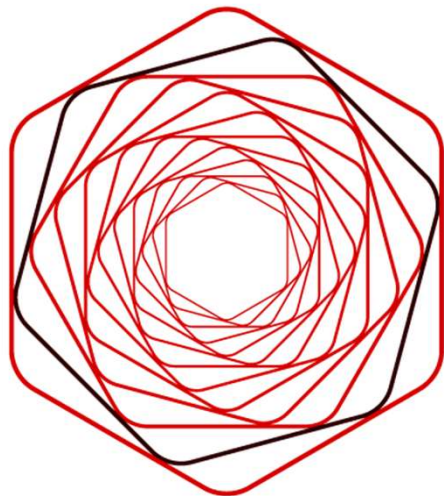
Training Activity	Frequency
Standard induction training	1 per month against published schedule
Masterclasses e.g. Nvidia	2-3 per year. Schedule and topics to be agreed
User Group to share best practices	1 per year June

- Funding awarded by EPSRC 1st Dec-19
- Final Site Survey and physical layout Nov-19
- Equipment ordered Dec-19
- Equipment on site Feb-20
- Equipment installed and networked Feb-20
- HPC Configuration & acceptance tested Mar-20
- First users (QUB exemplars) live date Easter 20
  
- Allocation Committee – first meeting late Feb/Mar
-

- Installation of Kelvin-2
  - Hardware arrived and is racked (almost!)
  - Acceptance tests in Feb/March
  - Integration with Kelvin-1 for Easter
- Development of website
- Looking best practice for SLURM configuration and user authentication for Tier-2
- Planning training courses



Bonus slide - logo



**NI-HPC**  
NORTHERN IRELAND  
HIGH PERFORMANCE COMPUTING