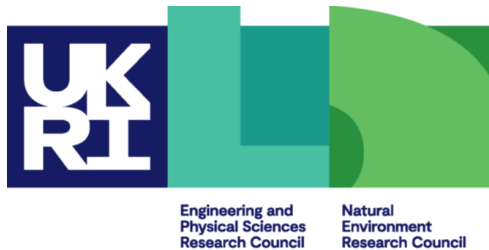


# ARCHER2 Training Courses

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## General Overview



# Reusing this material



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- New UK National Supercomputer Service
  - managed by UKRI/EP SRC
  - Housed, operated and supported by EPCC
  - hardware supplied by Cray
- Training provided by the ARCHER2 Computational Science and Engineering (CSE) support team
  - 60 days per year at various locations
  - free to all academics



# Located at EPCC's Advanced Computing Facility (ACF)





# Cirrus@ACF



# What is EPCC?

- UK national supercomputer centre
  - founded in 1990 (originally Edinburgh Parallel Computing Centre)
  - a self-funding Centre of Excellence at The University of Edinburgh
  - running national parallel systems since Cray T3D in 1994
  - over 100 full-time staff
  - a range of academic research and commercial projects
  - postgraduate teaching and HPC training courses
- Get in contact if you want to collaborate
  - many staff are named RAs on research grants
  - joint research proposals
  - European project consortia



# Edinburgh



# Key ARCHER2 Resources

- Upcoming courses
  - <http://www.archer2.ac.uk/training/>
- Material from past courses
  - <https://www.archer2.ac.uk/training/materials/>
- Virtual tutorials (online)
  - <http://www.archer2.ac.uk/training/>
- Documentation
  - <http://www.archer2.ac.uk/documentation/>



# Who am I?

Adrian Jackson [a.jackson@epcc.ed.ac.uk](mailto:a.jackson@epcc.ed.ac.uk)

- Teach at EPCC on HPC and program optimisation:
  - MSc, PhDs
  - PRACE Advanced Training Centre
  - ARCHER training programme
  - commercial training
  - ...
- Also do HPC research
  - Porting and optimizing community codes
  - new parallel programming models, accelerators, performance, memory hardware, ..



# Other Resources

- Please fill in the feedback form!
  - you will be sent a link at the end of the course
- General enquiries about ARCHER2 go to the helpdesk
  - [support@archer2.ac.uk](mailto:support@archer2.ac.uk)
- EPCC runs one-year taught postgraduate masters courses
  - ***MSc in HPC*** and ***MSc in HPC with Data Science***
  - awarded by the University of Edinburgh since 2001
  - scholarships available
  - <http://www.epcc.ed.ac.uk/msc/>



# MSc in HPC / HPC with Data Science



- taught by EPCC staff (plus options in Informatics, Maths, Physics, ...)
- 12 taught courses (8 months); research dissertation (4 months)
- also available fully online for part-time, intermittent study

# Supercomputing MOOC

- [futurelearn.com/courses/supercomputing](https://futurelearn.com/courses/supercomputing)

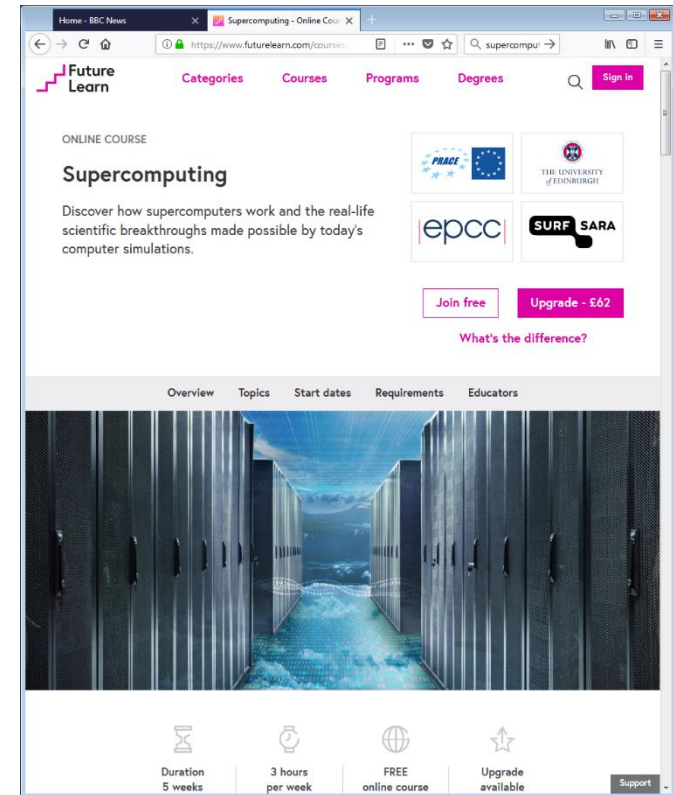
- 5 weeks
- free (with paid “upgrade” option)
- conceptual
- no computer programming required

- Run five times from 2017 - 2019

- typically thousands of “joiners”
- very collaborative
- lots of support from fellow learners

- Available now in “self-study” mode

- no active support from EPCC educators





# Access during course

- Personal accounts for duration of course
  - will allow machine access for up to a month afterwards
- Accounts will be closed two weeks after access ends
  - all files etc. will be deleted
  - take copies of all your work beforehand!
- Course materials (slides, exercises etc) will continue to be available from ARCHER2 website
  - archived on ARCHER2 training pages for future reference



# Security of room

- We cannot guarantee that the training venue is secure!
- We advise that you take your laptops and valuables with you during any breaks, e.g. over lunch time.

# Code of Conduct

<https://www.archer2.ac.uk/about/policies/code-of-conduct.html>

- We expect all course trainers and attendees to:
  - Use welcoming and inclusive language
  - Be respectful of different viewpoints and experiences
  - Gracefully accept constructive criticism
  - Focus on what is best for the community
  - Show courtesy and respect towards other community members
- See web page for full details and incident reporting form



# Funding calls

- Embedded CSE support
  - Through a series of regular calls, Embedded CSE (eCSE) support provides funding to the ARCHER2 user community to develop software in a sustainable manner to improve research on the ARCHER2 service. The funding allows the employment of a Research Software Engineer (RSE) to carry out software development of ARCHER2 software.
- See <https://www.archer2.ac.uk/ecse/> for details





# ARCHER2 hardware / software setup

- 5,860 nodes each with 128 AMD CPU-cores
  - made up of 2x64-Core AMD multicore processors
  - more than 750,000 CPU-cores!
- Batch access via SLURM: sbatch, squeue, ...
- Two file systems – you have two directories:
  - /home/project/project/username
  - /work/project/project/username
- You must run all parallel jobs from /work/
  - I recommend you “cd” straight there every time you log in
- If required, reserved queues each day for fast turnaround





PARTNERSHIP FOR ADVANCED COMPUTING IN EUROPE

# The Partnership for Advanced Computing in Europe | PRACE

## EPCC's PRACE Training Centre

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PARTNERSHIP FOR ADVANCED COMPUTING IN EUROPE

# PRACE | 26 members

(UK represented by EPCC on behalf of UKRI)

## Hosting Members

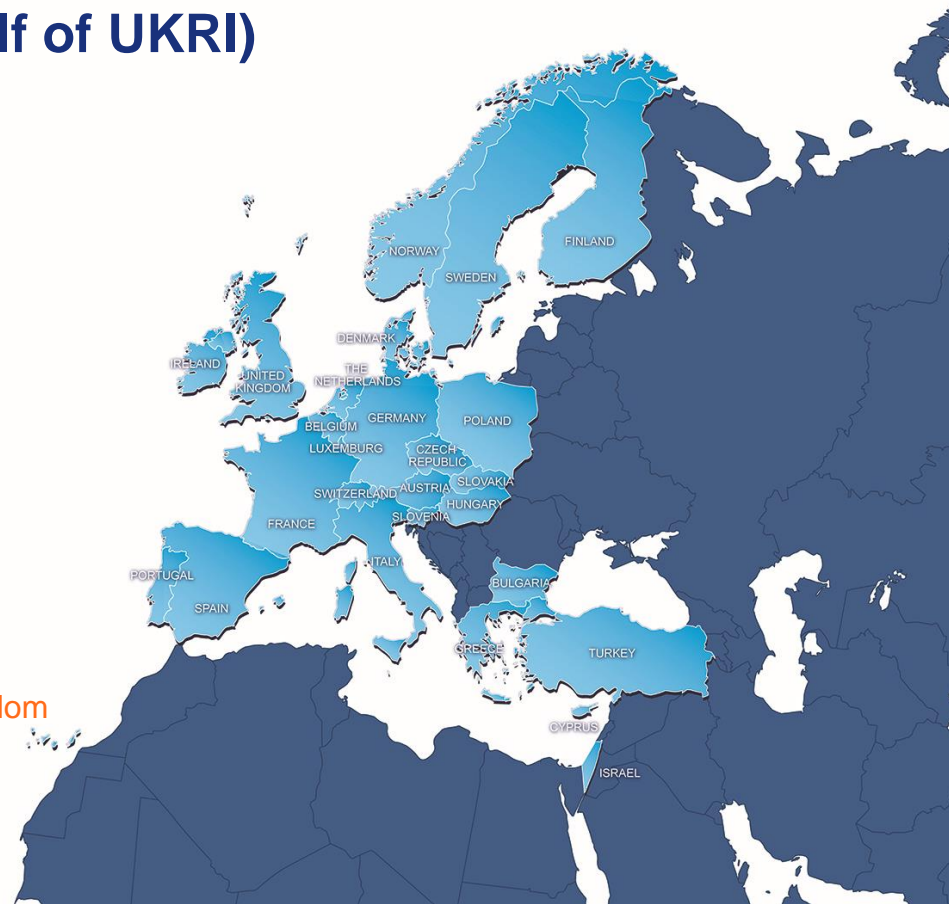
- ▶ France
- ▶ Germany
- ▶ Italy
- ▶ Spain
- ▶ Switzerland

## General Partners (PRACE 2)

- ▶ Austria
- ▶ Belgium
- ▶ Bulgaria
- ▶ Cyprus
- ▶ Czech Republic
- ▶ Denmark
- ▶ Finland
- ▶ Greece
- ▶ Hungary
- ▶ Ireland
- ▶ Israel
- ▶ Luxembourg
- ▶ Netherlands
- ▶ Norway
- ▶ Poland
- ▶ Portugal
- ▶ Slovakia
- ▶ Slovenia
- ▶ Sweden
- ▶ Turkey
- ▶ United Kingdom

## Observers

- ▶ Croatia
- ▶ Romania





PARTNERSHIP FOR ADVANCED COMPUTING IN EUROPE

# PRACE | 10 Training Centres (PTCs)

- ▶ Hubs for world-class HPC training for researchers in Europe: [www.training.prace-ri.eu](http://www.training.prace-ri.eu)
  - ▶ Barcelona Supercomputing Center (Spain)
  - ▶ CINECA - Consorzio Interuniversitario (Italy)
  - ▶ CSC - IT Center for Science Ltd (Finland)
  - ▶ EPCC at the University of Edinburgh (UK)
  - ▶ Gauss Centre for Supercomputing (Germany)
  - ▶ GRNET (Greece)
  - ▶ ICHEC (Ireland)
  - ▶ IT4I (Czech Republic)
  - ▶ Maison de la Simulation (France)
  - ▶ SURFsara (Netherlands)





PARTNERSHIP FOR ADVANCED COMPUTING IN EUROPE

# PRACE | Courses

- ▶ PRACE funds delivery for PTC courses
- ▶ Upcoming courses (at EPCC and throughout Europe)
  - ▶ [www.archer2.ac.uk/training/](http://www.archer2.ac.uk/training/)
  - ▶ [www.training.prace-ri.eu](http://www.training.prace-ri.eu)
- ▶ Please fill in the course feedback form!
  - ▶ linked in from PRACE course page (where you initially registered)
  - ▶ you will also receive reminder emails containing the link

# Timetable – Day 1

- 10:00 - Registration and check installations
- 10:15 - L01: Introduction
- 11:15 - Break
- 11:30 - L02: NumPy
- 13:00 - Lunch
- 14:00 - L03: Matplotlib
- 15:30 - Break
- 16:00 - Exercises
- 17:00 - End

# Timetable – Day 2

- 10:00 - L04: SciPy
- 11:00 - Break
- 11:30 - L05: Fortran/C Interfaces
- 13:00 - Lunch
- 14:00 - L06: Parallel processing and mpi4py
  - ARCHER2 Exercise
- 15:30 - Break
- 15:45 - L07: Parallel processing and Dask
  - ARCHER2 Exercise
- 17.00 - End

# I hope you enjoy the course



- ... and *please ask questions!*