

IRIS Collaboration meeting Smarter Systems: Welcome

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DiRAC
High Performance
Computing Facility



Welcome and Thanks!

- Thanks for coming
- Special thanks to Jo, Deniza, Georgina, Dorothy

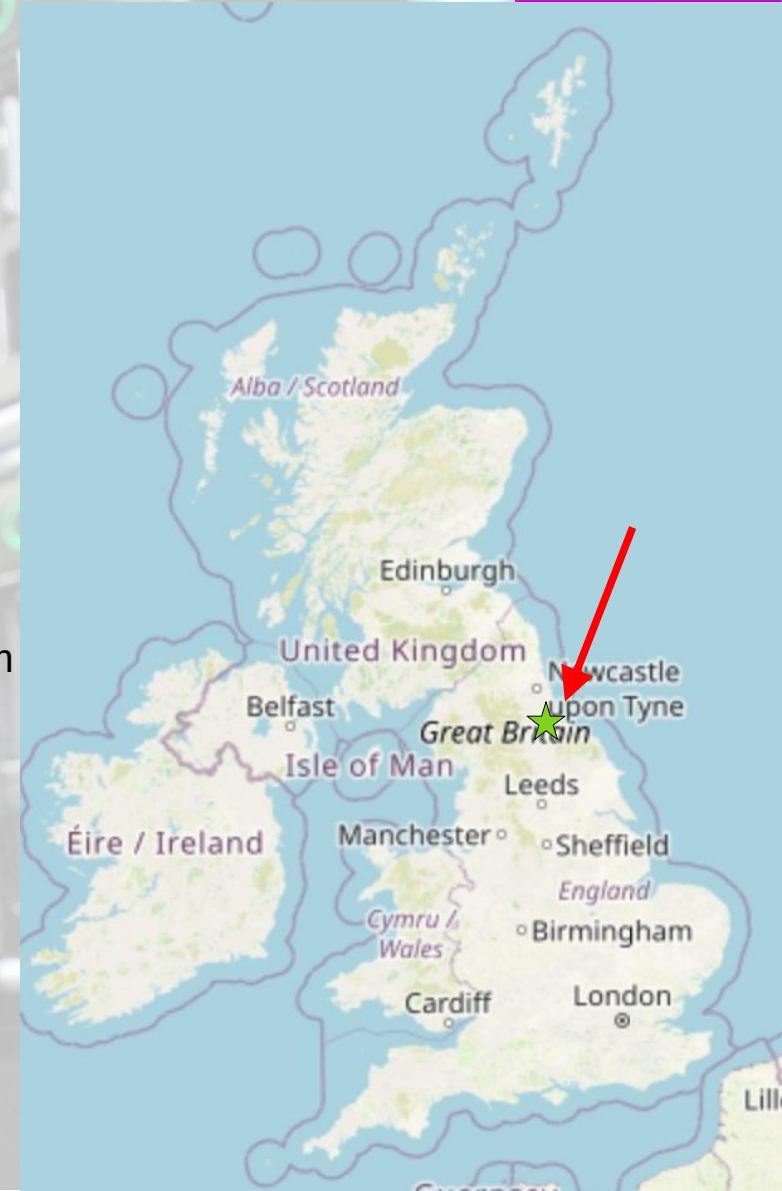
Durham County

- Bounded by Northumberland, Tyne and Wear, North Yorkshire and Cumbria
- 870,000 people
- Has a coast
- North Pennines AONB
- 200 years of public steam railway
- Highest point: Mickel Fell, 788m
- Plenty of history
 - Castles, palaces, forts, Beamish, etc
- Great place for a holiday!



Durham City

- 50,000 people
- Founded in 995
- On the river Wear
- A Reform local council
- On the river Wear
- Historically known for manufacture of mustard(!)
- Hosts the largest socialist trade union event in the world: Durham Miners' Gala
- On the river Wear
- Record high of 36.9°
- Higher than average sun, lower than average rain
- Twinned with Durham, Durham and Durham, US



Durham: A Top-100 University

- Founded in 1832: Collegiate
 - Third oldest university in England
 - UK's first World Heritage site
 - Including Durham Castle (C11)
 - In the QS World Top 100 every year since 2010
 - Top 5 nationally (Times, Complete)
- 640 acre estate, £850m insurance reinstatement (2014)
- Russel group, N8, etc
- 17k undergrads, 4.5k postgrads





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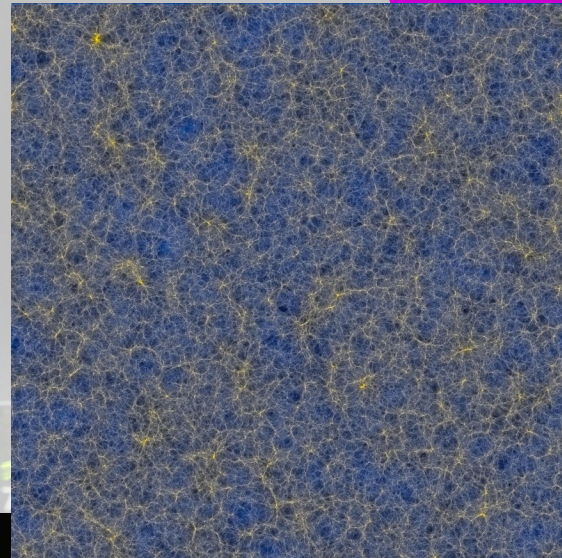
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Durham Physics

- 2nd in the UK (Guardian)
- Research includes:
 - Astronomy, cosmology
 - Instrumentation
 - Condensed matter
 - Quantum light and matter
 - Particle physics
 - Physics education and scholarship

The Institute for Computational Cosmology

- Founded 2002
- A leading institute for cosmology
 - 60+ researchers
- Lead for the Virgo consortium
- Host for the COSMA HPC facility



The COSmology MACHine

- Now in it's 8th generation
 - COSMA5, 7 and 8 are operational
- The DiRAC Memory Intensive service
 - Focus on high RAM workloads
- COSMA8:
 - 528 nodes, 67k cores, 0.5PB RAM
 - 128 cores/node, 1TB
 - 20PB storage, 1.5PB fast NVMe storage, 200Gb non-blocking network fabric
 - ~30PB tape storage



HPC Hardware Lab

- A facility offering UK-wide access to cutting-edge technologies
 - CPUs, GPU
 - Network, storage
 - Composability
 - Net-zero technologies

Coming soon

- Azimuth cloud
 - portal.azimuth.cosma.dur.ac.uk
 - Rome and Turin servers
 - RTX6000 GPUs
- COSMA5 replacement
 - 256-core 1.5TB RAM nodes

DiRAC

- One of STFC's other compute providers
 - Provides some compute to IRIS
- Want to know more? Ask someone at lunch!

Net-zero Durham

- Council have declared a climate emergency
- University aiming for net-zero by 2035
 - Decarbonisation of heating is problematic
 - HPC produces heat - investigation into inter-seasonal heat storage
 - The ICHS project: flooded mines
 - Solar panels: £1m DiRAC installation
- North East has the lowest average carbon intensity of UK regions
- Wide-ranging Durham Energy Institute
 - Research into various low-carbon technologies

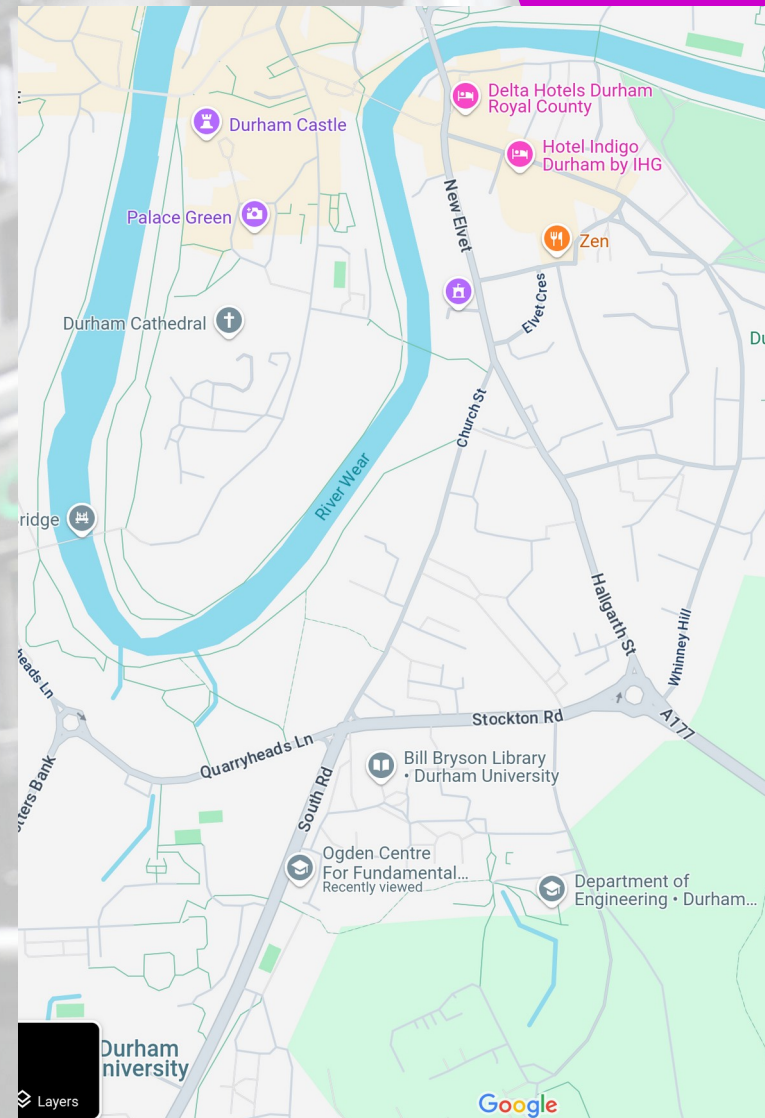


Data centre tour

- <https://virgodb.cosma.dur.ac.uk/public/agb/videos/cosmaMinecraft.ogv>
- And this evening

Logistics

- Lunch: 1st floor
- Toilets: all floors
 - No lighting on first floor!
- Fire alarms: probably a practice
- Data centre: 300m
- Dinner @ St John's: 0.7m
- Nearest pub - Victoria Inn: 0.4m



Facts!

- The sanctuary knocker on the cathedral door granted fugitives 37 days of sanctuary
- Charles Dickens stayed in the town of Barnard Castle (of eye-test fame) collecting material for Nicholas Nickleby
- The Bowes museum hosts a 250 year old Silver Swan automaton
- The Durham Regatta predates Henley
- The World's oldest surviving railway bridge, Causey Arch dates from 1725 (100 years prior to the oldest public steam railway!)
- The first football world cup was won by West Auckland in 1909
- The Bishop of Durham had the right to raise an army, collect taxes and mint coins