DiRAC Day Technical Programme

Welcome!

Alastair Basden
DiRAC / Durham University

Durham University
Institute for Computational Cosmology

DiRAC
High Performance Computing Facility

Agenda

- 12:15 - Now!
- 13:15 - Lunch break
- 14:15 - Session
- 15:15 - Coffee break
- 15:45 - Session
- 17:00 - Poster prize giving and reception
- 18:00 - End

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The Plan!

- News and UKRI project updates
- 15-minute technical talks
  - Gold sponsors in reverse alphabetical order
    - Vespertec, VDURA, SpectraLogic
    - HPE, Fsas Technologies, DDN
    - Dell, Cornelis
- The DiRAC-4 process
- DiRAC training show case
- Panel session (start thinking of questions)
  - How different will it be in 5 years time? (and any other topics)
  - Silver sponsors and DiRAC team members
- Network+ Federated Compute Services

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Contents

- News
- SHAREing
- CCP-AHC
- ICHS

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News and updates!

- RAC18 – decisions out early 2026
- AI for Science: AIRR compute opportunity
  - 200k+ GPU hours
- Innovator Route: AIRR
  - Up to 150k GPU hours
- Gateway Route: AIRR
  - Up to 10k GPU hours (seedcorn, ongoing)
- NCR calls opening soon

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SHAREing

- National UKRI project
- RTP/RSE training in
  - Performance analysis
  - Optimisation
  - Sustainable computing and infrastructure
- Seeks to foster an ecosystem within which RTPs can design and assess the best software-hardware solutions
  - Pioneer bespoke solutions
- Structured learning and upskilling
- Showcasing innovation

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SHAREing assessment service

- Submit codes for analysis:
  - Is the codebase well suited for accelerated compute?
  - What are likely best-case performance gains?
  - Which compute platforms would be best suited?

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SHAREing training

- Technical and professional skills
  - Including content creation
    - Particular interest in professional skills
    - To aid career paths
- Lobbying for long-term professional development
  - UK-wide hub supporting and enabling RTPs
- https://shareing-dri.github.io/

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CCP-AHC

- A new collaborative community project
  - For the Arts, Humanities and Culture remit
- Potential for collaboration, knowledge transfer, etc

Collaborative
Computational Project
for Arts, Humanities
and Culture

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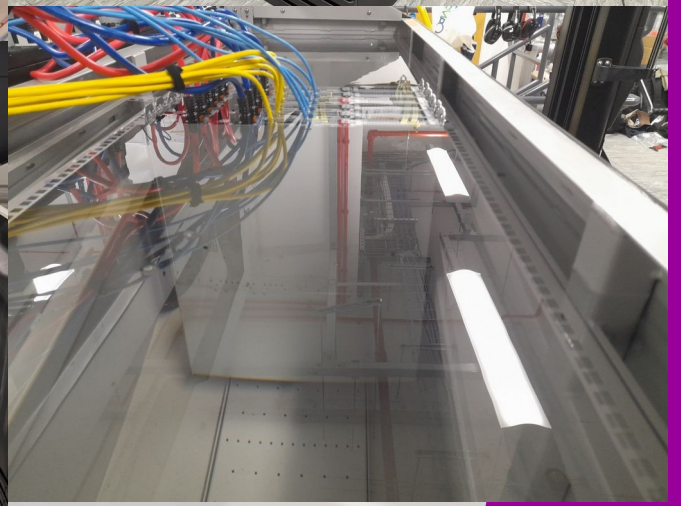
ICHS

- Immersion Cooling and Heat Storage project
  - Durham University
- Two components:
  - Immersion tank deployment and training
  - Inter-seasonal heat storage of waste heat

The Immersion Tank

- A training activity for RTPs
- Come and visit
  - To learn how to use this technology
  - We can fund it*
- Currently hosts COSMA5
  - IRIS hardware coming
- Key benefits:
  - high waste heat temperatures
  - Lower embodied carbon



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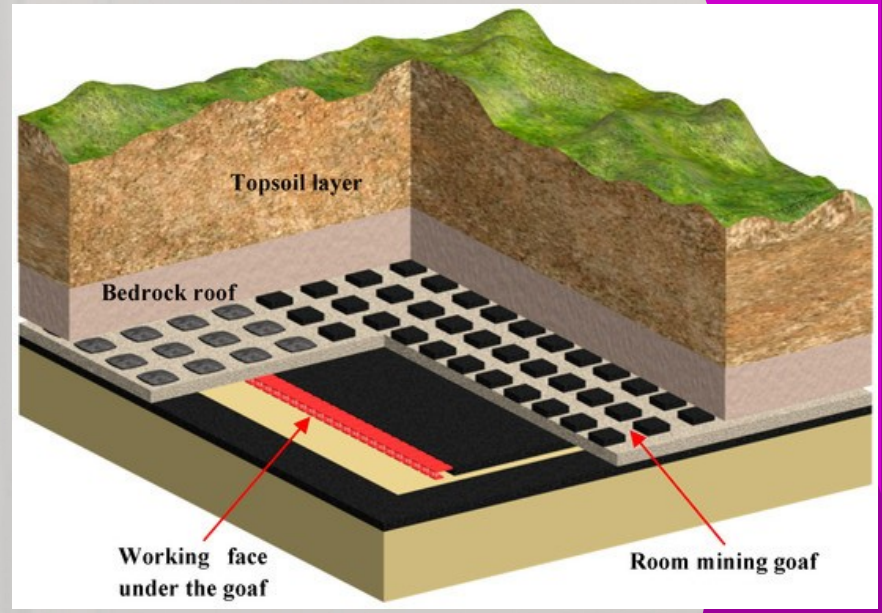
Heat storage

- Durham sits above flooded coal mines
  - These can be used as a heat source for a heat pump
    - Allowing us to heat buildings across campus
  - But the heat will gradually discharge
    - Reducing efficiency (pumping harder)
  - Can we recharge this with data centre waste heat?



Luan et. al, 2019

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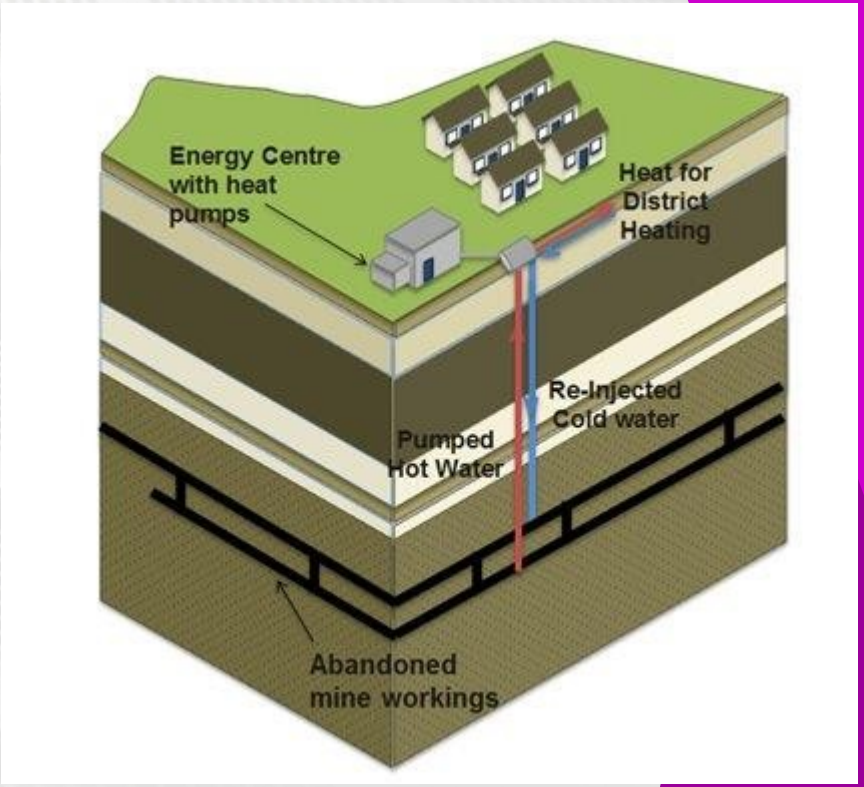
The concept

- Pump heat into the lower seam
- Extract cooling water from the upper seam
- Allow the heat to flow between them
- Reverse the process in the winter to extract the heat
- Current status: Tender to drill has been awarded
  - Watch this space!
  - Note: This is an investigatory prototype



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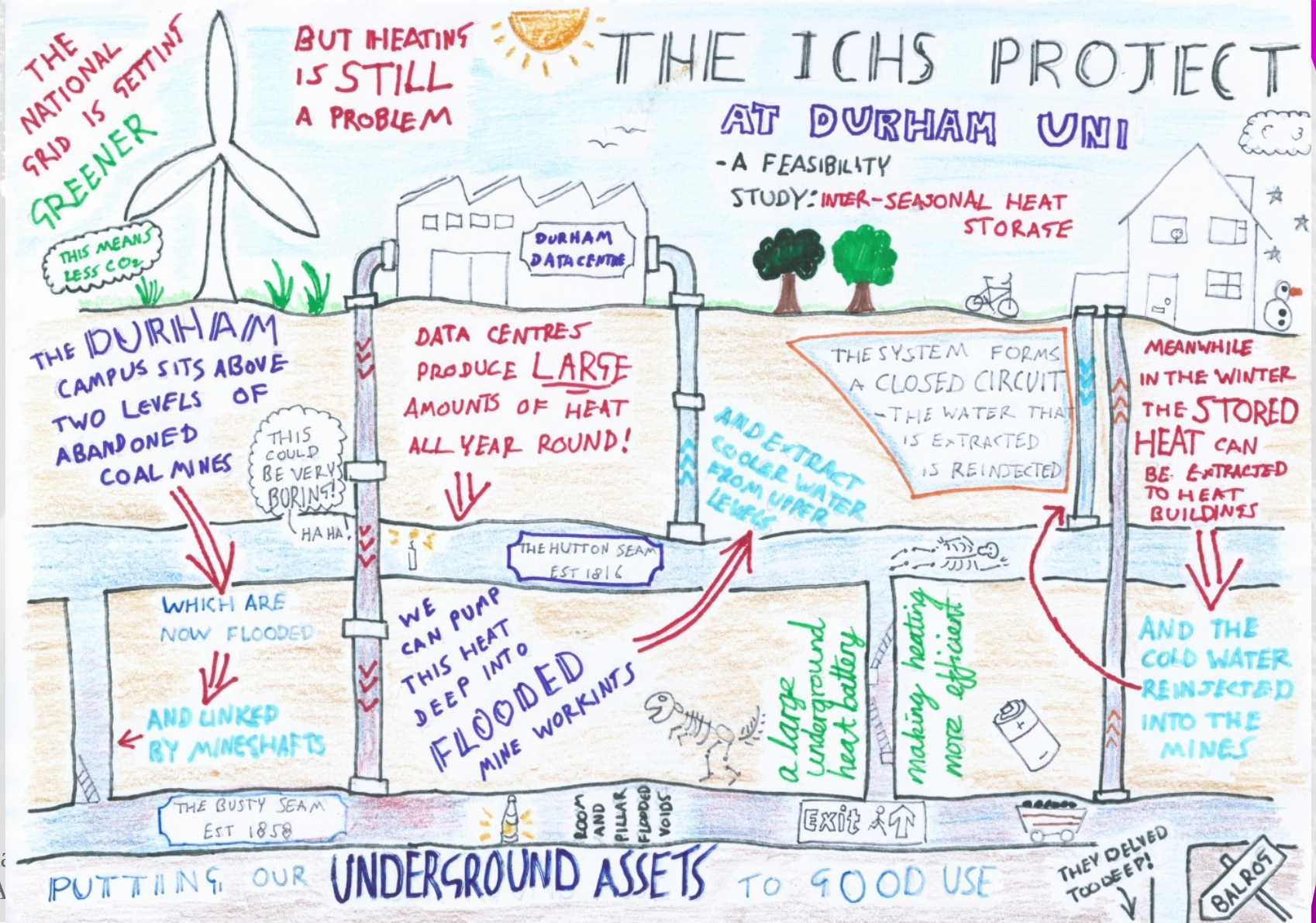
THE NATIONAL GRID IS GETTING GREENER
THIS MEANS LESS CO2
BUT HEATING IS STILL A PROBLEM
THE ICHS PROJECT
AT DURHAM UNI
- A FEASIBILITY STUDY: INTER-SEASONAL HEAT STORAGE
DURHAM DATACENTRE
THE DURHAM CAMPUS SITS ABOVE TWO LEVELS OF ABANDONED COAL MINES
THIS COULD BE VERY BORING! HA HA!
DATA CENTRES PRODUCE LARGE AMOUNTS OF HEAT ALL YEAR ROUND!
AND EXTRACT COOLER WATER FROM UPPER LEVELS
THE SYSTEM FORMS A CLOSED CIRCUIT - THE WATER THAT IS EXTRACTED IS REINJECTED
MEANWHILE IN THE WINTER THE STORED HEAT CAN BE EXTRACTED TO HEAT BUILDINGS
THE HUTTON SEAM EST 1816
WHICH ARE NOW FLOODED
AND LINKED BY MINESHAFTS
WE CAN PUMP THIS HEAT DEEP INTO FLOODED MINE WORKINGS
a large underground heat battery
making heating more efficient
AND THE COLD WATER REINJECTED INTO THE MINES
THE BUSTY SEAM EST 1858
BOOM AND PILLAR FLOODED VOIDS
EXIT
PUTTING OUR UNDERGROUND ASSETS TO GOOD USE
THEY DELVED TOO DEEP!
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Talks...

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Panel session

- 5 years ago…
  - About to go into lockdown (again)
  - LLMs? What are they?
- 5 years time…
  - Where will we be?
  - What will have changed?
- Please ask questions (on this, or any, theme)

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