



UK Research  
and Innovation

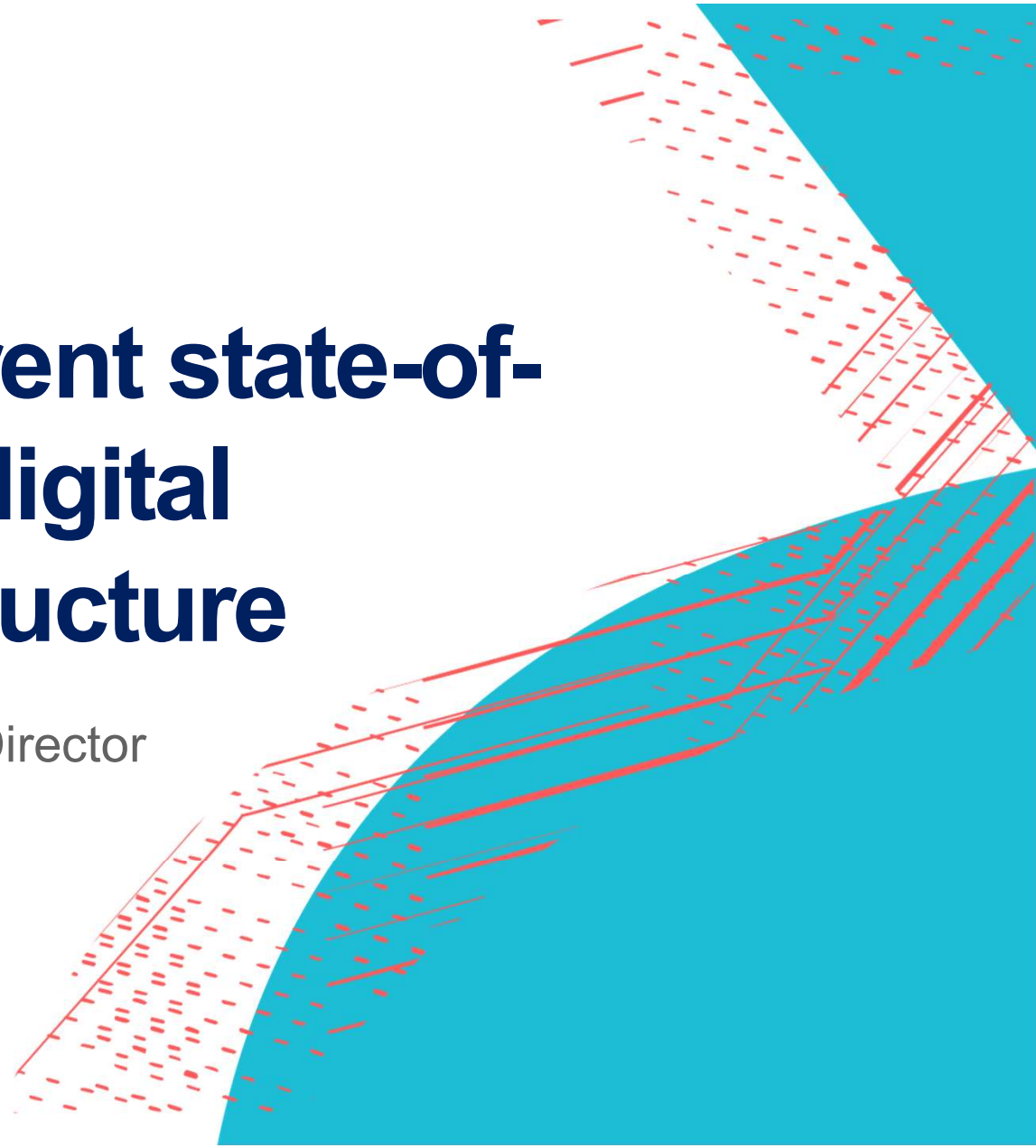
# Towards a coherent state-of-the-art national digital research infrastructure

Richard Gunn, DRI Programme Director

CIUK, Manchester Central  
7 December 2023



UK Research  
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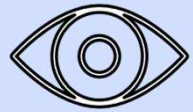
# What I'm going to cover

Since the first DRI Congress in March 2023, we have:

- Been working closely with DSIT on delivering the recommendations of the Future of Compute review.
- Developed our programmatic and governance arrangements, including establishing our independent expert advisory group.
- Developed a portfolio of investments for the second 'ramp up' phase of the DRI programme.

And there will be much more to come in 2024!

# UKRI's vision for Digital Research Infrastructure



## Our Vision

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A coherent state-of-the-art national Digital Research Infrastructure (DRI) that will seamlessly connect researchers and innovators to the computers, data, tools, techniques and skills that underpin the most ambitious and creative research



## Our Approach

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DRI is a system that includes large-scale computing (LSC), data storage, facilities, software, networks, skilled DRI professionals, and other components.

Working with Councils, we will achieve our vision by evolving existing infrastructures to support new communities of practice and, subject to funding, by investing in new capabilities.

# Digital Research Infrastructure

- Long-term planning
- Driven by community requirements
- Environmental sustainability
- Partnership with government and industry
- Five cross-cutting themes



## UKRI's vision for a national Digital Research Infrastructure



Turning data into knowledge  
Catalysing breakthroughs and accelerating innovation and productivity

A foundation to enable UK researchers and innovators to harness the full power of modern digital platforms, tools, techniques and skills:

- A breadth and depth of capabilities and skills
- Seamless connection of communities to data, tools and techniques
- Accelerating productivity by enabling secure and easy access
- A step change in computational power
- Fostering collaboration across disciplines
- New capabilities and new communities of practice
- Environmentally sustainable



### UKRI National Digital Research Infrastructure

**Data infrastructure**

- Storage and archives
- Data stewardship
- Interfaces
- Shared tools and pipelines

**Large-scale computing**

- HTC
- HPC
- Cloud computing
- Heterogenous computing
- Next generation software

**Secure services and tools for sensitive data**

- Trusted research environments
- Privacy-enhancing technology
- Securing trust

**Skills and career pathways**

- Career paths progression
- Training
- Community building
- Knowledge exchange
- Skills access
- Public engagement

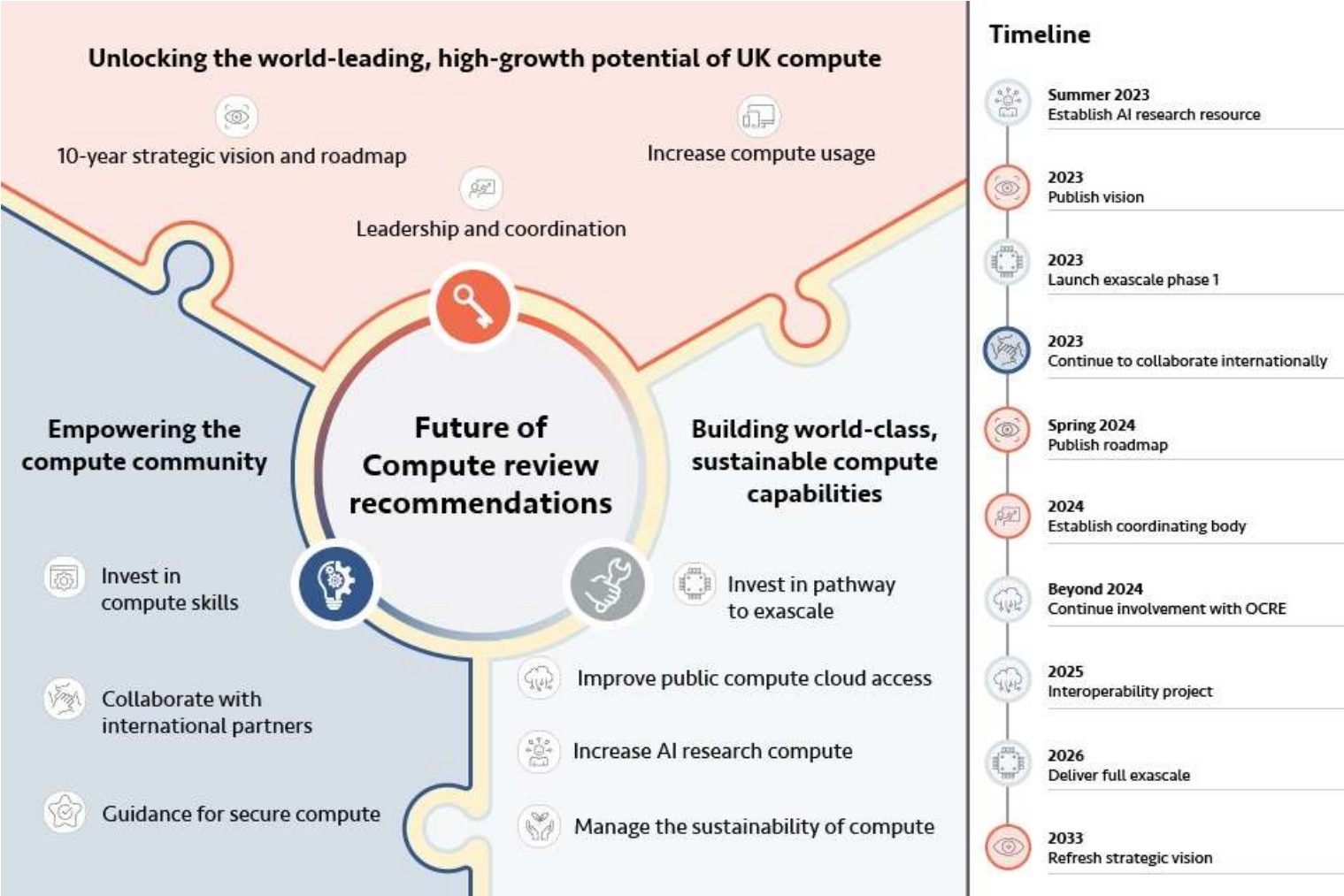
**Foundational tools, techniques and practices**

- Networks
- AAAI
- Administrative processes
- Security
- Software



The inter-dependent themes of the digital ecosystem

# Future of Compute Review





# Delivering the Future of Compute Review Recommendations

- Our priority is to provide appropriate and ambitious compute capabilities reaching out towards exascale and large AI enabled supercomputing investments for UKRI's diverse research and innovation communities.
- We are working closely with DSIT to support £300m investment in the AIRR programme and deliver the governments ambition for AI.
- We are taking a phased approach towards Exascale.



# DRI Projects to Date – First Pilot Phase



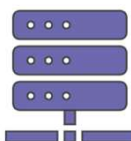
**Scoping studies** to assess the large-scale computing, data infrastructure and software needs across the breadth of UKRI’s communities



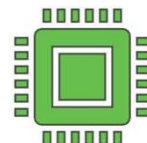
**UKRI Net Zero Digital Research Infrastructure Scoping Project**



**Ada Lovelace Centre**, an integrated, cross-disciplinary data intensive science centre.



The launch of the UK trusted and connected **Data and Analytics Research Environments** programme (DARE UK)



**Digital Research Infrastructure retreat**: a five-day event to help technology specialists to develop additional professional skills



**Report: UKRI JASMINx expansion: User need analysis**

Prepared for UKRI

March 2022

Contributors: Victoria Moody, Tim Chown, Matthew Dovey, James Earl-Fraser, Andy Powell, Jeremy Sharp

With thanks to Robert Allen, David Hartland (Hapsis)



You can find out more on the [UKRI Website](#)

## Slide 7

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**SBU0**

[@Richard Gunn - STFC UKRI] edited this slide - original wording in the speaker notes. Can revert back if you'd prefer

Stephanie Bonehill - UKRI, 2023-12-05T16:10:32.610



# UKRI's Digital Research Infrastructure Programme



## A phased approach...

UKRI secured £129 million for digital infrastructure (profile rising to £70m in year three) of this Spending review (FY22/23 – FY24/25)

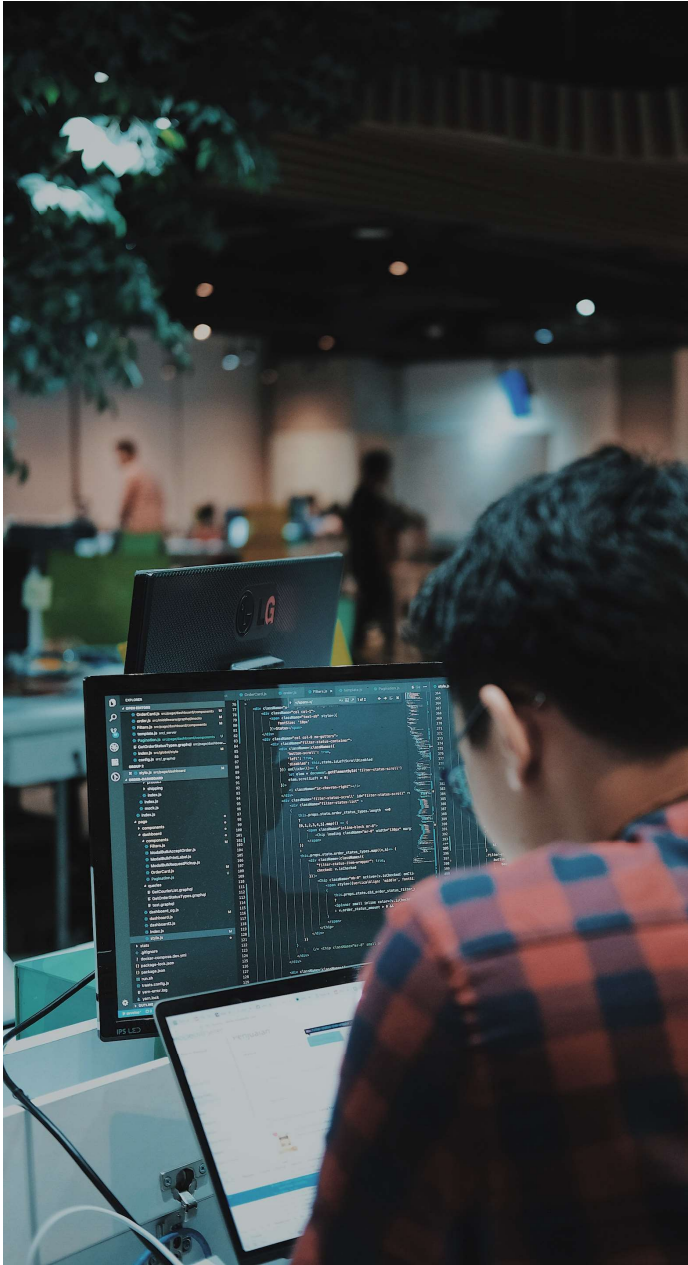
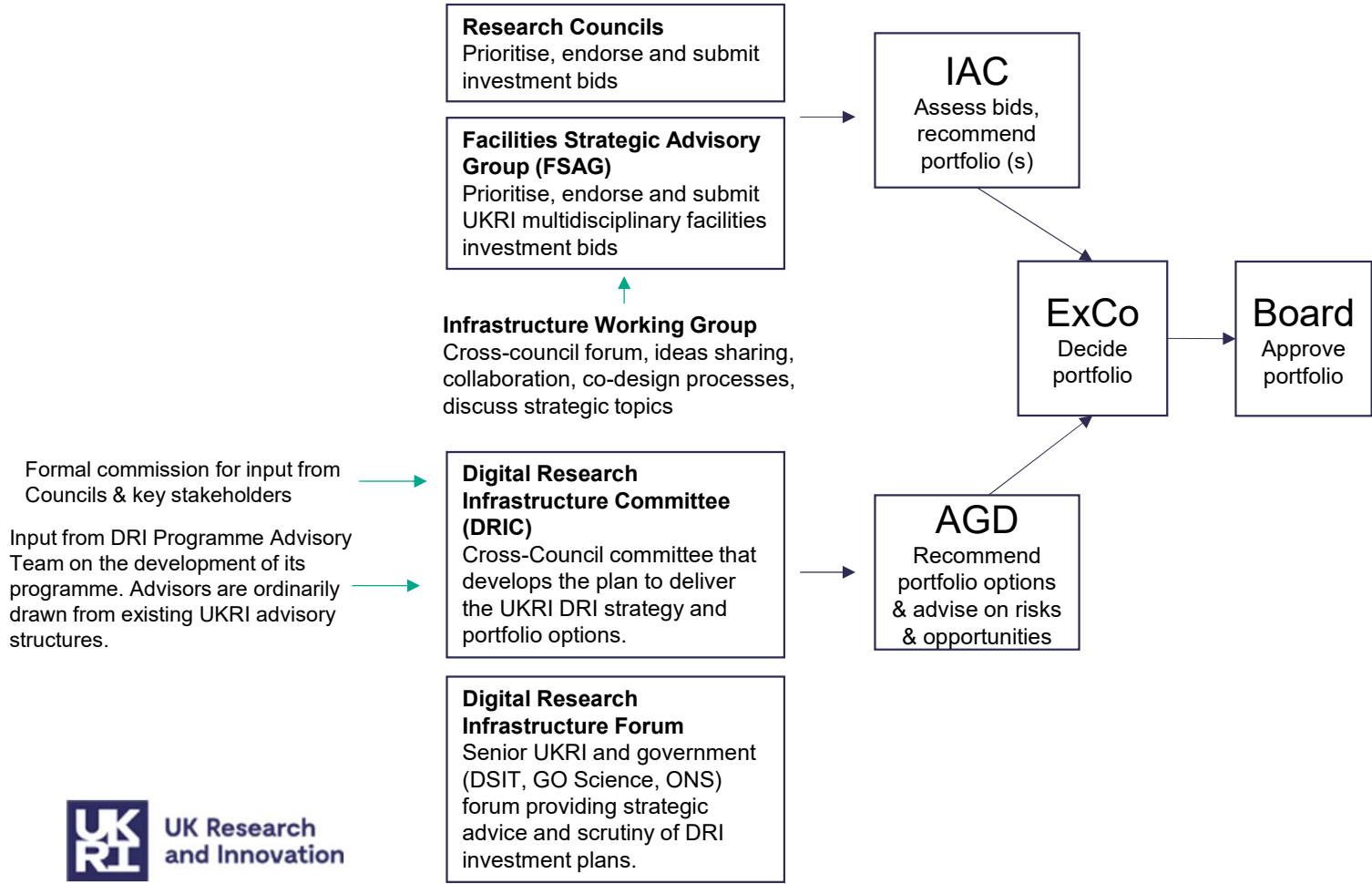
## UKRI DRI Phase 1 (2021-23) – £34 million invested in:

- A portfolio of interventions to enhance our existing digital infrastructures
- Investments in priority areas including Net Zero and Trusted Research Environments
- Scoping activities to assess data and computing requirements in more detail

## UKRI DRI Phase 2 (2023 onwards) :

- Established the Advisory Group for DRI (AGD)
- AGD has made a recommendation for a portfolio of 37 projects.
- Projects will take many forms and will cover all themes of the strategy.

# UKRI Support for Infrastructure

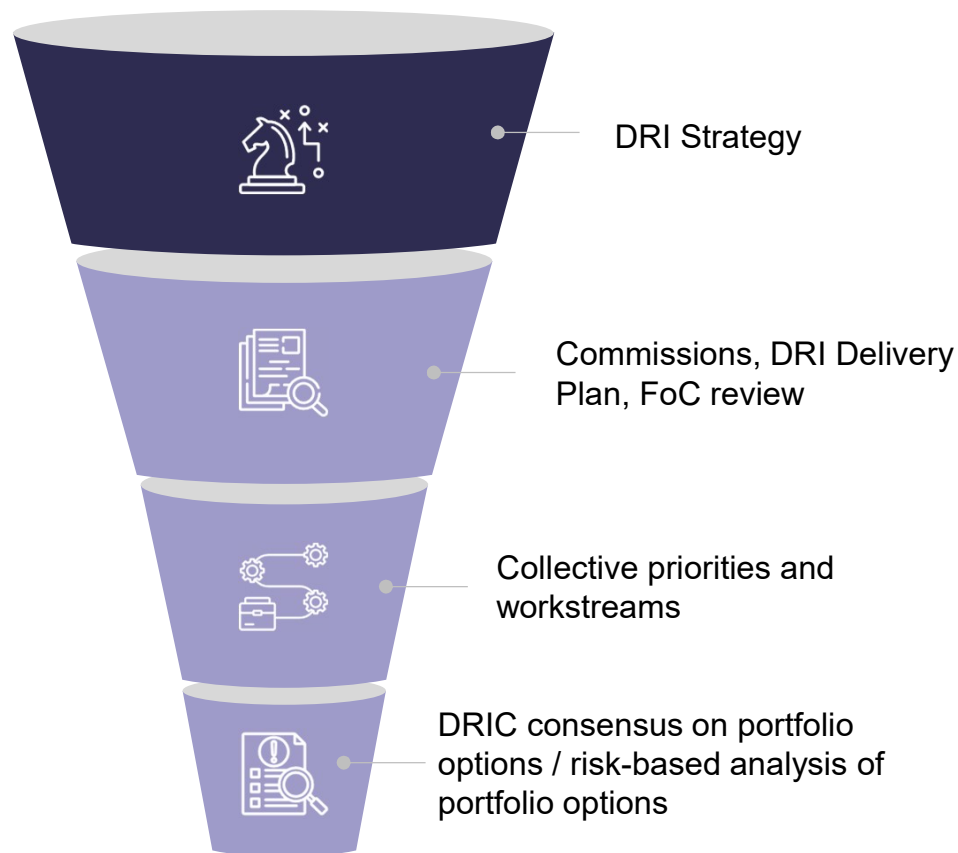


# Advisory Group for DRI (AGD): first cohort of members

- David De Roure, University of Oxford
- Christine Orengo, University College London
- Tom Crick, University of Swansea
- Sian John, NCC Group
- James Fleming, The Francis Crick Institute
- Neil Chue Hong, The University of Edinburgh
- Tony Cass, CERN
- Amanda Brock, Open UK







**Open recruitment for new members coming soon!**

# Phase 2 portfolio Development



- **Council Responses:** Councils have outlined current and planned investments, highlighting their priorities and opportunities for collective investment.
- **Priorities Mapping:** These priorities have been correlated with the DRI Delivery Plan, ensuring alignment and cohesion in the direction of Phase 2.
- **Incorporating Reviews:** Future of Compute review recommendations have been considered, enhancing the effectiveness and relevance of Phase 2 goals.
- **DRIC's Role:** The Digital Research Infrastructure Committee (DRIC) used this extensive evidence to create a series of Strategic Outline Cases under **5 workstreams**
  - DRIC has made progress in developing preferred options and addressing delivery risks, while also assessing and mitigating associated risks.
  - The Exascale, AIRR, and Research Cloud Pilot projects are being implemented under the DRI governance structure with the involvement of DSIT, running concurrently with the aforementioned DRIC activities.

# Priorities for collective investment

Theme	1 Data Infrastructure	2 LSC	3 Sensitive data	4 Skills	5 Foundational tools
 <p>Councils' highest priorities for collective investment in Phase 2 (2023-2025)</p> <p>Ranked by Council vote, &gt;3 votes included</p> <p>Priorities don't always map neatly on to strategic themes!</p>	 <ol style="list-style-type: none"> <li>1. Coordination/ overarching network</li> <li>2. Federation</li> <li>3. Data standards/ management/ curation</li> <li>4. Data policy and governance</li> <li>5. Mapping data infrastructures</li> </ol>	 <ol style="list-style-type: none"> <li>1. Access to LSC (e.g., for new communities)</li> <li>2. Move towards a national system/ scoping future requirements</li> <li>3. Maximising current investments</li> </ol>	 <ol style="list-style-type: none"> <li>1. Priorities for this theme tended to be included in 'Data Infrastructure' more broadly</li> </ol>	 <ol style="list-style-type: none"> <li>1. Training</li> <li>2. Knowledge exchange/ community building</li> <li>3. Technical 'pools'/ 'ambassadors' to work with researchers</li> <li>4. Career pathways</li> </ol> <p>Note: General agreement with skills working group here</p>	 <ol style="list-style-type: none"> <li>1. Software activities (software as infrastructure, and development of future software)</li> </ol>
<p style="text-align: center;"><b>Cross-cutting: Net zero, interdisciplinary working</b></p>					



# UKRI Digital Infrastructure Phase 2 Portfolio



## Federated Data Services

To deliver aspects of the DRI strategy relating to data infrastructure and implementation of FAIR.

Total for this SR  
**£38.1M**

Indicative forward profile  
**£31.6M**



## National Computational Research Services

Ensuring the UK has the compute services to facilitate the ambitions of our R&I community.

Total for this SR  
**£23M**

Indicative forward profile  
**£16M**



## Software for future Large-scale compute

Creation of a mission-led software programme for large-scale accelerated computing.

Total for this SR  
**£8.5M**

Indicative forward profile  
**£13.5M**



## Supporting DRI Professionals

Ensuring the UK has the skills base to deliver effective world-leading research and innovation.

Total for this SR  
**£12.2M**

Indicative forward profile  
**£21.5M**



## Software, Networks, Security and Net Zero

Secure access and connectivity, and software as an infrastructure and UKRI net zero ambitions.

Total for this SR  
**£11M**

Indicative forward profile  
**£18.2M**

# Case Studies



## Federated Data Services

Expanded support for 6 data infrastructures, including:

**iDAH** – a national infrastructure for digital innovation and curation for arts and humanities - £3.3M

**BioFAIR**: A BioCommons infrastructure for UK life science researchers - £10.8M



## National Computational Research Services



Transitioning UKRI's Council-focused compute services to 'UKRI National Computational Research Services' to unify hardware, operations, and service provision to serve all of UKRI's communities of practice - £21M.

## Enabling Software, Networks, Security and net zero



Establishing authentication, authorization and accounting Infrastructure (AAAI) - £5.9M

Building a cybersecurity community - £0.9M

# Case Studies Continued



## Calls for funding & uplifts

Support for DRI Professional workstream – in 2024 there will be an open call for networking activities of digital Research Technical Professionals - £10M over 4 years  
Enabling Software, Networks, Security and net zero workstream – in 2024 there will be an open call for a Net Zero DRI Coordinator, who will build connectivity across disciplines and coordinate the development of an application to a future funding opportunity supporting a net zero DRI network - £3M over 4 years.



## Funding for software



Software for large-scale compute: building on ExCALIBUR, funding for knowledge exchange, RTP hubs, pathfinder projects, and code porting - £22M.  
Enabling Software, Networks, Security and net zero workstream: Piloting approaches for funding software development and maintenance £5.7M.

## Federated Data Services



Four cross-cutting projects to reduce silos and explore opportunities for improved data access, data discovery, and federation - £16.1M

# More to come in 2024!

- We will engage across a diverse range of current and potential user communities across UKRI's communities of practice on future compute requirements.
- We will explore the development of a 'statement of requirements' process to contribute ideas for the development of our DRI and recruit a further cohort of AGD members.
- We will develop new activities to expand our support for software and skills.
- We will increase the visibility of UK involvement in relevant international initiatives and organisations.



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# Thank you



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# How do we foster a productive compute ecosystem for the benefit of all users, existing and potential?

Sadaf Alam, University of Bristol

Chris Coates, Logicalis

Victoria Moody, Jisc

Tobias Weinzierl, Durham University

