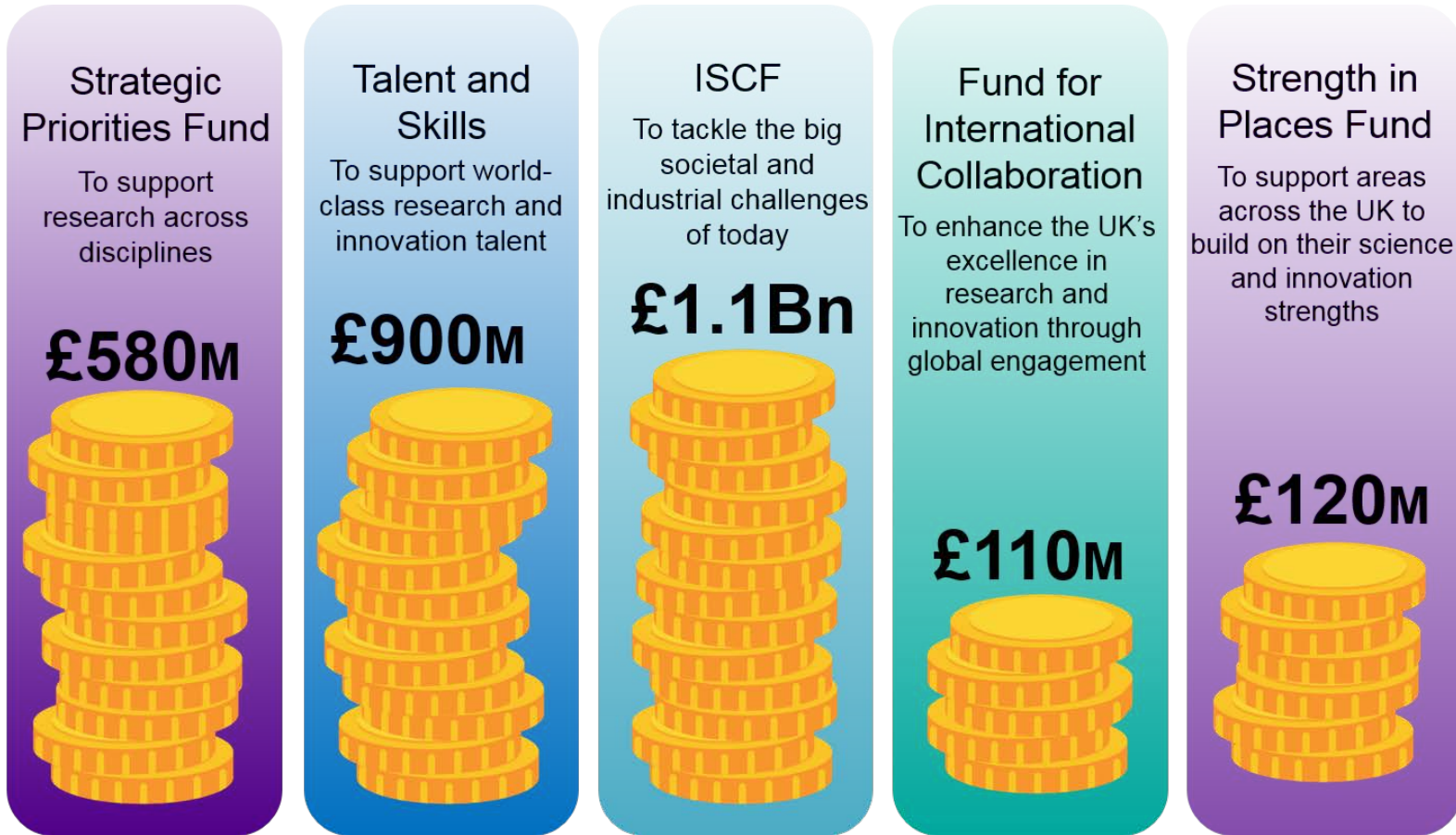# Overview

1. Explaining the context, vision and importance of the Strategic Priorities Fund (SPF) and the ExCALIBUR programme.

2. Explaining the structure of the programme and planned activities.

3. Sharing and discussing opportunities for the RSE community to get involved.

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Strategic Priorities Fund (SPF)

Established in 2018 and led by UKRI, the Strategic Priorities Fund (SPF) aims to:

- drive an increase in **high quality multi and interdisciplinary** research and innovation;
- ensure that UKRI's investment **links up effectively with government** research and innovation priorities and opportunities; and
- ensure that the system **responds to strategic priorities and opportunities**.

SPF builds on Sir Paul Nurse's vision of a 'common fund', to support high quality multidisciplinary and interdisciplinary research programmes, which could have otherwise been missed through traditional funding channels.

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Strategic Priorities Fund (SPF)

- The SPF portfolio consists of 34 programmes with a combined total investment of around £830m, funded in two 'waves'.

- ExCALIBUR (Exascale Computing Algorithms and Infrastructures Benefitting UK Research) was awarded £45.7m of SPF funding in 2019.

- ExCALIBUR is a partnership between the UKRI Councils and Public Sector Research Establishments (PSREs) – led by EPSRC and the Met Office respectively – to harness the power of exascale HPC.

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Programme structure

The ExCALIBUR approach

Efficiency **Capability** **Expertise**
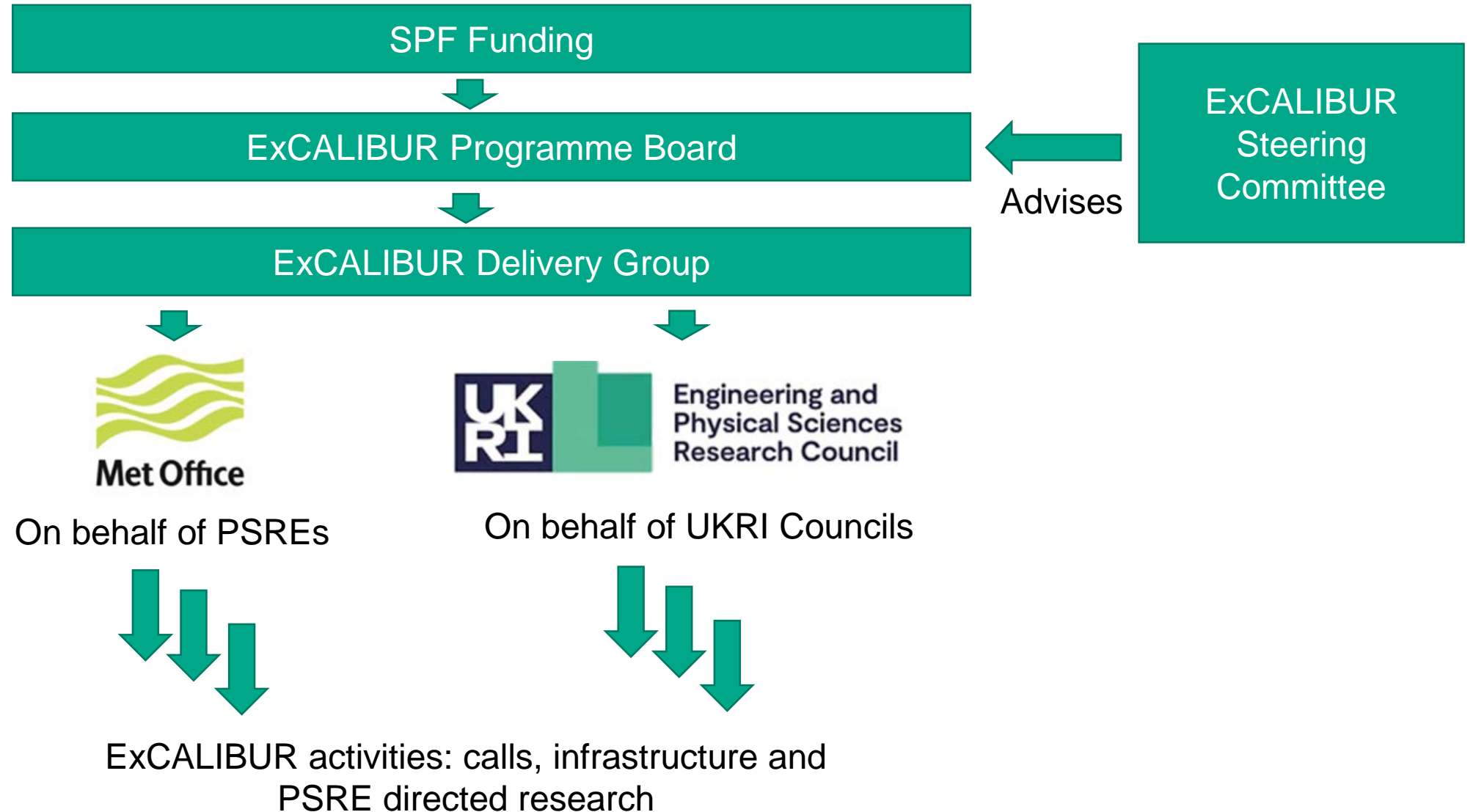
Separation of Concerns: the maths of problem is separated from the computer science of implementation

Co-design: holistic, collaborative system design by mathematicians, domain scientists and computer scientists

Data Science: new workflows to manage and analyse vast volumes of simulation data

Investing in People: interdisciplinary RSE career development driven by forward-looking scientific software design

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The ExCALIBUR approach

Efficiency	International academic research sees benefits through increased efficiencies in supercomputing enabling increased scientific output.
	Public and Government services that rely on high-performance simulations, e.g. weather forecasts, benefit from continued and improved services.
Capability	Academia and Industry using high-performance simulation codes see benefit through the implementation of the framework across disciplines which bring a step-change in capability.
	The Government sees benefit through the positioning of the UK as world-leaders in implementation and use of exascale supercomputing.
	UK plc sees benefits through transformational changes in capability in fields such as fusion modelling.
Expertise	Academic research and Industry will benefit from an interdisciplinary, agile RSE work force and an increase in two-way flow within and between academic and industry.
	UK plc will see benefit from an increase in productivity related to an increase in skilled RSE workforce.

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Programme delivery
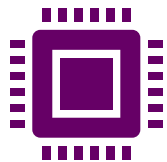
RSE Knowledge Integration (~£750k, yrs 1-5)

High Priority Use Cases (~£26m, yrs 1-5)

Emerging Requirements for High Performance Algorithms (~£3m, yrs 2-3)

Cross-cutting Research (~£10m, yrs 2-5)

Hardware and Enabling Software (~£4.5m yrs 1-5)

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RSE Knowledge Integration

- Grow and Develop a multidisciplinary cohort of research software engineers (RSE's) who in collaboration with researchers will take on the fast-moving challenges in evolving supercomputer design.

- Build an evolving training curriculum to support the development of existing and new RSE's to meet the skills-gap arising from the changing demands of industry and academia.

- Provide a net outflow of highly-skilled workers into the UK economy

- RSE career development – create a new, forward-facing, interdisciplinary approach.

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High Priority Use Cases

- UKRI defines a 'high priority use case' as having the following features:

    - Enabling high quality, high impact research in multiple areas of strategic importance;

    - Providing a step-change in simulation performance and/or provide solutions that are not currently feasible, consistent with the enhanced performance of exascale computing;

    - Applicable and scalable solutions that can be applied across a range of architectures, including non-exascale systems;

    - Providing a national and international focal point for the relevant research communities, including the development of partnerships with complementary initiatives in the UK and internationally.

High Priority Use Cases

- UKRI Use Case activities span the breadth of UKRI's remit.

- Met Office and UKAEA Use Cases are directed to weather & climate prediction and fusion modelling respectively.

- Initial UKRI ('Design and Development Working Groups', ~£2.5m) and Met Office activities launched in April 2020.

- Phases 2 (~£7.5m, Jul 21 – Apr 25) and 3 (~£4m, Apr 22 – Apr 25) of the UKRI Working Groups activity will provide further funding opportunities.

- A range of community engagement activities will take place over the coming months.

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