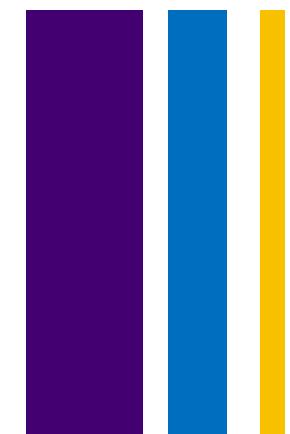




The University of Edinburgh

Dr Amanda Chmura, Associate Director, EPSRC

Wednesday 21st March 2018

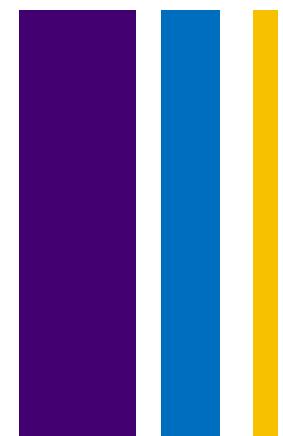


- Transition to UK Research and Innovation (UKRI)
- The Industrial Strategy and the Industrial Strategy Challenge Fund
- EPSRC's Delivery Plan: Progress and Next Steps
- Centres for Doctoral Training





Transition to UK Research and Innovation (UKRI)



Transition to UKRI: drivers for the creation of UKRI

- **Greater strategic vision** for UK science
- Providing a **stronger voice** into Government in support of UK science
- Creating greater space for individual Research Councils to put **more effort into science** (and less into back-office)
- Enabling **greater co-ordination** including for interdisciplinary research
- Improved **policy for science** and improved **science for policy**

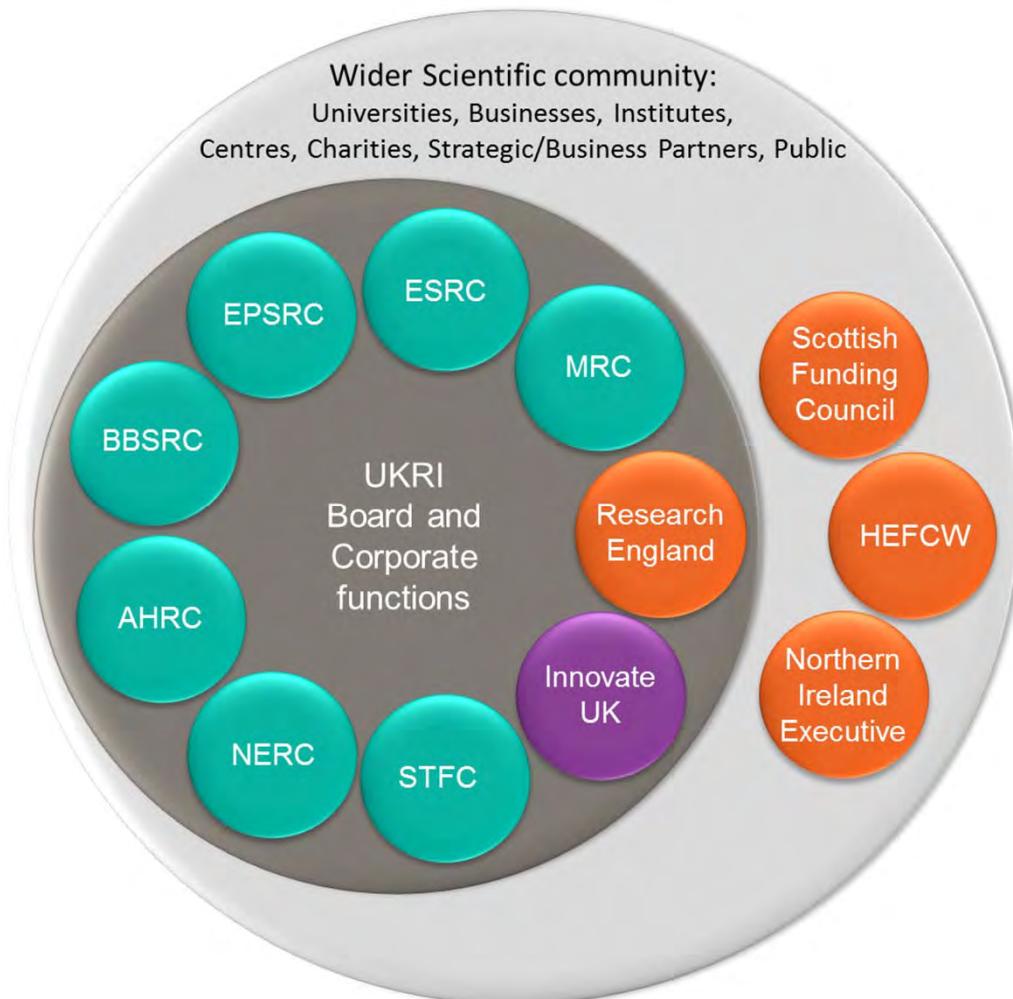
DRIVERS
FOR
UKRI



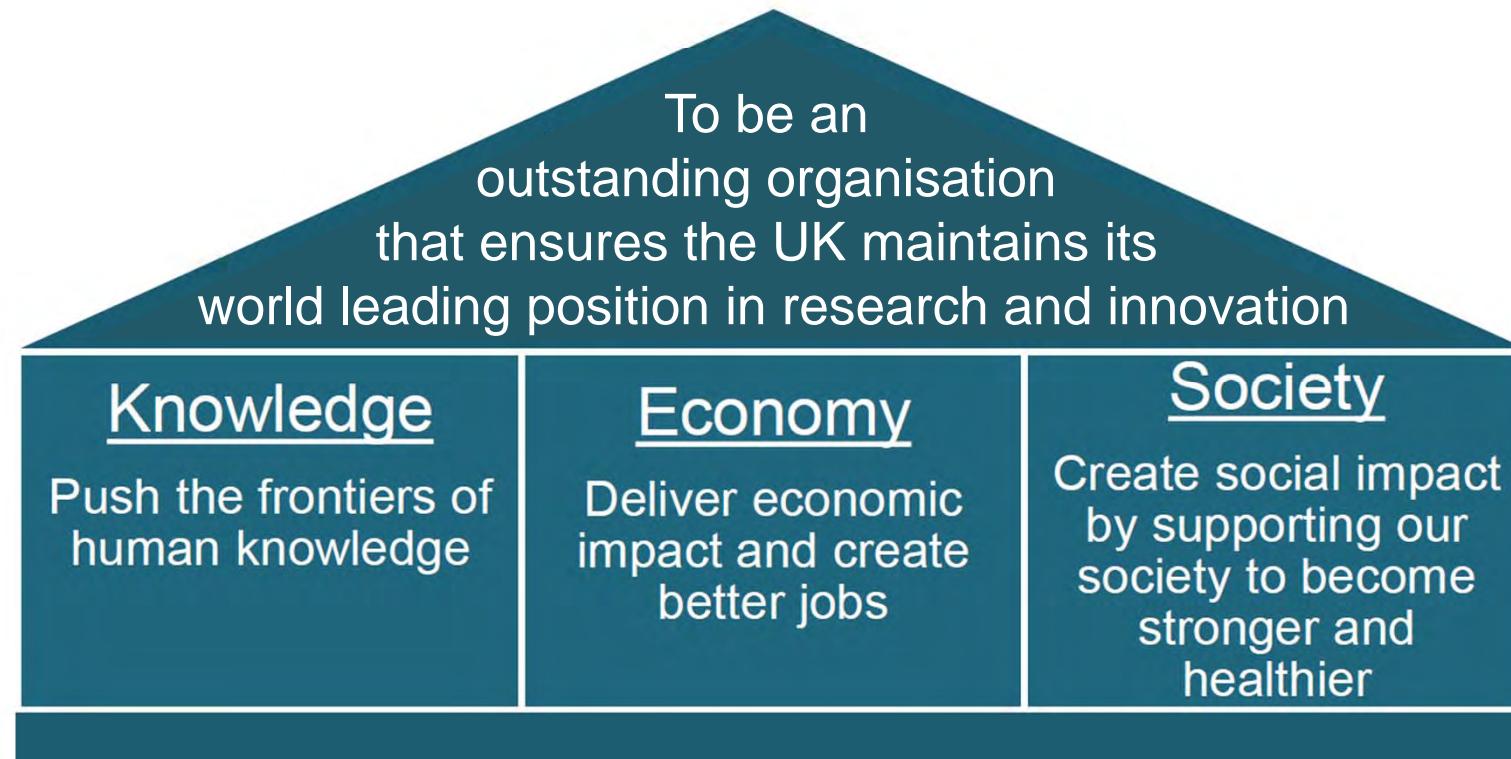
Transition to UKRI: UKRI organisation

UK Research and Innovation, launching in April 2018, will be the new funding organisation for research and innovation in the UK.

UKRI brings together the seven **UK Research Councils**, **Innovate UK** and a new organisation, **Research England**, working closely with its partner organisations in the devolved administrations.



Transition to UKRI: EPSRC's role in the changing landscape



EPSRC is well placed, through its core investment in fundamental EPS research and skills, to provide the strong foundation for UKRI

MISSION STATEMENT



Transition to UKRI: collaborative initiatives

EPSRC is contributing to the collaborative initiatives already offered by UKRI



Global Challenges Research Fund (GCRF)

- 5-year £1.5 billion fund
- key component in the delivery of the UK Aid Strategy: tackling global challenges in the national interest.

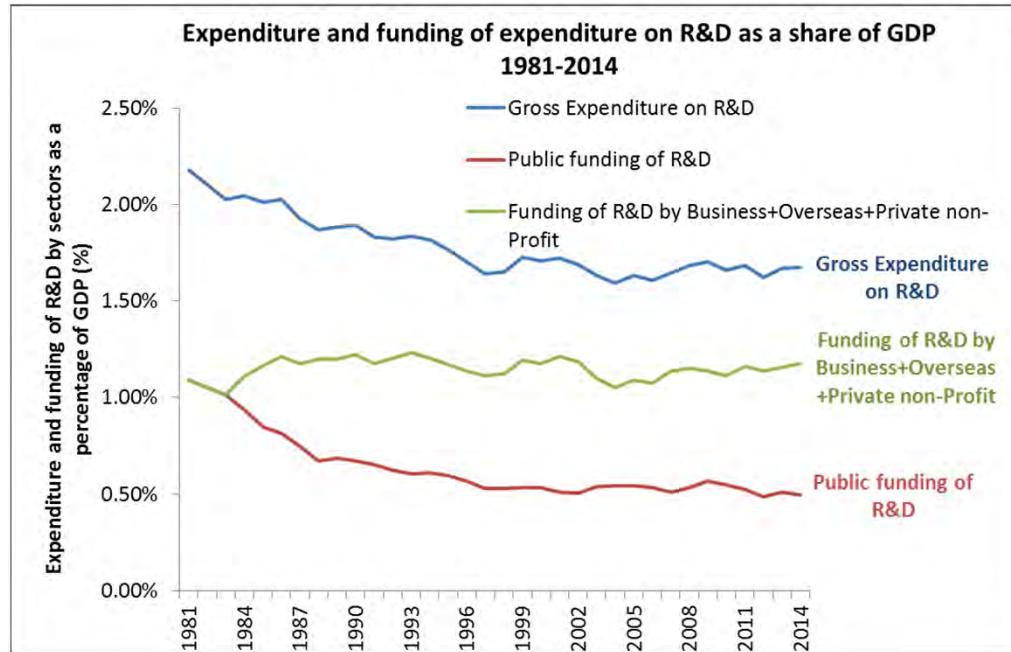


Newton Fund

- £735 million fund
- aim is to develop science and innovation partnerships that promote the economic development and welfare of collaborating countries

R&D SPENDING

Transition to UKRI: research and innovation spending



Source: GERD, ONS, 2014; Source: OECD Main Science and Technology Indicators;

With no additional funding we would expect this percentage to fall in the future. However, with the additional funding announced in the 2016 Autumn statement we estimate the percentage will rise to ~1.75% of GDP by 2020/21

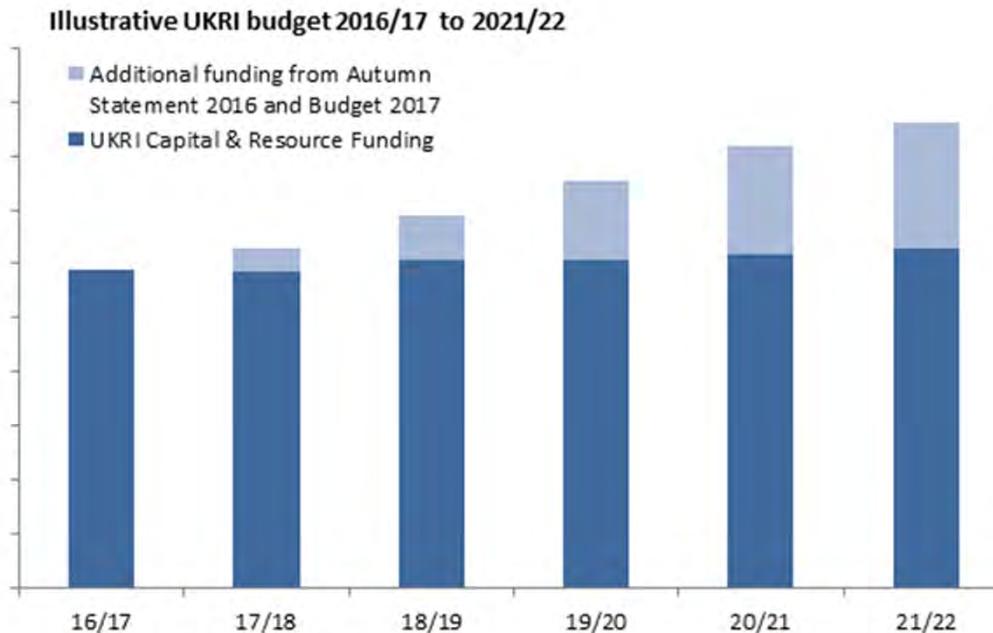
Public (including HE, Research Councils and Government departments) spend on R&D has fallen in recent years to **0.5%** of GDP

After declining through the 80s and 90s, since 1998 the level of R&D expenditure in the UK has fluctuated and in 2014 it was **1.67%** for the second year running.

R & D SPENDING



Transition to UKRI: £4.7 billion more for R&D



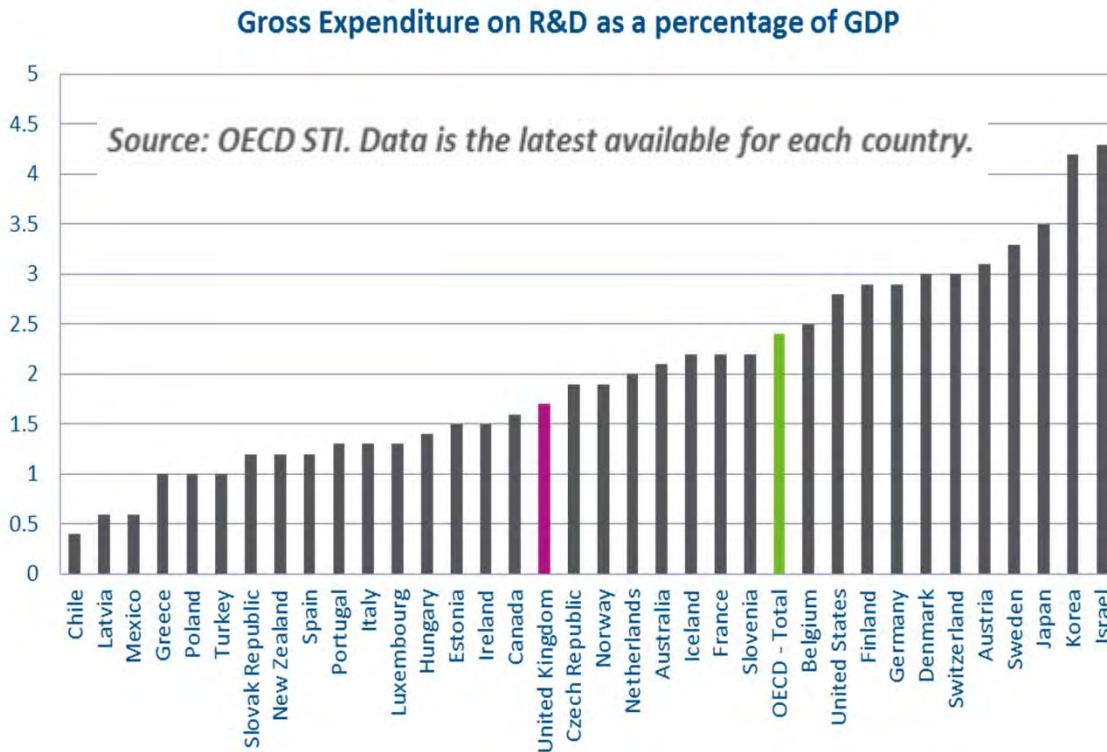
In the 2016 Autumn Statement **£4.7bn of additional funding for R&D** was announced, with a rising profile, over the period 2017/18 to 2020/21.

This increase in funding, if baselined at an additional **£2bn per annum**, is likely to halt the decline in R&D investment as a percentage of GDP (currently around 1.7%).

R&D SPENDING



Transition to UKRI: working towards 2.4%



In 2015 UK's expenditure on R&D represented 1.7% of GDP – below the OECD average R&D intensity of 2.4%.

R&D SPENDING

The Government has committed to reaching 2.4% of GDP investment in R&D by 2027, and to reaching 3% in the longer term. As a first step it will invest an additional £2.3bn over what was previously planned in 2021/22. UKRI will work with the Government to develop a roadmap for meeting this target to be published in 2018.



Transition to UKRI: The Government's White Paper

The Government published its Industrial Strategy White Paper in November 2017



UKRI will deliver a further £725m through ISCF over the next three years, including through **six new wave two challenges**, and **two pioneers**

An investment of £300m over the next three years in world-class **research and innovation talent**, including additional PhD and KTP places, and prestigious awards that support rising stars and the top talent from both the UK and overseas

UKRI will work the Government to develop a new competitive **Strategic Priorities Fund**, which builds on the vision of a 'common fund' set out in Sir Paul Nurse's review

INDUSTRIAL
STRATEGY



Transition to UKRI: The Government's White Paper

A new £115m **Strength in Places Fund** to support areas across the UK to build on their science and innovation strengths



UKRI will work with the Government to launch a new '**International Research and Innovation Strategy**' in early 2018, and a new £110m **Fund for International Collaborations** to enhance the UK's excellence in research and innovation through global engagement.

INDUSTRIAL
STRATEGY

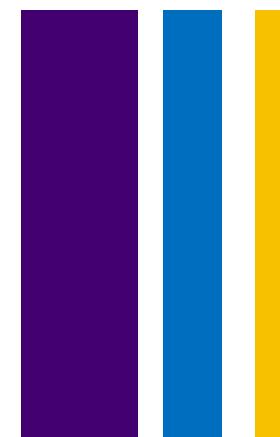
The Industrial Strategy also sets out four **Grand Challenges** to put the UK at the forefront of the industries of the future: Growing the Artificial Intelligence and Data Driven Economy, Clean Growth, Future of Mobility and our Ageing Society.

The Government will also announce **Sector Deals** in construction, life sciences, artificial intelligence and automotive industries.





The Industrial Strategy and the Industrial Strategy Challenge Fund (ISCF)



EPSRC and the Industrial Strategy: maximising opportunities

**EPSRC is an intelligent investor, inspiring innovation,
leveraging investment, creating connections and
delivering outcomes**

CREATING CONNECTIONS

£4.6 billion – total value of EPSRC's research and training portfolio, of which **£3.4 billion** is relevant to industrial sectors

DELIVERING OUTCOMES

REF analysis showed **£80 billion** of economic activity and cost efficiencies from an investment of **£7.8 billion** from EPSRC

INSPIRING COLLABORATION

3,800 collaborating organisations

LEVERAGING INVESTMENT

£1.1 billion leveraged from business against a current portfolio of **£4.6 billion**



EPSRC and the ISCF: wave one challenges



Medicines manufacturing technologies



Batteries for clean and flexible energy storage



Manufacturing and materials of the future

Robots for a safer world



Self-driving vehicles



Satellites and space technology



EPSRC and the Industrial Strategy: maximising opportunities

The industrial strategy has UKRI right at its very heart - for innovation and growth to be successful there needs to be a strong and coherent innovation chain that joins up fundamental research and industrial expertise across all sectors

EPSRC has maximised opportunities presented through the Industrial Strategy. Additional allocations to EPSRC now total nearly:

£250 million

This includes:

£42 million

**RAI in Extreme
Environments (ISCF)**

£78 million

Faraday Challenge (ISCF)

80

**Innovation
Fellowships**

500

doctoral places (NPIF)

RECOGNISED SUCCESS



EPSRC and the ISCF: wave two challenges and pioneers



Transforming construction: up to £170m

Prospering from the energy revolution:
up to £102m

Transforming food production: up to £90m

Audience of the future: up to £33m

Data to early diagnosis and precision medicine: up to £210m

Healthy ageing: up to £98m

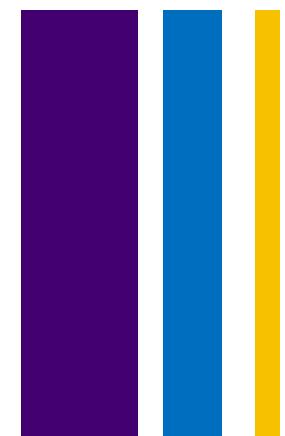
Next generation services: up to £20m

Quantum technologies: up to £20m





EPSRC's Delivery Plan: Progress and Next Steps



1

OUR VISION

Our vision is for the UK to be the best place in the world to research, discover and innovate

2

OUR GOALS

Our vision is supported by two goals:

Research and
Discover

Research and
Innovate

3

OUR STRATEGIES

To achieve our goals we will use three strategies:

Balancing
Capability

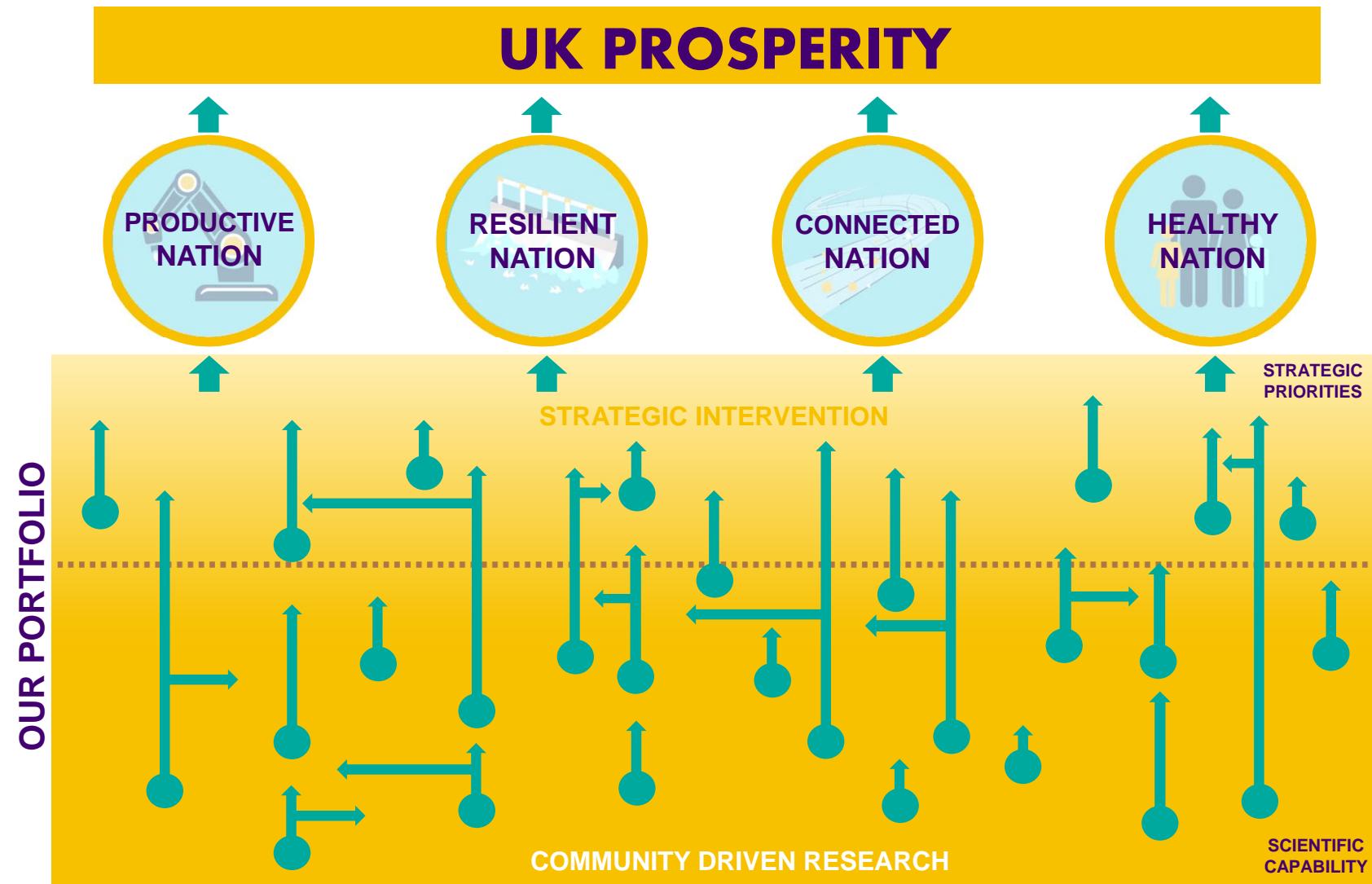
Building
Leadership

Accelerating
Impact

STRATEGIC
VISION



EPSRC's Delivery Plan – Progress to Date: fundamental science underpinning innovation



EPSRC's Delivery Plan – Progress to Date: our strategies

BALANCING CAPABILITY

- Published balancing capability results, confirming the suggested future strategies for these **areas over the next five years**
- Worked with our advisory bodies and the wider community to **refresh the 111 research areas** that make up the building blocks of our portfolio

BUILDING LEADERSHIP

- Continued investment in doctoral training – **single largest funder of PhDs**
- Allocated **£92 million per annum** over the next two years through the Doctoral Training Partnerships
- Allocate **£17 million** of EPSRC funds per annum to support **200 Industrial CASE** students

ACCELERATING IMPACT

- Facilitating relationships through
- Impact Acceleration Accounts
 - Prosperity Partnerships
 - Business Engagement Forum

11 Prosperity Partnerships

- £3 million EPSRC investment
- £11 million university investment
- £36 million industry investment

OUR STRATEGIES



EPSRC's Delivery Plan – Progress to Date: impact acceleration awards

EPSRC supports knowledge transfer across the UK, ensuring accessible research that is not restricted by geographic location

EPSRC's Impact Acceleration Accounts have resulted in over 1,000 projects of extraordinary diversity leading to range of financial and societal benefits:

£95
million
EPSRC INVESTMENT

451
**PATENTS
FILED**

97
**COMPANIES
FORMED**

£370
million
**FROM COLLABORATING
PARTNERS**

4,700

**ACADEMICS
TRAINED**

770
**PROTOTYPES
DEVELOPED**



EPSRC's Delivery Plan – Progress to Date: summary of achievements

18 months into this delivery plan, we have:

- Established our Outcomes framework and Science Strategy
- Refreshed our research areas through Balancing Capability
- Completed mid-term review of our CDT investment
- Introduced New Investigator Awards Scheme
- Launched our first Prosperity Partnerships
- Delivered key investments such as UKCRIC

**SUMMARY OF
ACHIEVEMENTS**



EPSRC's Delivery Plan – Progress to Date: the global landscape

Partnership is key to successful innovation whether that is across disciplines, across academia and industry or across the globe

We recognise that the international aspect of excellent research is more important than ever before as we look to our future outside of the EU. By identifying a broader strategy for international collaboration, we have:

- An **increase in engagement** with international funding bodies to ensure profile and leadership in readiness for Brexit
- More UK researchers have more contact with the world's best, leading to **greater exchange of knowledge and ideas**
- Over **£200 million** of additional investment attracted through international collaborations across **50** different countries

In addition, UKRI has been allocated **£110 million** from the **£4.7 billion** Autumn Statement uplift toward a new **Fund for International Collaborations**.

INTERNATIONAL INVESTMENT



EPSRC's Delivery Plan – Progress to Date: regional prosperity

Regional prosperity is reinforced by the national investment in EPS research and skills that contributes to economic activity and creates jobs

EPSRC invests in excellence wherever it may arise, attracting research leaders and industrial leverage to deliver impact beyond the point of investment



For example, EPSRC invests in 115 Centres for Doctoral Training across 49 UK universities, involving 1100 companies and 200 overseas institutions

In addition, UKRI's new £115 million **Strength in Places Fund** will:

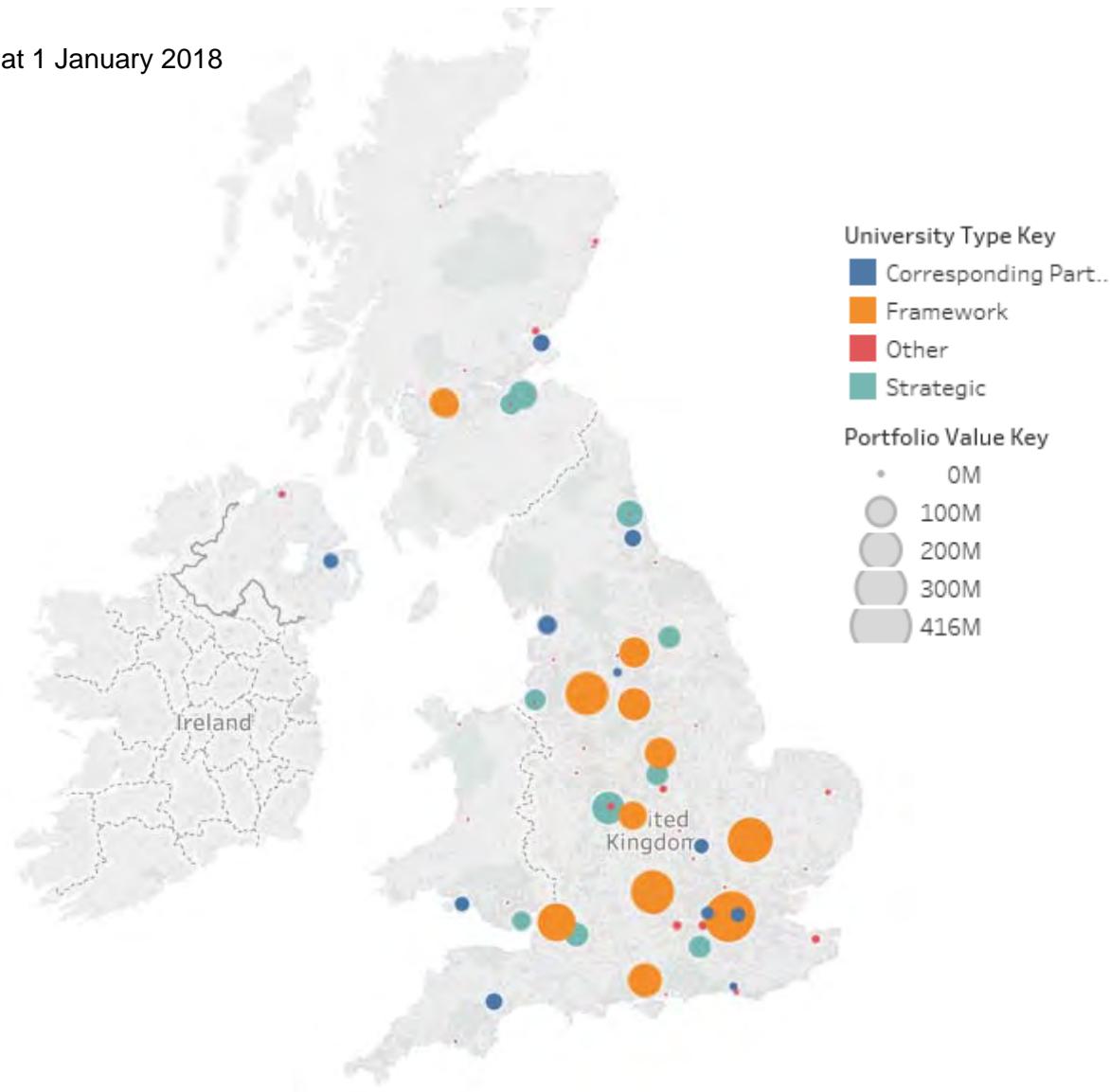
- Support regional growth by identifying and supporting areas of emerging R&D strength that are driving clusters of innovative or disruptive businesses
- grow the capacity of existing research excellence and high quality innovation in identified areas

**REGIONAL
PROSPERITY**



EPSRC's Delivery Plan – Progress to Date: EPSRC is a national investor in EPS

NB: Figures correct at 1 January 2018

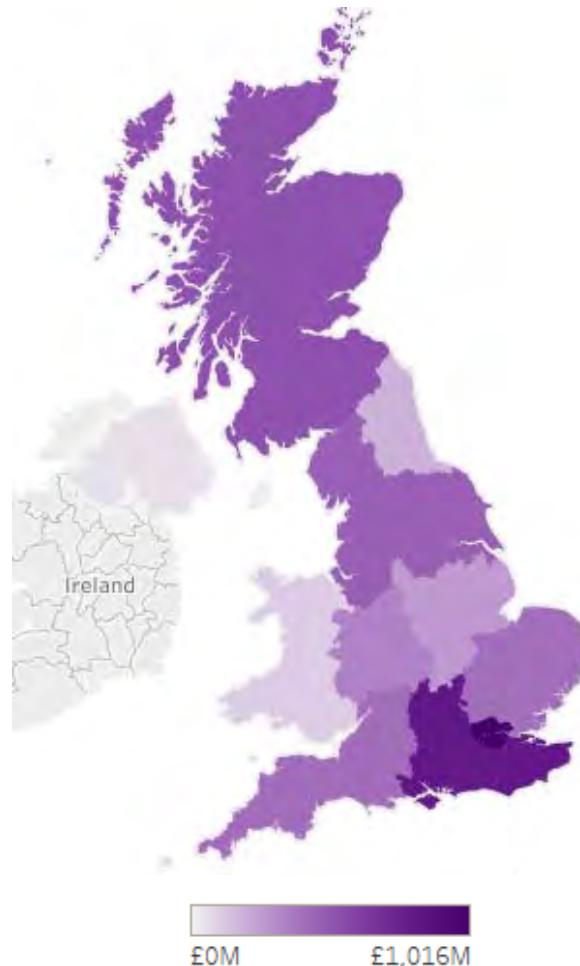


**REGIONAL
PROSPERITY**



EPSRC's Delivery Plan – Progress to Date: portfolio by region

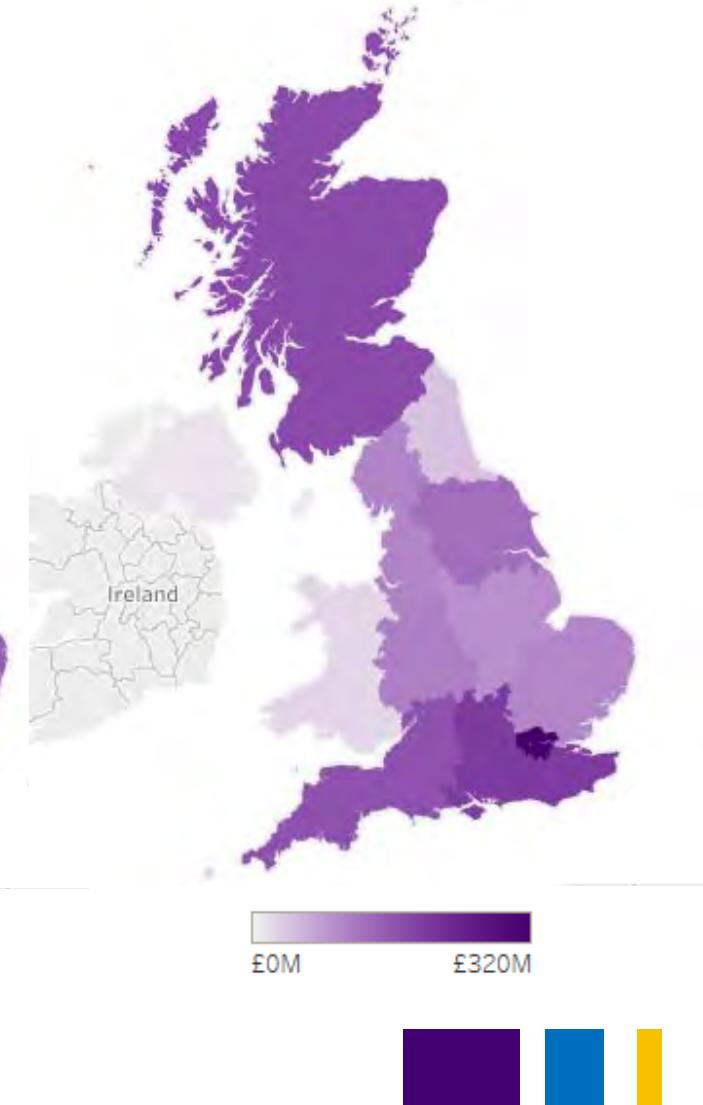
Total Portfolio



Research



Training

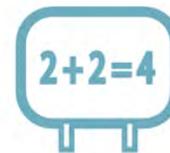


NB: Figures correct at 1 January 2018

EPSRC's Delivery Plan – Progress to Date: fundamental science underpinning innovation

New technologies and industries are driven by the fundamental engineering and physical sciences research that disrupts current thinking and drives future innovation

- EPSRC values excellent fundamental, discovery-led research - something the UK celebrated in 2016 with Nobel Prizes in physics and chemistry
- We recognise the importance of long-term investment in both investigator-led research and our strategic research programme with a balance of 60:40
- These long-term investments have ensured that EPSRC is well placed to maximise opportunities arising from the industrial strategy

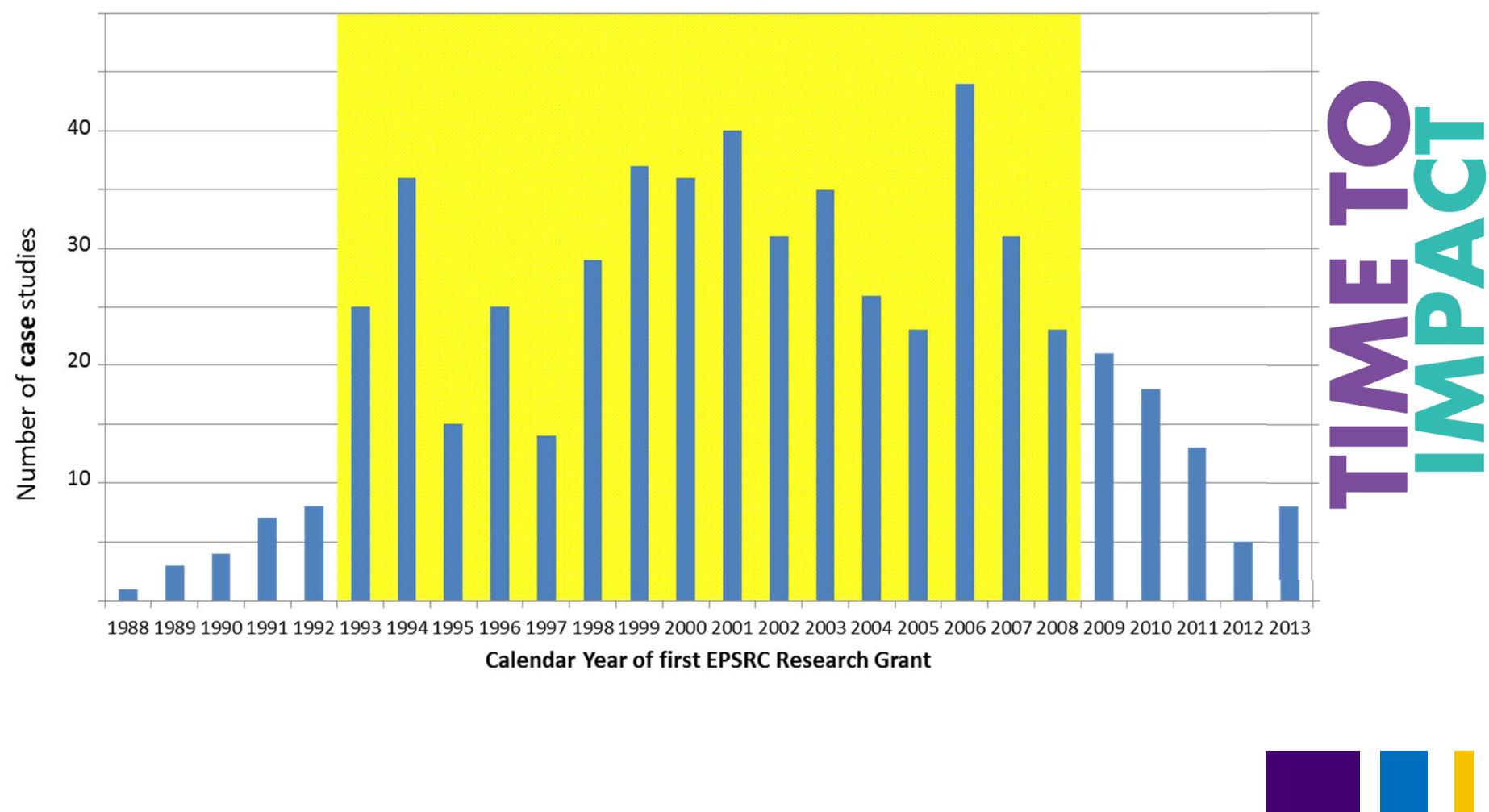


**DRIVING
INNOVATION**

EPSRC's Delivery Plan – Progress to Date: fundamental science underpinning innovation

Data from REF 2014 Impact Case Studies

Period over which
impact was assessed



EPSRC's Delivery Plan – Progress to Date: fundamental science underpinning innovation

EPSRC invests in the fundamental science that drives the innovation to create new technologies

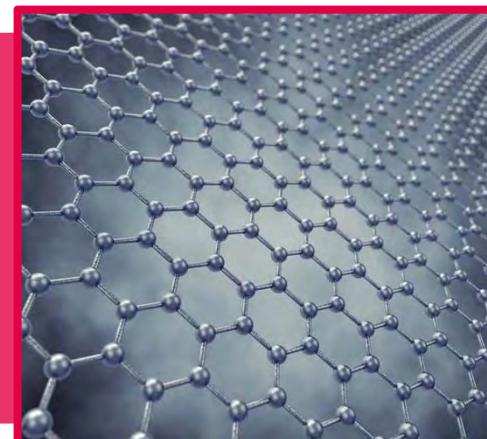


Quantum Technologies

- £192 million quantum research portfolio over 15 years
- £1 billion UK National Quantum Technologies Programme

Advanced Materials

- £765 million investment in advanced materials research over 20 years
 - £61 million National Graphene Institute will commercialise research



**CREATING NEW
TECHNOLOGIES**



EPSRC's Delivery Plan – Next Steps: future years of the Delivery Plan period

Some examples of the high-level plans for the remainder of the Delivery Plan period are:

Continue to ensure that our plans for 17/18 onwards are informed by and align to the Prosperity Outcomes

Continue to work up “Big Ideas” to generate challenges that focus thinking on core capability

Refresh CDTs to, in part, focus around skills to deliver prosperity outcomes in the medium/long term

Align the ambitions to the prospective core commission budget bids such as RAAI, maths capabilities, and the institutes

Further develop benefit realisation plans so that future activities are better aligned to intended outcomes

FUTURE
YEARS



EPSRC's Delivery Plan – Next Steps: engaging with the community

With a number of new initiatives (e.g. ISCF) and large investments (e.g. the 2018 CDT call) underway, we need to focus our staff resources on organisational priorities for the next few months

In order to deliver these priorities, EPSRC staff may need to reduce time spent away from the office and stay focussed on office-based activities during this time

We recognise that community engagement is a highly valued aspect of our staff's work and we are not suggesting that community engagement stop, but that it **temporarily** changes in nature to maintain working relationships whilst saving staff time

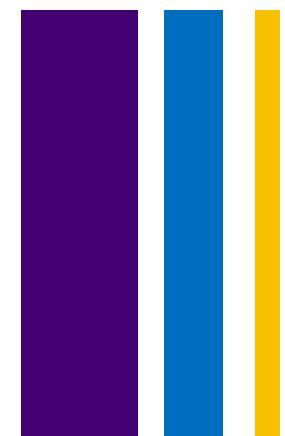
Although staff may not be able to arrange in-person visits during the next few months, we'd still expect you to be able to engage with us – e.g. via a phone call

COMMUNITY
ENGAGEMENT





Centres for Doctoral Training (CDTs)



A portfolio of doctoral training approaches

Doctoral Training Partnerships

- Block grants to universities for flexible PhD support, based on research income

Industrial CASE

- Highly user focused, company chooses project and university

Centres for Doctoral Training

- Cohort-based in areas of national need

Doctoral Studentships on Strategic Research Investments

- Currently being piloted through Prosperity Partnerships 2017/18



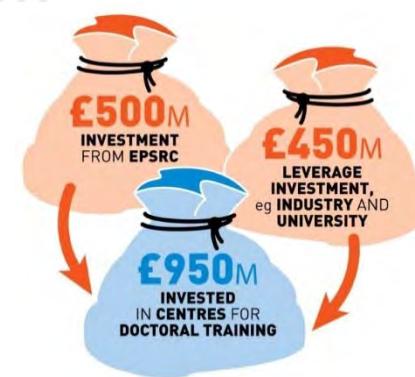
Centres for Doctoral Training: CDTs funded in 2013



THE NUMBER
OF CENTRES



THE NUMBER
OF UNIVERSITIES



7,000+
THE NUMBER OF
STUDENTS THAT WILL
BE TRAINED
IN THE CENTRES

2017 Mid-Term Review of CDTs judged >90% of Centres to be operating at or above satisfactory levels



Centres for Doctoral Training: timetable for the 2018 call



Priority areas were agreed after taking advice from the EPSRC Strategic Advisory Teams (SATs), Strategic Advisory Network (SAN), and Council

The CDT call was issued 17th January 2018

Activity	Date
Deadline for Outlines	13 March 2018
Outline Panels	w/b 23 April 2018
Deadline for Full Proposals	31 Jul 2018*
Interview Panels	w/b 05 November 2018
Funding awards	December 2018
New CDT cohort starts	2019/20 Academic Year



Centres for Doctoral Training: what's different this time?

- The need for doctoral training, **delivered specifically through the CDT mechanism** is a key feature
- **Equality, Diversity and Inclusion** will be more prominent
- **Re-articulation of partner contributions** to ensure the enhancement to the training provision, not just the money or benefit to the partner, is better captured
- The need to **maintain cohorts** throughout a student's doctorate is included
- The **number of applications** being submitted by an institution (as lead) is limited
- **Dual stream** – priority area stream and an open stream
- A **minimum of 50 students over five cohorts** (more flexible articulation than previously)
- **20-40% leverage on studentship costs** (more flexible articulation than previously)
- Universities will need to **underwrite the leverage** needed to reach the minimum requirements, even if this is being committed from a project partner



Centres for Doctoral Training: other important messages



- We welcome multi-site and single site proposals
- We will treat new and existing Centre bids equally
- We have no preference on the qualifications offered (PhD, EngD etc.)
- NERC are committing £2.2 million towards Renewable Energy.
 - All other Research Council co-funding (including NERC for other priorities) will be considered on a case-by-case basis
- SFI (Science Foundation Ireland) are committing funding to support partnerships between UK-based cohorts with student cohorts in any of their 17 Research Centres
 - UK component must be able to stand alone and meet our conditions without SFI
 - Gavin Salisbury (international@epsrc.ac.uk) is contact for this



- **Outline panels** followed by **full proposals** (postal review and interview panels)
- **Specific need** for doctoral training through the CDT mechanism is a key feature of this call (it's not just the volume of students).
- **Outline assessment criteria** to support this are:
 - National need for cohort-based doctoral training
 - Centre vision and leadership
 - Quality of the research training environment

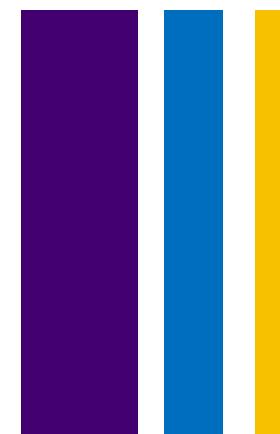


- UKRI will be investing in 150 doctoral student starts in 2019/20 and 200 per year for four years afterwards
- UKRI has requested that EPSRC deliver this investment through the CDT call
 - We expect to fulfil this investment by funding 10-20 AI CDTs
 - This predominantly affects the 'Enabling Intelligence' priority area and a newly launched priority 'Applications and Implications of Artificial Intelligence' (AIAI)
 - The AIAI priority has no EPSRC remit requirement
 - All other call conditions must be met
- As this opportunity was announced 05 February, a different deadline for AI CDTs exists (28 March) with outline panels w/b 14 May. Full proposals and interviews will be integrated with the EPSRC CDT call.





Closing Remarks



Protectors of the Long-Term: making a case

Protectors of long-term fundamental research

We are making the case to
Government and industry that
continued investment in
science and engineering is
critical to maintaining our
world-class UK research
base

How can you help us?



MAKING
A CASE

