EPSRC ICT Early Career Workshops

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Sheffield and Cardiff
February and March 2017
Presentation Outline

- Introduction to EPSRC
- Why are we running this event?
- ICT strategy and priorities
- Industrial Strategy
- Balancing Capability
EPSRC is the main UK government agency for funding research and training in engineering and the physical sciences, investing more than £850 million a year.

With a mission to promote and support, by any means, high quality basic, strategic and applied research and related postgraduate training in engineering and the physical sciences.

Aim to advance knowledge and technology, and provide trained scientists and engineers, which meet the needs of users and beneficiaries, to the benefit of the UK.
One Vision

For the UK to be the best place in the world to research, discover and innovate

Two Goals

Research and Discover

Research and Innovate

Three Strategies

Balancing Capability

Building Leadership

Accelerating Impact
EPSRC is at the heart of discovery and innovation.

We invest in long-term, fundamental engineering and physical sciences research and training in the UK.

Committed to excellence and impact, we support the talented scientists, engineers and postgraduate research students who through their research, discover new knowledge, explore new ways of thinking and drive innovation.

Our research ranges from physics, chemistry and mathematics to materials, computing and engineering.

Our research provides underpinning knowledge that informs other fields such as the life and medical sciences.

Our research places the UK as a leading global research nation. It saves lives, creates prosperity, protects the environment and inspires future generations.
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Why are we running this event?

**Aims**

- To provide support and opportunities for Early Career Researchers (ECRs) across EPSRC
- To raise awareness of:
  - EPSRC’s strategy
  - funding opportunities
  - the peer review process
- To encourage networking between ECRs from across the UK research community
- To provide an opportunities to interact with experienced colleagues and mentors
How you can help us with dissemination

- This event was heavily over subscribed (over 250 expressions of interest)

- We would like the outputs of this workshop to be shared with people who could not attend

- One of the questions you were all asked in the expression of interest was: “How will you disseminate information from the event to colleagues at your institution?”
  - Please do these things!
  - Presentations at your institution, blogs, newsletter items, etc
  - We will circulate slides

- Twitter hashtag:
  #ICTECCR
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How ICT Research is Funded

- Research Area model
- Rationale for each area with a strategy based on evidence
- No allocations by research area

Current ICT portfolio: Approx. £415M active grants
Current ICT portfolio

- TCS
- Programming languages & compilers
- Verification and correctness
- Architectures & operating systems
- Databases
- Information systems
- Software engineering
- Microelect. design
- Microelect. Device technology
- RF & MW devices
- Optical comms
- Displays
- Optoelect. devices & circuits
- Optical devices and subsystems

- AI technologies
- Biological informatics
- Image & vision computing
- Graphics and visualisation
- Speech technology
- Vision, hearing & other senses
- Music & acoustic technology
- DSP
- NLP
- Human comm. in ICT
- PUC
- ICT networks and distributed systems
- RF & MW comms
- Optoelect. devices & circuits

- HCI
- Information systems
- Programming
- Verifying
- Correctness
- Programming
- Verifying
- Correctness
ICT Theme Strategy and Priorities

Some current areas of focus:

- Equality and Diversity in the ICT research landscape
- Responsible ICT Research and Innovation
- Contribution of ICT to the Connected Nation Outcome
ICT research and research training contributes by:

- Enabling a competitive data driven economy
- Achieving transformational development and use of the internet of things
- Delivering intelligent technologies and systems
- Ensuring safe and trusted cyber society
- Designing for an inclusive, innovative and confident digital society
Future Cross-ICT Priorities

We have developed a set of new cross-ICT priorities:

- Data Enabled Decision Making
- Future Intelligent Technologies
- Safe and Secure ICT
- Cross-Disciplinarity and Co-Creation
- People at the Heart of ICT
- New and Emerging Areas

The cross-ICT priorities were published along with the Research Area strategies on 15 February 2017.
New methods for making decisions in a data-rich world

Will require an integrated approach in which every element reflects the ultimate need for the outputs of that process to in some way benefit a person making a decision.

This will include, but not be limited to:

- data wrangling,
- data analytics,
- interaction with data,
- data visualisation

The data in question will often be complex, incomplete and/or mixed mode.

There could also be opportunities for work on hardware and computer architectures for enabling faster, more efficient or even real-time decision making.
Future Intelligent Technologies

- Promote development of intelligent, adaptive or autonomous systems that can learn, adapt and make decisions without the need for human control.

- Will inform and contribute to a new level of smartness, e.g. systems exhibiting social intelligence, understand context and adapt accordingly.

- High-ambition priority

- Move towards computing-with-meaning

- Computational systems able to match or even exceed, levels of human performance in interpreting and making sense of information
Modern life relies increasingly on its digital dimension.

We are highly dependent on connected information systems and our dependence exposes us to risks.

Promote work which reduces the risks associated with ICT technology

Reliability, robustness and maintainability

in the face of accidents, malice or unpredictable events.

Technical, socio-technical and human-centric approaches will be required.
Cross-Disciplinarity and Co-Creation

- 'Cross-disciplinarity and co-creation' encourages collaboration between disciplines and sub-disciplines with users of research.
- Focus on the benefits of cooperation and partnership throughout research process.
- ICT landscape has rich opportunities for closer working between disciplines.
- Many of the most exciting opportunities emerge at the interfaces between established areas.
- Co-creation approaches will help ensure that the problems being tackled and the opportunities being explored within the EPSRC ICT portfolio are well-framed and clearly understood.
People at the Heart of ICT

- People engage with and are impacted by ICT as commissioners, users and often without even knowing it.
- Encourages the development of better ICT by asking researchers to acknowledge the relationship that people have with ICT and ICT-enabled systems.
- Consider the impact these technologies can have on people.
- Consider these relationships and impacts throughout the research process from planning to implementation.
- Move beyond abstract notions of 'the user' and instead develop a more detailed and realistic understanding of the stakeholders in their research and what solutions which address people's needs look like.
New and Emerging Areas

- Encourage truly transformative concepts and technologies within and beyond currently recognisable ICT space
- Needs to comprise something more than an advance, however significant, within an established field.
- It must be genuinely disruptive, offering real potential to significantly alter current practise in research or industry.
- Ideas in ICT might arise in two ways:
  - grown within the ICT research landscape
  - introduced into ICT from other themes / disciplines
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Industrial Strategy

Announced by Chancellor in his Autumn Statement on 23 November 2016

Extra £2 billion a year for research and development by 2020

The Industrial Strategy includes

- **Industrial Strategy Challenge Fund**
  - a new cross-disciplinary fund to support collaborations between business and the UK’s science base
  - will set identifiable challenges for UK researchers to tackle
  - Will be managed by Innovate UK and the Research Councils

- **Innovation, applied science and research**
  - Additional funding will be allocated to research capacity and business innovation to further support the UK’s world-leading research based and to unlock its full potential
  - UKRI, once established, will award funding on the basis of national excellence
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Balancing Capability

What is Balancing?

- **Refreshing** of all 111 research areas across EPSRC; the building blocks of our research portfolio

- Updated **strategic focus** for each area, helping us to deliver a more healthy, resilient, connected and productive nature through research

- Significant milestone in EPSRC’s delivery plan representing 18 months of **evidence gathering**, **consultation** and alignment with our **strategic priorities**
Balancing Capability

Why do Balancing?

- Recognition that we have a finite budget to work with and, as a result, need to balance our investments across our portfolio, taking into account input from the academic community but also the needs of the business users and national and international challenges.

- Ensure our investments are targeted in the most appropriate and effective ways

- Creates the space for us to respond to changes from both community-led 'bottom up' and from strategic 'top down' research
The balancing changes to the ICT portfolio will be as follows:
Current ICT portfolio

- Biological informatics
- Image & vision computing
- AI technologies
- TCS
- Programming languages & compilers
- Verification and correctness
- Architectures & operating systems
- Databases
- Information systems
- Software engineering
- Microelect. design
- AI
- Intelligence
- Microelect. device technology
- Optoelect. devices & circuits
- Displays
- Speech technology
- Vision, hearing & other senses
- Graphics and visualisation
- Music & acoustic technology
- DSP
- HC
- ICT networks and distributed systems
- RF & MW devices
- RF & MW comms
- Microelectronics
- Microelectronics & optical devices
- Displays
- PUC
- Human comm. in ICT
- NLP
- NLP
- Software engineering
- Microelect. design
- Optical comms
- Displays
- Optical devices and subsystems
The ICT portfolio we aim to achieve by the end of the next period - approximately 15/03/2017
Planned trajectories for ICT Research Areas

- NLP
  - Architectures & operating systems
  - Artificial intelligence (AI) technologies
  - Human comm. in ICT
  - Databases

- PUC
  - Optical devices and subsystems
  - Speech technology

- RF & MW devices
  - Microelect. design
  - Programming languages & compilers
  - RF & MW comms
  - Vision, hearing & other senses

- Software engineering
  - HCI
  - Microelect. Device technology
  - Verification and correctness
  - Displays

- Information systems
  - DSP
  - Graphics and visualisation
  - HCI
  - Information systems

- TCS
  - Intelligence technologies
  - Human comm. in ICT
  - Microelect. Device technology

- ICT networks and distributed systems
  - Programming languages & compilers
  - Microelect. Design technology
  - Verification and correctness

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  - Vision, hearing & other senses

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Planned trajectories for ICT Research Areas – rationales and strategic focus

Key for a data driven economy, the internet of things, intelligent tech, and safe and trusted cyber security

Key for the internet of things, intelligent tech, confident digital society, future healthcare, business innovation

Can contribute to the internet of things, solutions to acute threats, future healthcare, business innovation

Increased emphasis needed for safe and trusted cyber society, intelligent tech, reliable infrastructure and solutions to acute threats

Researchers have to submit high quality proposals

Research into displays is now part of other research areas

Still want a significant portfolio but a shift towards other research areas, most notably PUC – researchers in this area encouraged to collaborate and link to real world tests

Still want a significant portfolio but can’t justify current size at expense of other areas – researchers encouraged to continue to take a systems approach and for there to be a range of projects by scale and scope

Reduce does not mean stop
Planned trajectories for ICT Research Areas – rationales and strategic focus

Key for a range of ambitions under the Connected Nation and other Outcomes described in EPSRC’s Delivery Plan

Strategic foci in for all of these Research Areas – researchers should consider these

All researchers still have to put in competitive proposals
How we got here - engagement

Engagement and evidence collection

- Regional workshops in 2015
- Programme grant holders and fellows meeting 2016
- Network directors meeting 2016
- CDT Directors meeting 2016
- Strategic Advisory Team meetings and input
- Visits to research groups
- Attendance at steering committees for large grants
- Community, industry and other user groups
- Input from industry and other users
- Call for evidence: 692 unique pieces of evidence reviewed across EPSRC
Why Balancing Matters for Researchers

The research area strategies and priorities have a **direct** bearing on:

- Expectations for applications for **standard** grants
- Our **fellowship** priorities
- Expectations for **programme grant** applications
- Any upcoming CDT calls (none announced yet)
- Any other targeted calls
- Where we focus our efforts
How will these research positions be used?

Researchers should:
- **Read** the research area rationales carefully
- Consider the **strategic focus** under each rationale
- Submit research proposals which **contribute** to the strategy of the relevant research area(s)
- **Use rationales** as a basis for the arguments for aspects such as national importance

EPSRC will:
- Use the rationales to guide strategic approach to management of the portfolio
- If appropriate, design calls and other activities to manage the portfolio

Reviewers will:
- Consider the strategic information in the research area rationales relevant to proposals which they are reviewing
- Consider how well the arguments have been made for aspects such as national importance based on these rationales
Balancing Capability – in summary

- We published the outcomes of this activity on 15 February 2017

- These decisions are consistent with our Outcomes and Ambitions, as described in our Delivery Plan

- For the ICT portfolio there are:
  - Positions on research areas
  - A new set of cross ICT priorities
# The ICT Team

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<th>Name</th>
<th>Role</th>
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