Connected Nation:

Thriving in a Digital World

The British Library
8th December 2015

Programme

Time	ACTIVITY	SPEAKER
10.00	**WELCOME**	Philip Nelson, Chief Executive, EPSRC
10.15	**OPENING ADDRESS**	Anthony Finkelstein, FREng, UCL and the Alan Turing Institute
10.30	**KEYNOTE**	Richard Harper, Social Shaping Research Cambridge, and Rachel Cooper OBE, Lancaster University
11.00	**EXHIBITION** Showcase of 11 research projects, supported by EPSRC in partnership with AHRC and ESRC. The exhibition will start in the main auditorium with two-minute pitches from each exhibitor. **Neo-Demographics: Opening Developing World Markets via Personal Data and Collaboration**, James Goulding, The University of Nottingham **Broadcasting Thrill**, Brendan Walker, The University of Nottingham **LifeGuide – Online Support for Improving Health,** Lucy Yardley, University of Southampton **Resonant Bits,** Peter Bennett, University of Bristol/Pervasive Media Studio **Connected High Street**, Chris Speed, University of Edinburgh **Ultra-Parallel Visible Light Communications (UP-VLC),** Martin Dawson, University of Strathclyde **Zinwave,** Richard Penty and Ian White, University of Cambridge **Bee Watch and Blogging Birds,** Advaith Siddharthan, University of Aberdeen **Lighting the Future,** Colin Humphreys, University of Cambridge **Making Public Health 2.0 – FeedFinder and AppMovement,** Madeline Balaam, Newcastle University **TouchKeys,** Andrew McPherson, Queen Mary University of London	
12.00	**LUNCH**	
13.00	**PARALLEL PANEL SESSIONS**	
	Transforming development and use of the Internet of Things (Bronte Room)	Sian John, Symantec (Chair); Jeremy Frey, University of Southampton; Jessica Rushworth, Digital Catapult; Andy Stanford-Clark, IBM
	Action and insights from data: Delivering the next generation of big data capabilities (Auditorium)	Sofia Olhede, UCL & The Alan Turing Institute (Chair); Sian Thomas, Food Standards Agency; Giles Pavey, dunnhumby; Patrick Callinan, Channel 4
	Ensuring a safe and trusted cyber society (Eliot Room)	David Brewer, Digital Catapult (Chair); Lilian Edwards, University of Strathclyde; Robert Nowill, Cyber Security Challenge UK; Miranda Mowbray, Hewlett Packard Enterprise
14.00	**PLENARY DEBATE**	
	A Connected Nation: How can the UK Survive and Thrive in a Digital World?	Shini Somara, BBC (chair); Tim Whitley, BT; Rachel Cooper OBE, Lancaster University; Chris Jacobs, GO-Science, Jake Kennard, University of Bristol
14:45	**CLOSING REMARKS**	Jane Nicholson, EPSRC
15:00	**NETWORKING RECEPTION** Further opportunity to view exhibits	
16:00	**CLOSE**	

Connected Nation: Thriving in a Digital World

A warm welcome to today's event.

What is the Connected Nation?

The world is changing. Our economy and society are becoming increasingly dependent on digital and data technologies, which are presenting us with new challenges and opportunities almost every day. The UK is ideally placed to tackle these challenges – it's in our DNA.

Pioneering digital technologies

From Charles Babbage's concept for a Difference Engine in 1822, a landmark in the prehistory of the computer, to the work of Alan Turing, the father of theoretical computer science, and to modern data analytics, which can make sense of the digital world around us, the UK has an incredibly strong foundation in the science that has supported digital technologies over the last two centuries. Today, our cutting-edge research is more important than ever, as we design and build safe and inclusive digital technologies for future generations.

Working together across disciplines

The Engineering and Physical Sciences Research Council (EPSRC) is at the heart of this research, and invests across the spectrum of digital and ICT technologies – from the underpinning disciplines of maths, computer science and statistics to their applications in fields such as software development, electronics, advanced materials, networks, visualisation and web science. Helping to build a connected, productive and prosperous nation.

Impact from this research comes in many forms: ultra-fast wireless communications using visible light (Stand 3); software that can translate huge volumes of data into everyday language (Stand 4); novel, yet familiar, musical instruments that provide musicians with new avenues of performance and creativity, revolutionising how we play and enjoy music (Stand 1), to name but a few.

Working through the RCUK Digital Economy Theme, EPSRC, the Arts and Humanities Research Council (AHRC) and the Economic and Social Research Council (ESRC) have invested over £170 million to rapidly realise the transformational impact of digital technologies on community life, cultural experiences, future society, and the economy.

Driving UK success

Over the coming decades, the UK's prosperity will be driven by a host of new industries and services (some as yet unimagined). Our skill at connecting people, things and data together, in safe, smart, secure, trustworthy, productive and efficient ways, will be crucial to this process. But this can only be achieved through new discovery and innovation stemming from fundamental research – leading to transformational technologies from which the world will benefit.

Today's event

Today's event is about exploring how we approach such challenges and opportunities, now and in the future, in ways that will enable our economy and society not just to survive, but to thrive in a digital world as a truly connected nation.

I am pleased to welcome a fantastic line up of speakers from academia, business and government, along with an exciting selection of exhibitors, whose research has been supported by EPSRC and the RCUK Digital Economy Theme.

In the afternoon, you're invited to attend parallel panel discussions focusing on some of the key issues – challenges which can only be tackled by the combined efforts of researchers, industry and policymakers.

Our closing plenary panel debate, How can the UK Survive and Thrive in a Digital World?, is a chance to bring these conversations together – and take the discussion forward into the future.

A celebration of talent

As part of this celebration of talent, passion and energy, we are delighted to be partnering with the Digital Catapult and the Knowledge Quarter for today's event. The programme also features contributors from the recently launched Alan Turing Institute, a joint venture between EPSRC and five partner universities based here at the British Library, which is pioneering new pathways in data science research.

Above all, this event is about you, and the contribution you make. With the chance to engage with experts, take part in interactive displays and start conversations of your own, I hope you, and those who will be joining the conversation online, at #ConnectedNationUK, will find this a day to remember.

I am confident these conversations will continue long after the event, as together we help the UK to thrive in a connected future.

Philip Nelson
Chief Executive, Engineering and Physical Sciences Research Council

STAND 1
TouchKeys

Andrew McPherson, Queen Mary University of London

How do you create a novel yet familiar musical instrument? TouchKeys transforms the piano-style keyboard into an expressive multi-touch control surface.

Capacitive touch sensors on the surface of every key measure the position of each finger, allowing the player to intuitively add vibrato, pitch bends, timbre changes and other expressive effects just by moving the fingers on the key surfaces.

In 2013, TouchKeys successfully launched on Kickstarter, shipping kits and keyboards to musicians in over 20 countries.

Andrew McPherson's research focuses on augmented musical instruments which extend the capabilities of traditional instruments, embedded hardware for interactive systems, and musical human-computer interaction.

STAND 2
Making Public Health 2.0 – FeedFinder and AppMovement

Madeline Balaam, Newcastle University

Are you interested in how digital technologies can revolutionise public health nationwide? Come and find out about FeedFinder and AppMovement; two digital tools created by Madeline Balaam and her team that put communities in the driving seat.

The tools allow communities to create their own public health content and to become actively involved in commissioning their own public health services.

Madeline Balaam is a lecturer at Newcastle University's Open Lab, with expertise in interaction design and the use of digital technologies to support health and wellbeing.

Madeline leads over 20 digital public health projects in Open Lab, including the digital public health strand of the recently launched EPSRC and Innovate UK-supported Digital Economy Research Centre in Digital Civics.

STAND 3
Ultra-Parallel Visible Light Communications (UP-VLC)

Martin Dawson, University of Strathclyde

Can you communicate through a light bulb? This exhibit showcases the breakthrough technology of ultra-high bandwidth optical wireless data communications based on solid-state lighting.

Come and see how these systems of micro-LEDs can operate adaptively to direct individual Giga-bit/second data streams to different locations.

This novel technology will increase the available bandwidth for communications, opening up a new spectrum of possibilities and creating additional benefits such as increased security and energy savings.

Martin Dawson is Professor and Director of Research in the University of Strathclyde's Institute of Photonics. This EPSRC-supported research also involves the universities of Cambridge, Edinburgh, Oxford and St Andrews.

STAND 4
BeeWatch and Blogging Birds

Advaith Siddhartan, University of Aberdeen

Can digital technologies bring people closer to nature? This research explores the use of Natural Language Generation (NLG) technology as an interface to communicate environmental data and engage members of the public directly.

The project has focused on two nature conservation projects: the reintroduction of red kites into the Black Isle in the Scottish highlands by the Royal Society for the Protection of Birds, and a citizen science biological recording project BeeWatch.

Advaith Siddharthan's research focuses on Text Analytics and Natural Language Processing. He is a senior lecturer in Computing Science at the University of Aberdeen and is particularly interested in the effective communication of information to diverse users.

STAND 5
LifeGuide – Online Support for Improving Health

Lucy Yardley, University of Southampton

No programming background? No problem. LifeGuide is a set of unique software resources that allows people without programming skills to create interactive websites and apps to support health.

This exhibit showcases how the software has been successfully applied, with posters, demos and downloads illustrating some of the websites and apps that have been shown to improve health and wellbeing.

Lucy Yardley pioneered the development of LifeGuide as well as the EPSRC-supported UBHave project.

Lucy's research addresses how best to both optimise user engagement with digital interventions and to integrate digital support for self-management of health with existing healthcare services.

STAND 6
Broadcasting Thrill

Brendan Walker, University of Nottingham

Are you ready to be thrilled? The EPSRC-led Horizon Digital Economy Hub works with Thrill Laboratory to investigate how biosensing technologies can be used to enhance thrilling experiences across the creative industries.

This project focuses on the use of wearable and networked sensors to develop unique live entertainment for TV, advertising and public engagement.

Brendan Walker runs Aerial, a design practice which specialises in the creation of tailored emotional experience.

Described by *The Times* as 'the world's only Thrill Engineer', Brendan is Principal Research Fellow at The University of Nottingham and is currently a presenter on BBC2's *Coast*.

STAND 7
Resonant Bits

Peter Bennett, University of Bristol/
Pervasive Media Studio

Fancy experiencing resonant interaction? Resonant Bits is a fundamentally new way to interact with digital devices using rocking, shaking, swaying and wobbling.

The concept arose in collaboration with Stuart Nolan, a research magician, while investigating new methods for measuring subconscious movements of the body. This novel concept has led to the development of swaying music players, soundscape rocking chairs, interactive wine glasses, origami blown by a digital wind and tiles containing topological tales.

Peter Bennett's research is driven by the vision of giving tangible form to digital bits, bringing the virtual out of the computer into the physical world.

STAND 8
Zinwave

Richard Penty/Ian White, University
of Cambridge

Bored of bad cellphone coverage? This exhibit shows how the EPSRC-supported Radio over Fibre system research at the University of Cambridge and at UCL was commercialised via the successful spin-out company Zinwave Ltd.

Find out about some of the initial research and see a few of the company's latest products which can provide a high speed cellular service using multiple input multiple output technologies (4G LTE MIMO) alongside more conventional services, such as 3G and wi-fi.

Working with Alwyn Seeds at UCL and with EPSRC funding, Richard Penty and Ian White developed a multi-service Radio over Fibre technology for in-building radio distribution. Since founding Zinwave Ltd they have also founded spin-out companies PervasID and eComm.

STAND 9
Neo-Demographics: Opening Developing World Markets via Personal Data and Collaboration

James Goulding, The University of Nottingham

How can you analyse data that doesn't currently exist? This project uses Big Data analytics to investigate how UK business can better interact with new markets in the developing world via novel forms of geo-demographic intelligence.

The development of behavioural segmentations and predictive models from non-standard datasets is resulting in the generation of both new insights and invaluable social contributions, from transport planning to disaster management in countries such as Tanzania.

James Goulding leads this data science programme at the EPSRC-led Horizon Digital Economy Hub at The University of Nottingham, researching in the field of machine learning with Big Data.

STAND 10
Connected High Street

Chris Speed,
University of Edinburgh

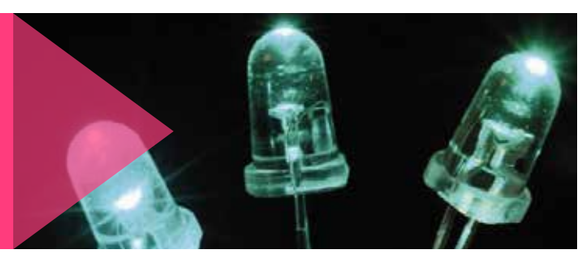
What does the high street of the future look like? From an internet of printers between shopkeepers to a mirror that plays music from your childhood when you look in to it, and a system that lets you donate your loyalty card points to charity, this series of design artefacts and digital platforms developed by EPSRC-supported researchers provides insight into how design-led research can enhance the high street shopping experience.

The Connected High Street research team is a combination of design researchers, social and computer scientists from the universities of Edinburgh, Dundee and Northumbria.

Chris Speed is Chair of Design Informatics at the University of Edinburgh, where his research focuses on the Network Society, Digital Art and Technology, and the Internet of Things.

STAND 11
Lighting the Future

Colin Humphreys, University
of Cambridge



Are you switching on to LEDs? Find out about a pioneering technique that allows gallium-nitride crystals to be grown on silicon, rather than on sapphire, reducing the cost of LED manufacture by an expected factor of five.

It is estimated that a worldwide move to LEDs, which are far more energy-efficient than conventional lighting technologies, would result in annual CO_2 savings equivalent to the output of all the cars on the planet.

Sir Colin Humphreys is Professor and Director of Research in the Department of Materials Science and Metallurgy at the University of Cambridge, where he is also a Fellow of Selwyn College.

MEET AN EXPERT

You can book a private one-to-one meeting with a Research Council representative for advice on engaging with research. Please come to the 1-2-1 Meeting Booking Desk at registration and the team will assist you. Please note numbers are limited.

- **Matthew Lodge**, Senior Manager, Business Engagement
  Engineering and Physical Sciences Research Council
- **Matthew Ball**, Head of Business Relationships
  Engineering and Physical Sciences Research Council
- **Heather Williams**, Knowledge Exchange Strategy and Development Manager
  Arts and Humanities Research Council
- **Bruce Jackson**, Senior Knowledge Exchange Manager
  Economic and Social Research Council

Engineering and Physical Sciences Research Council (EPSRC)

As the main funding agency for engineering and physical sciences research, EPSRC's vision is for the UK to be the best place in the world to research, discover and innovate.

By investing £800 million a year in research and postgraduate training, we are building the knowledge and skills base needed to address the scientific and technological challenges facing the nation.

RCUK Digital Economy Theme

The RCUK Digital Economy Theme supports research to rapidly realise the transformational impact of digital technologies on community life, cultural experiences, future society, and the economy.

The programme brings together a unique community of researchers and users to study, understand and find solutions to real problems.

Researchers are from a diverse range of disciplines including the social sciences, engineering, computer science, the arts and medical research.

EPSRC leads the RCUK Digital Economy Theme in partnership with the Arts and Humanities Research Council and the Economic and Social Research Council on behalf of Research Councils UK.

EPSRC ICT Theme

The ICT Theme is responsible for the information and communication technologies research in EPSRC's portfolio.

The Theme supports high quality fundamental ICT research to meet the UK's current and future technological demand, needs and requirements, and to ensure the future prosperity of the UK, as well as the safety and wellbeing of its people.

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