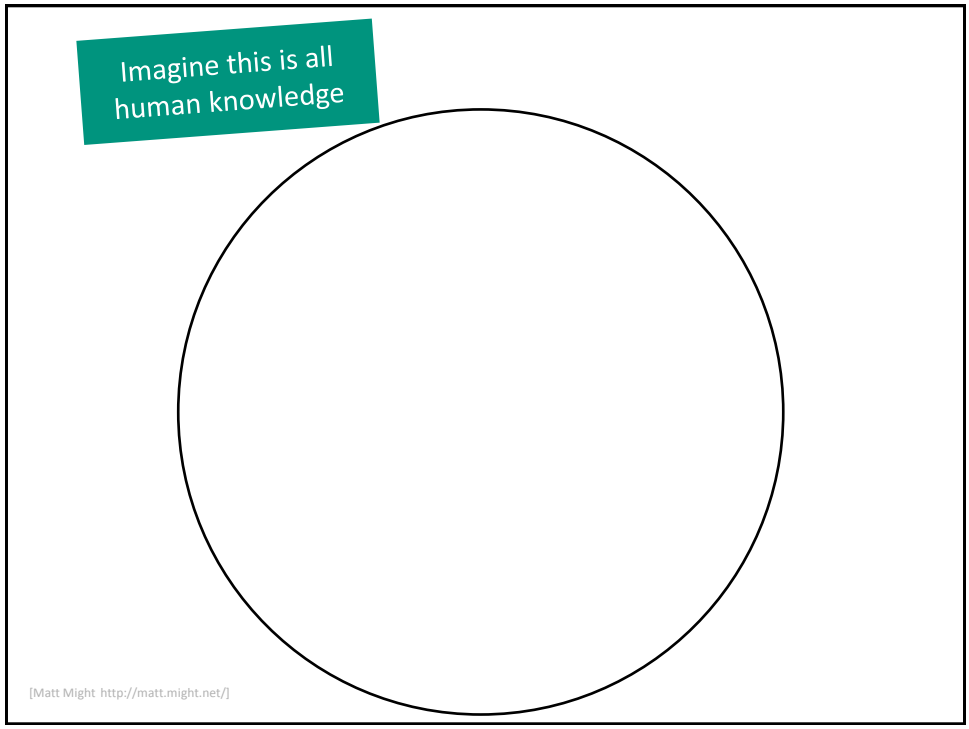
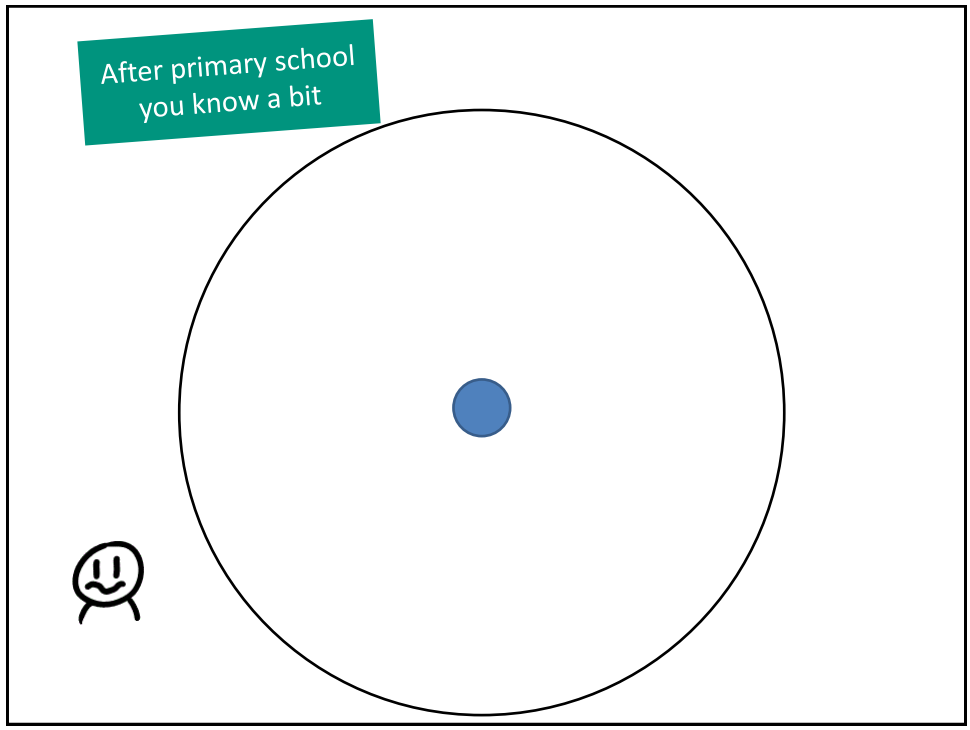
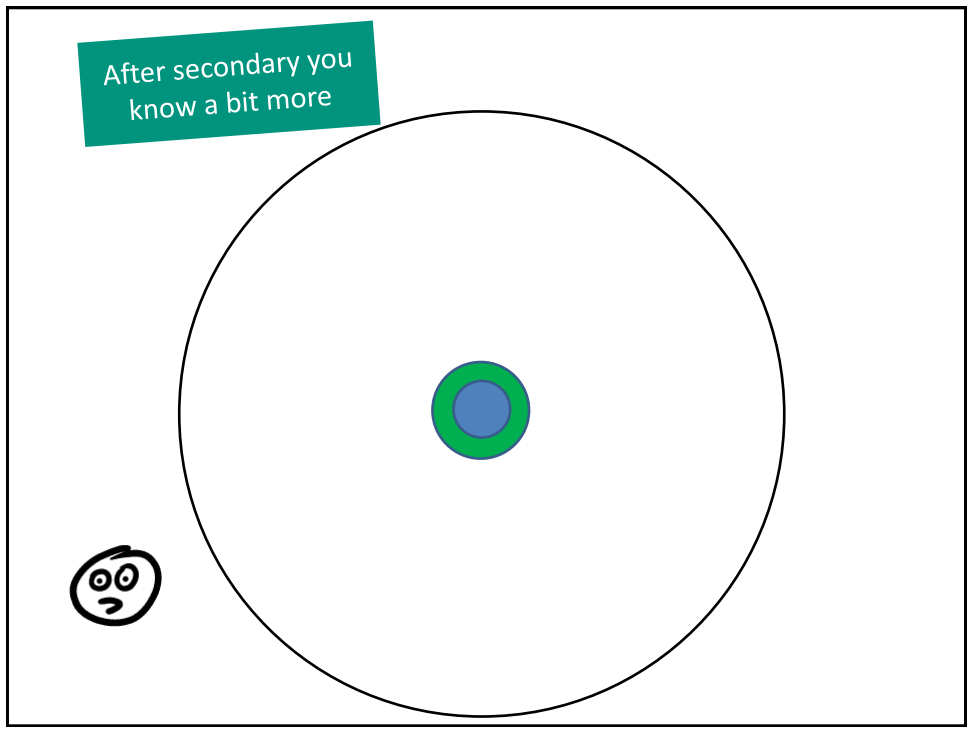
Working Together

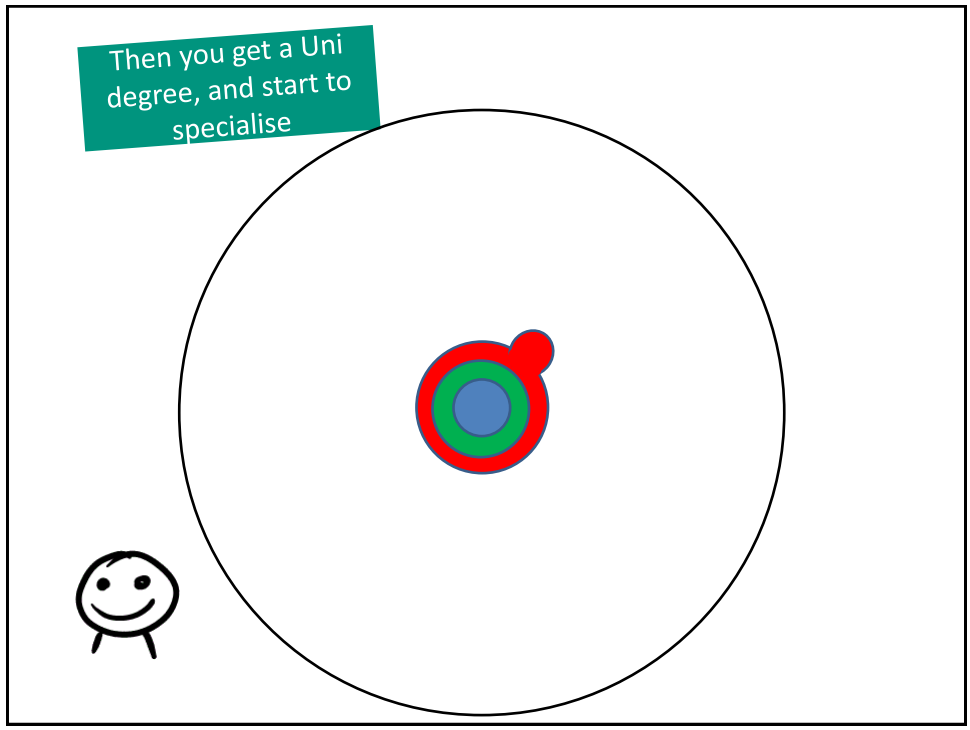
5 Feb 2014, Oxford

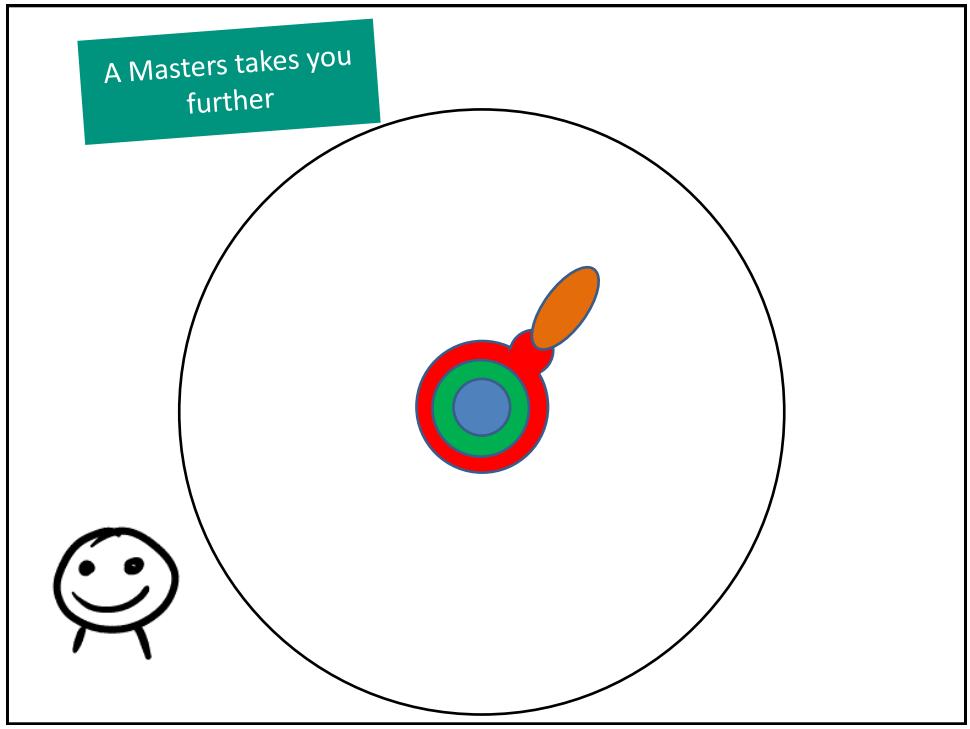
Mike Chantler, Heriot-Watt, Edinburgh

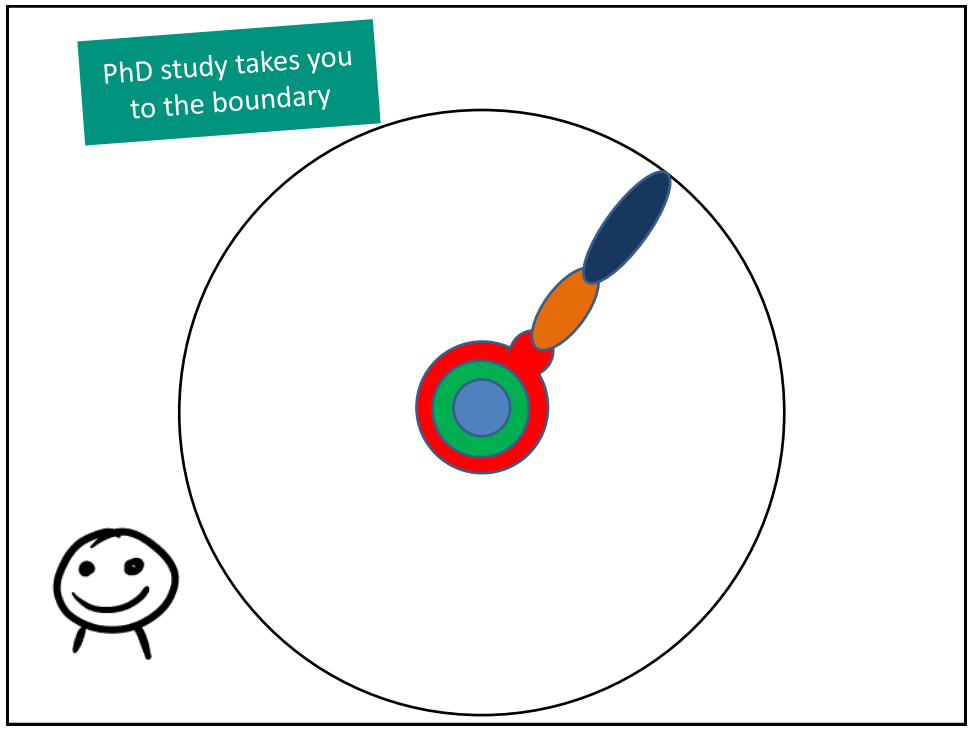


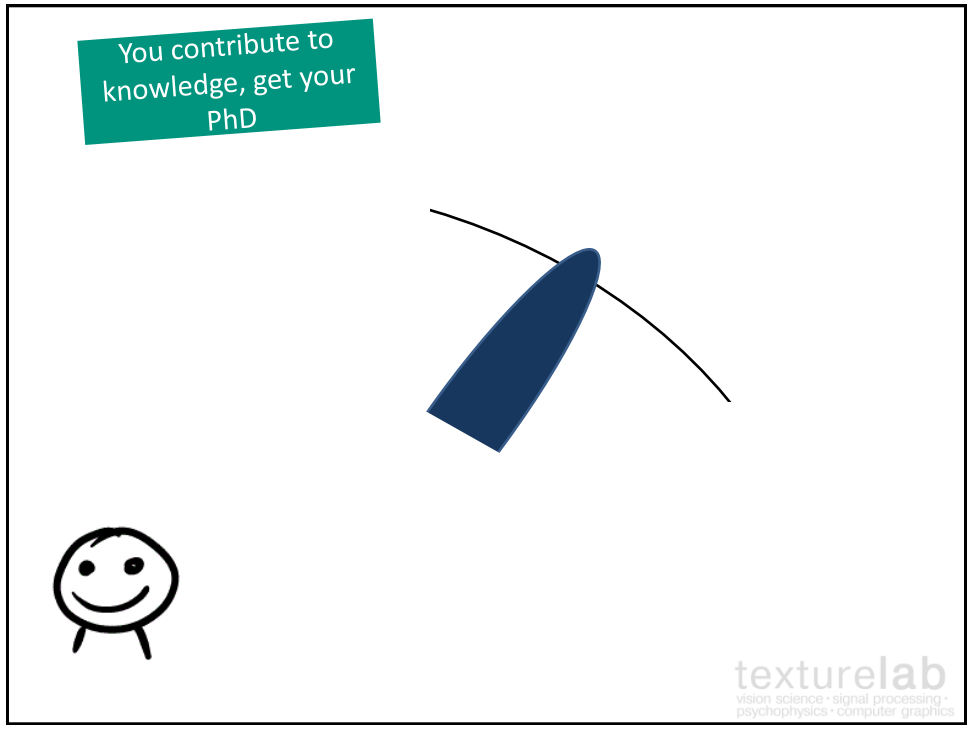

After primary school you know a bit

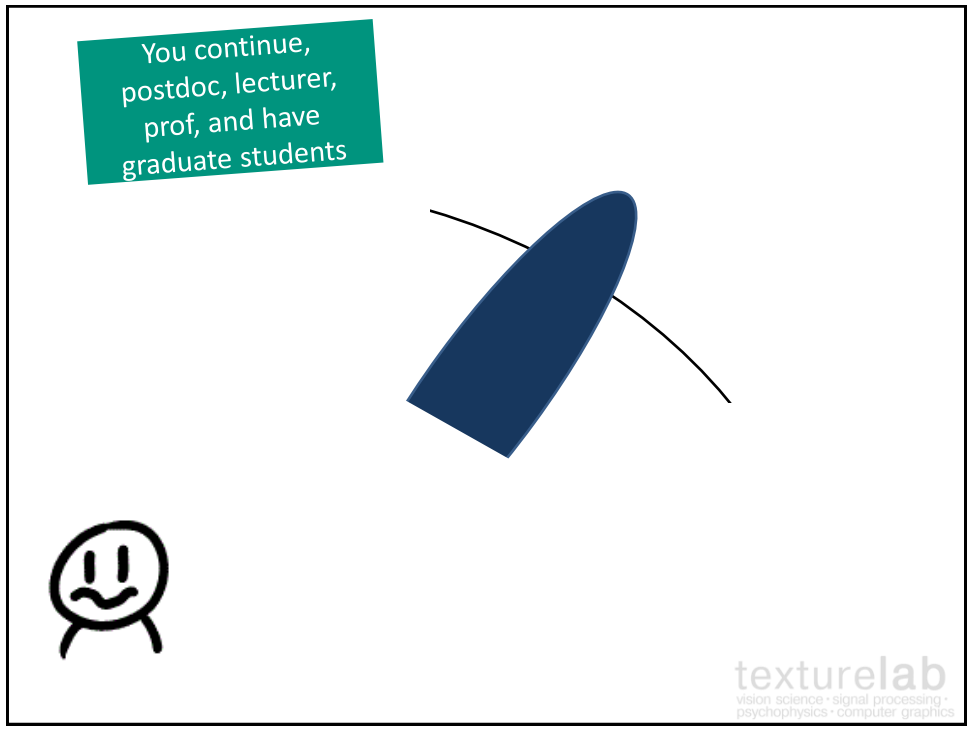

After secondary you know a bit more

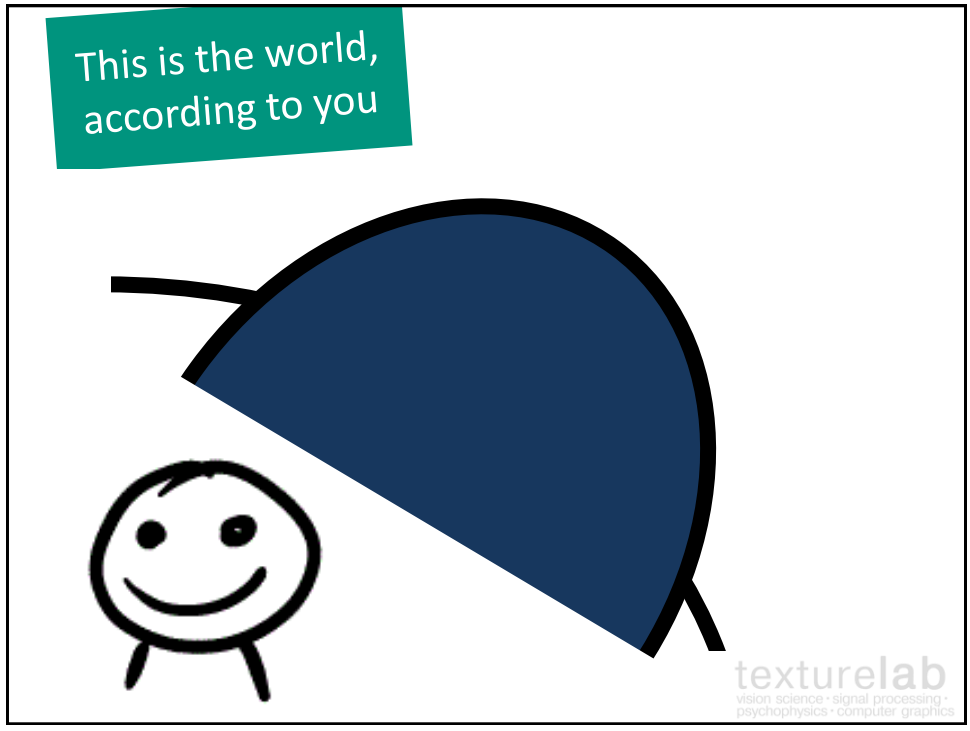

Then you get a Uni degree, and start to specialise

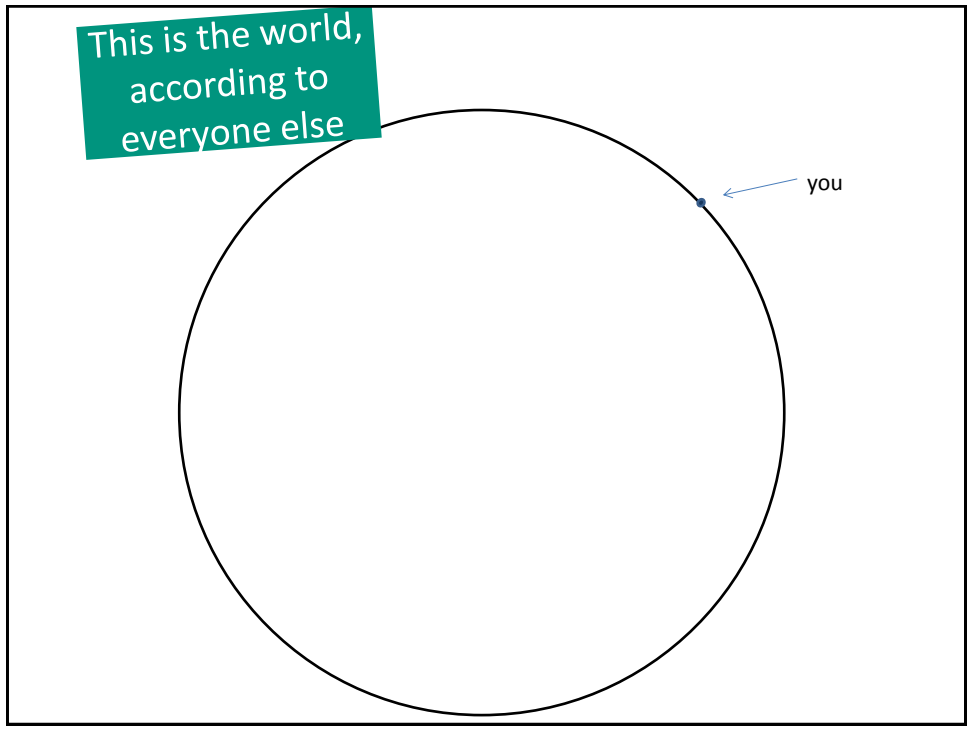

A Masters takes you further

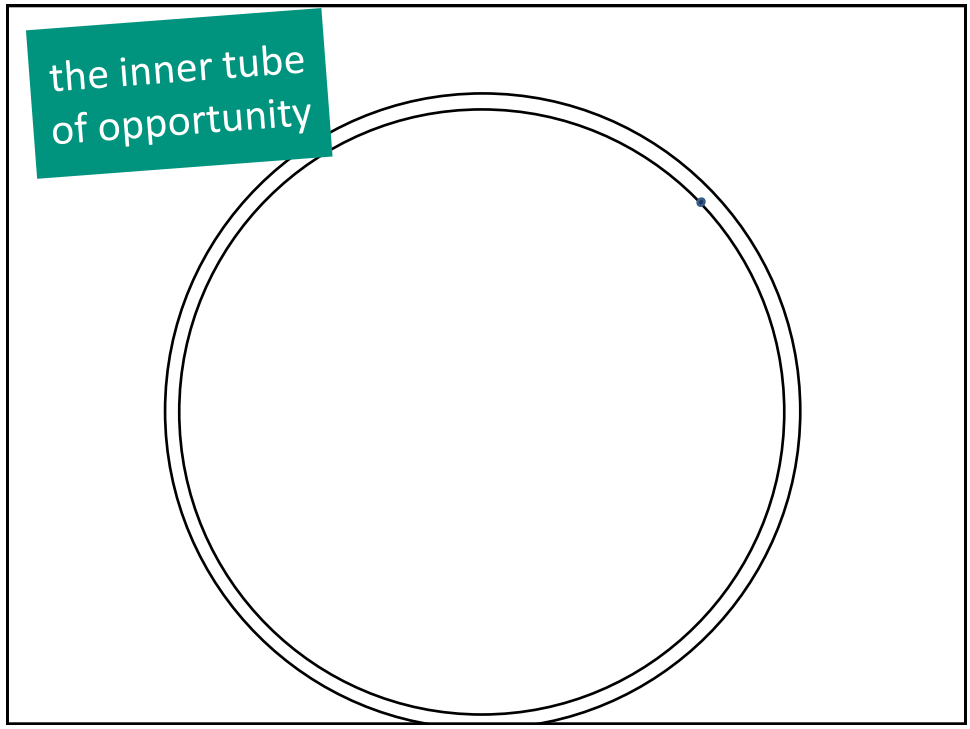

PhD study takes you to the boundary

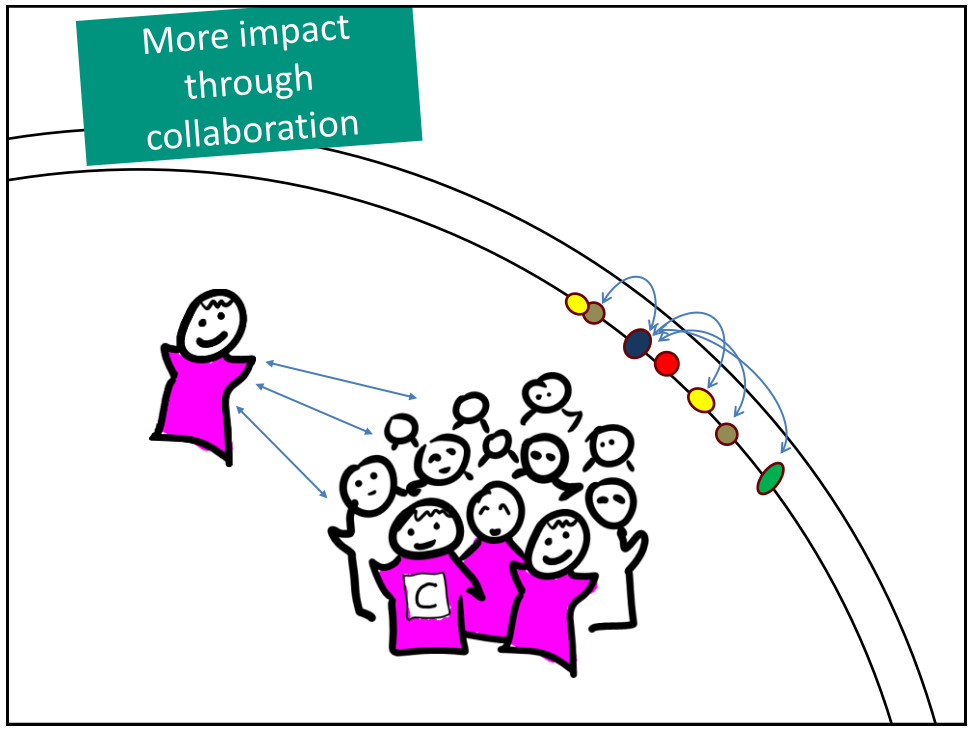

You contribute to knowledge, get your PhD
textureLab
vision science · signal processing · psychophysics · computer graphics


You continue, postdoc, lecturer, prof, and have graduate students
textureLab
vision science · signal processing · psychophysics · computer graphics

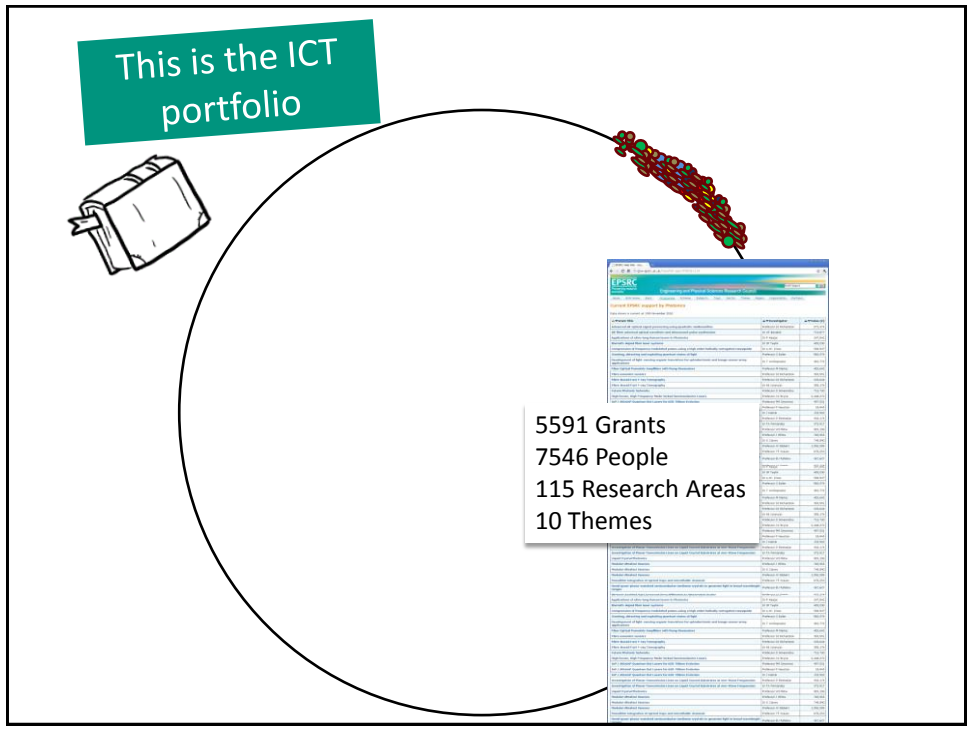

This is the world, according to you
textureLab
vision science · signal processing · psychophysics · computer graphics

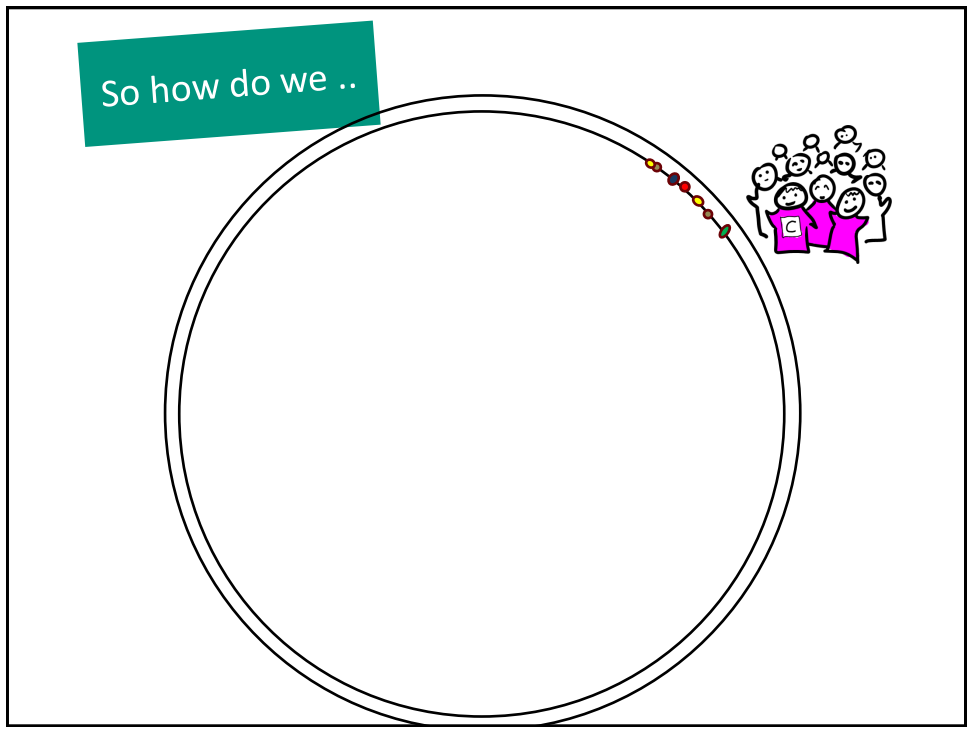

This is the world, according to everyone else
you


the inner tube of opportunity



Exploring the ICT Portfolio


This is the ICT portfolio
5591 Grants
7546 People
115 Research Areas
10 Themes

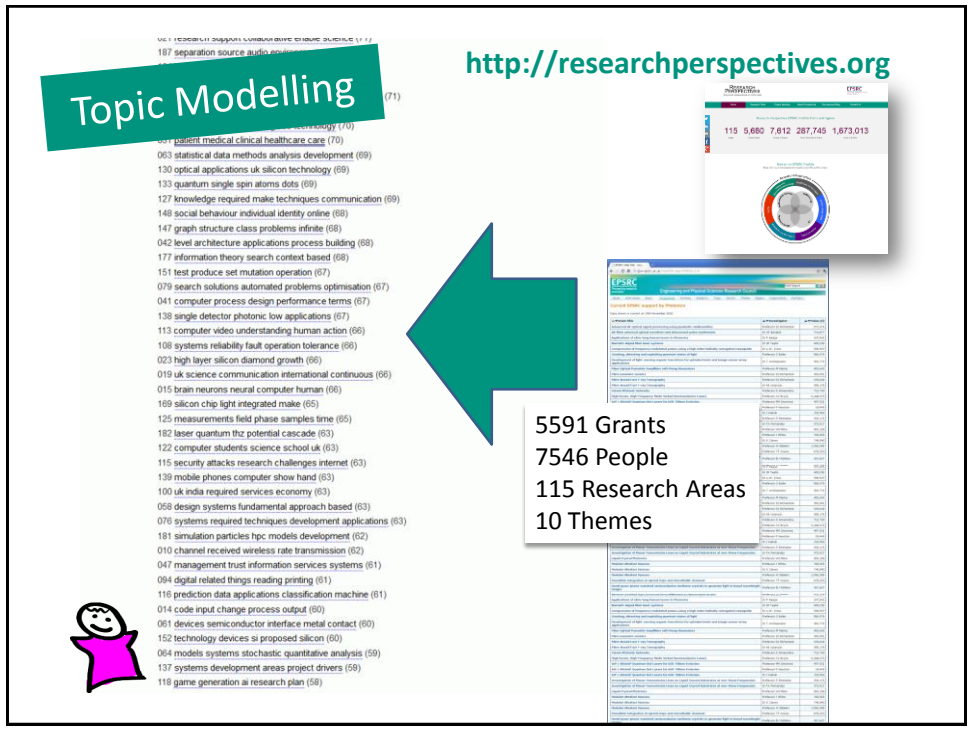

So how do we ..

Navigate this?

5591 Grants
7546 People
115 Research Areas
10 Themes

Grants on the web

5591 Grants
7546 People
115 Research Areas
10 Themes


Topic Modelling
http://researchperspectives.org
187 separation source audio
063 statistical data methods analysis development (69)
130 optical applications uk silicon technology (69)
133 quantum single spin atoms dots (69)
127 knowledge required make techniques communication (69)
148 social behaviour individual identity online (68)
147 graph structure class problems infinite (68)
042 level architecture applications process building (68)
177 information theory search context based (68)
151 test produce set mutation operation (67)
079 search solutions automated problems optimisation (67)
041 computer process design performance terms (67)
138 single detector photonic low applications (67)
113 computer video understanding human action (66)
108 systems reliability fault operation tolerance (66)
023 high layer silicon diamond growth (66)
019 uk science communication international continuous (66)
015 brain neurons neural computer human (66)
169 silicon chip light integrated make (65)
125 measurements field phase samples time (65)
182 laser quantum thz potential cascade (63)
122 computer students science school uk (63)
115 security attacks research challenges internet (63)
139 mobile phones computer show hand (63)
100 uk india required services economy (63)
058 design systems fundamental approach based (63)
076 systems required techniques development applications (63)
181 simulation particles hpc models development (62)
010 channel received wireless rate transmission (62)
047 management trust information services systems (61)
094 digital related things reading printing (61)
116 prediction data applications classification machine (61)
014 code input change process output (60)
061 devices semiconductor interface metal contact (60)
152 technology devices si proposed silicon (60)
064 models systems stochastic quantitative analysis (59)
137 systems development areas project drivers (59)
118 game generation ai research plan (58)
5591 Grants
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115 Research Areas
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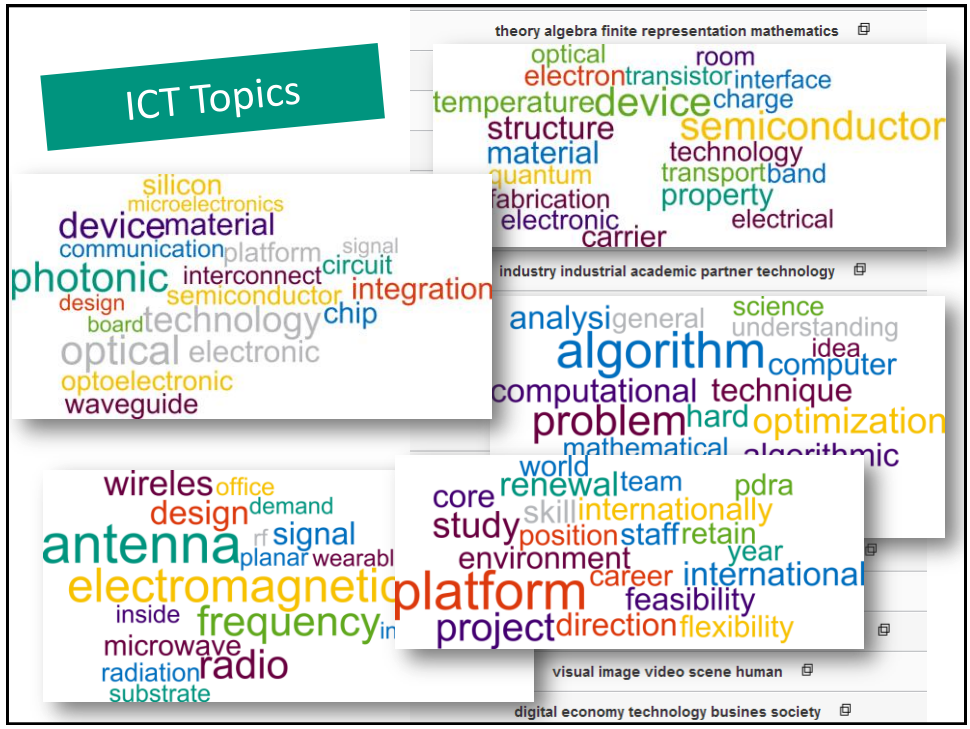
ICT Topics
theory algebra finite representation mathematics
optical room electron transistor interface temperature device charge structure semiconductor material technology quantum transport band property fabrication electronic electrical carrier
industry industrial academic partner technology
analysis general science understanding algorithm idea computer computational technique problem hard optimization mathematical algorithmic
silicon microelectronics device material communication platform signal photonic interconnect circuit design semiconductor integration board technology chip optical electronic optoelectronic waveguide
wireless office design demand antenna rf signal planar wearabl electromagnetic inside frequency microwave radiation radio substrate
world core renewal team pdra study skill internationally position staff retain environment year career international platform feasibility project direction flexibility
visual image video scene human
digital economy technology busines society

Generative model

EP/K002228/1 - Integrated, Market-fit and Affordable Grid-scale Energy Storage (IMAGES)

It is accepted that UK energy networks face a number of unprecedented challenges in the upcoming decades. These challenges include the threat to the security of energy supply due to declining indigenous fossil fuel reserves, increased reliance on imported fossil fuel (78% of [redacted] and 50% of natural [redacted] are imported, it is predicted that [redacted] import will be over 80% in 2020), and planned retirement of ageing generation capacity over the next decade (approximately 20GW or 25% of the existing generation capacity); decarbonising electricity generation to achieve the goal of 80% reduction in CO2 emissions by 2050; and coping with the future increases in electricity demand from electrification of transportation and space heating. To address these great challenges, it is recognized that the UK energy networks, must change, strategically and the existing regulatory arrangements should be examined to check if they are fit for the purpose of future energy network operations.

To ensure that power supply closely matches demand, the amount of electricity generated must be well controlled and managed. If the balance between supply and demand is broken and the difference exceeds a critical level, the power system may fail and cause a regional blackout. The UK is especially vulnerable in terms of network stability as it has a relatively isolated small island power network. Currently, 80% of our electricity is generated from fossil fuel ([redacted] or [redacted]) with the load balancing function mainly managed through fossil fuel peaking generation [redacted]s that respond to load changes. The mix of electricity generation in the UK will change dramatically with a large reduction in the use of [redacted] and [redacted] and an increase in the clean variable, intermittent renewable energy generators. The inherent energy storage capability that we currently enjoy due to our dependence on fossil fuel power generation will then be greatly reduced by 2030.

Solutions are needed to address the network challenges that will occur due to a decrease in the implicit energy storage available with the planned reduction in fossil fuel power generation and the integration of large amounts of unpredictable intermittent renewable sources. Energy storage can provide manifold values in i) help meeting of peaky large scale electrical loads, ii) providing time varying energy charge management, iii) allowing renewable power generation to be stored to alleviate intermittence, iv) improving power quality/reliability, v) meeting remote load needs, vi) storage for management of distributed power generation, etc. This proposed research programme will focus on the challenging technical and economic issues faced by integrating large grid scale energy storage with the energy network.

Generative model

EP/K002228/1 - Integrated, Market-fit and Affordable Grid-scale Energy Storage (IMAGES)

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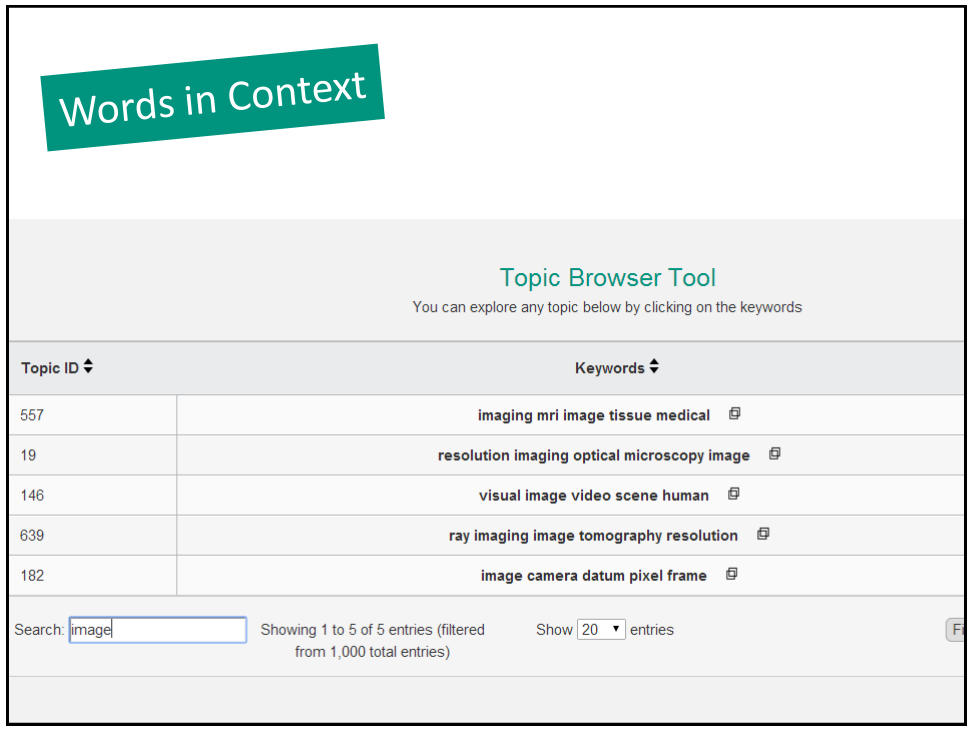
34%

22%

4%


Words in Context
Topic Browser Tool
You can explore any topic below by clicking on the keywords
Topic ID
Keywords
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imaging mri image tissue medical
19
resolution imaging optical microscopy image
146
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Search: image
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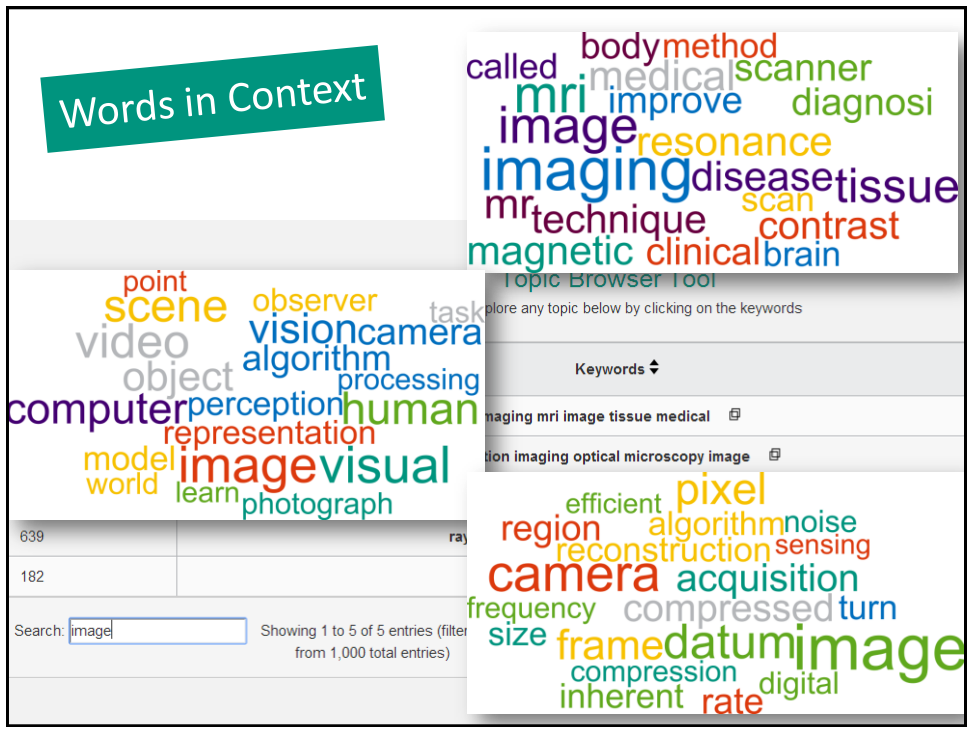
Show 20 entries


Words in Context
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disease
tissue
mr
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scan
contrast
magnetic
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brain
point
scene
observer
video
vision
camera
algorithm
object
processing
computer
perception
human
representation
model
image
visual
world
learn
photograph
Topic Browser Tool
plore any topic below by clicking on the keywords
Keywords
aging mri image tissue medical
ion imaging optical microscopy image
efficient
pixel
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algorithm
noise
reconstruction
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camera
acquisition
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compressed
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size
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datum
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compression
digital
inherent
rate
639
182
Search: image
Showing 1 to 5 of 5 entries (filter from 1,000 total entries)

RP Website

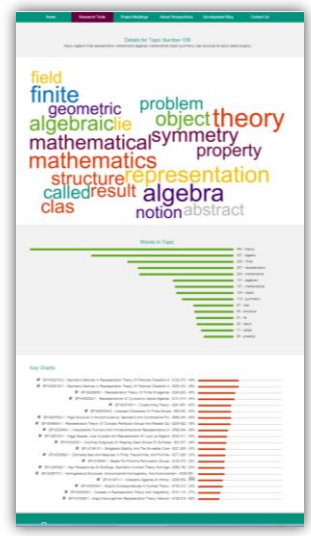
1. Topics
2. Grants
3. Investigators
4. Tools

http://researchperspectives.org

Topics

1. Visualisation
2. Words
3. Key Grants

http://researchperspectives.org

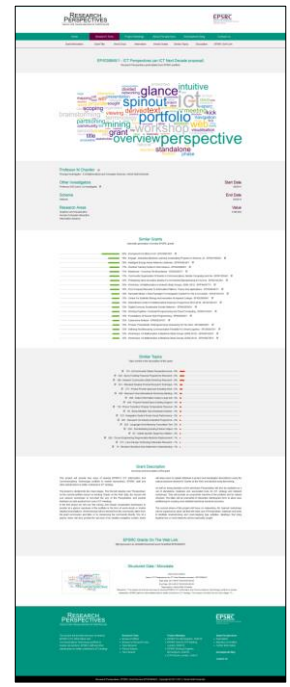


Grants

Modular design easily extended:

1. Visualisation
2. Link information
3. Similar grants
4. Similar topics
5. Description
6. GOW link
7. Meta Data

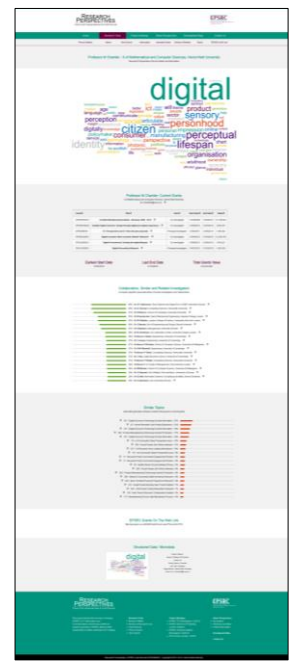
http://researchperspectives.org



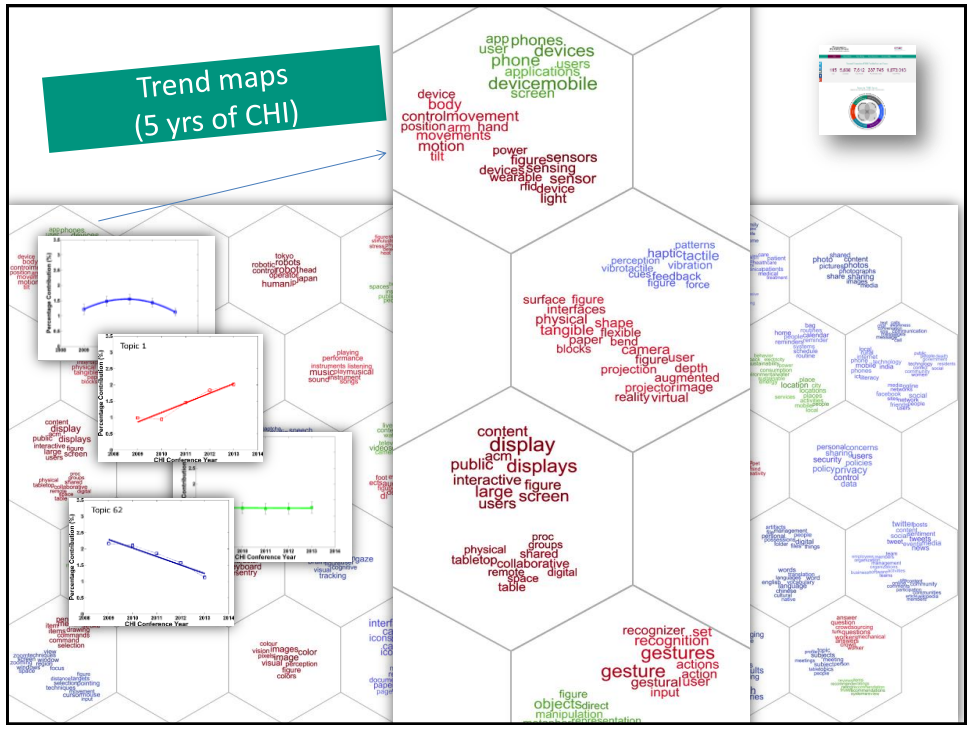
Investigators

1. Visualisation
2. Grants
3. Similar investigators / collaborators
4. Similar topics
5. GOW link
6. Meta Data

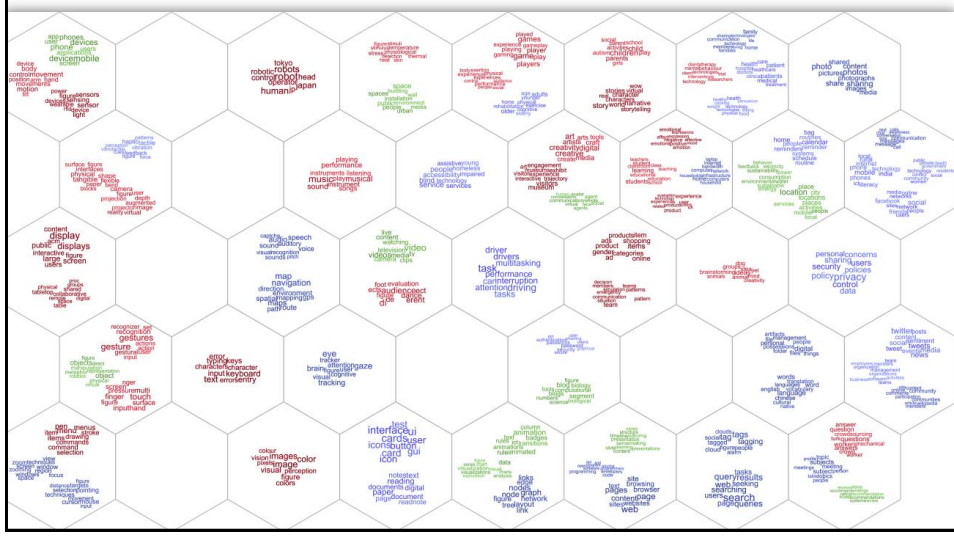
http://researchperspectives.org



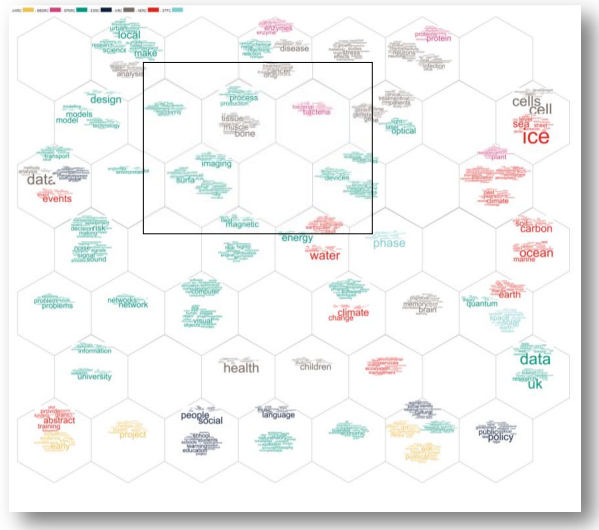
Other things you can do with topic modelling

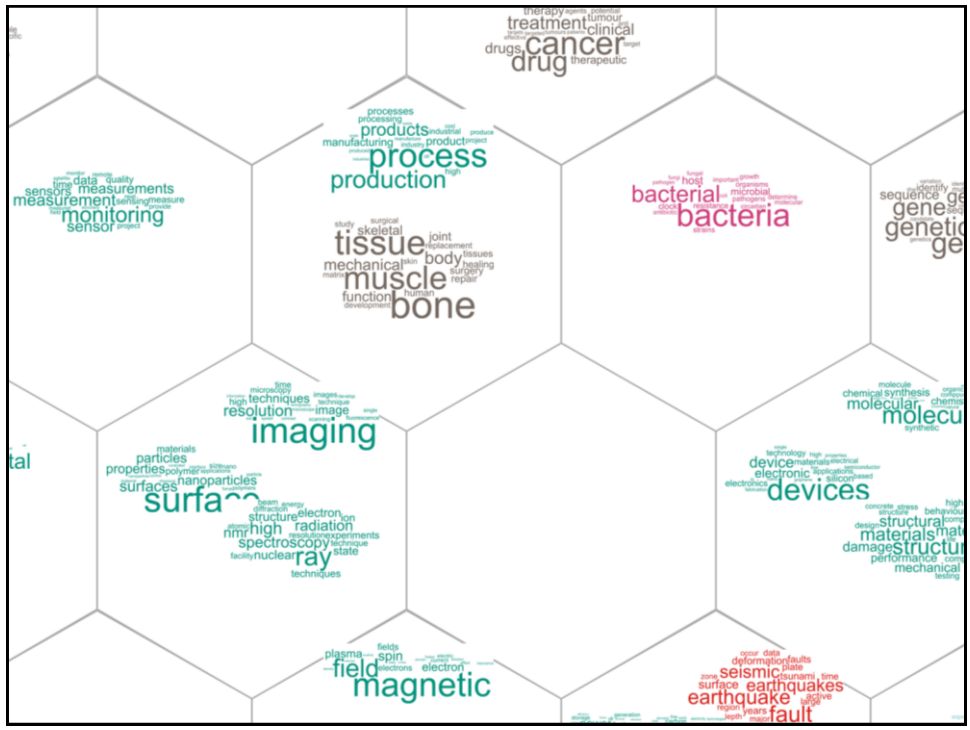


Trend maps (5 yrs of CHI)



RCUK research

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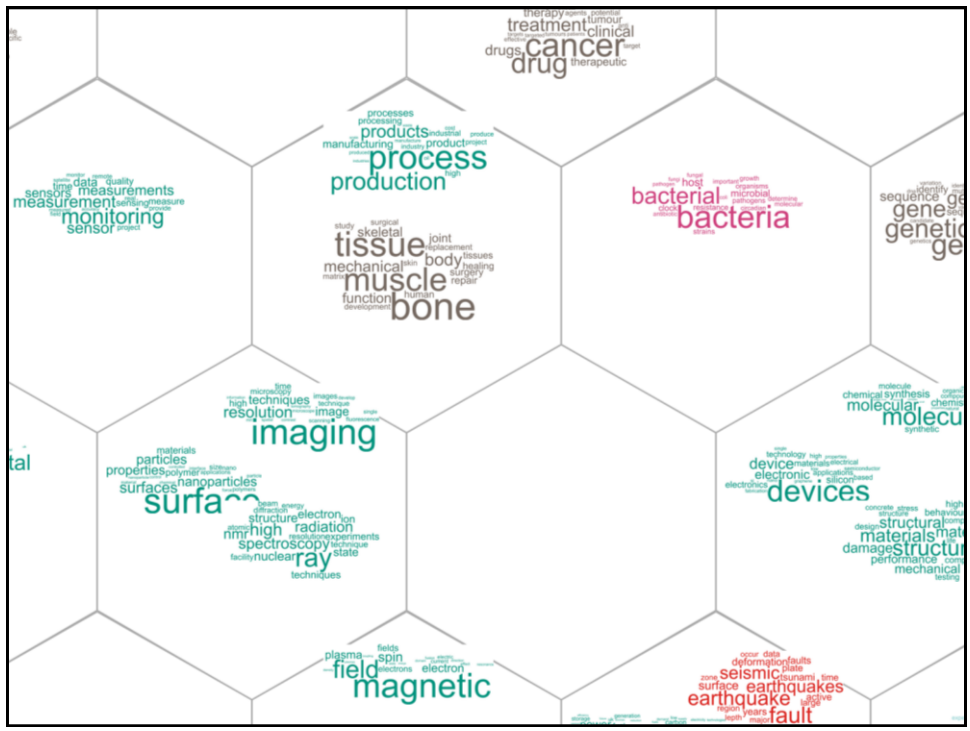
earthquake
earthquakes
fault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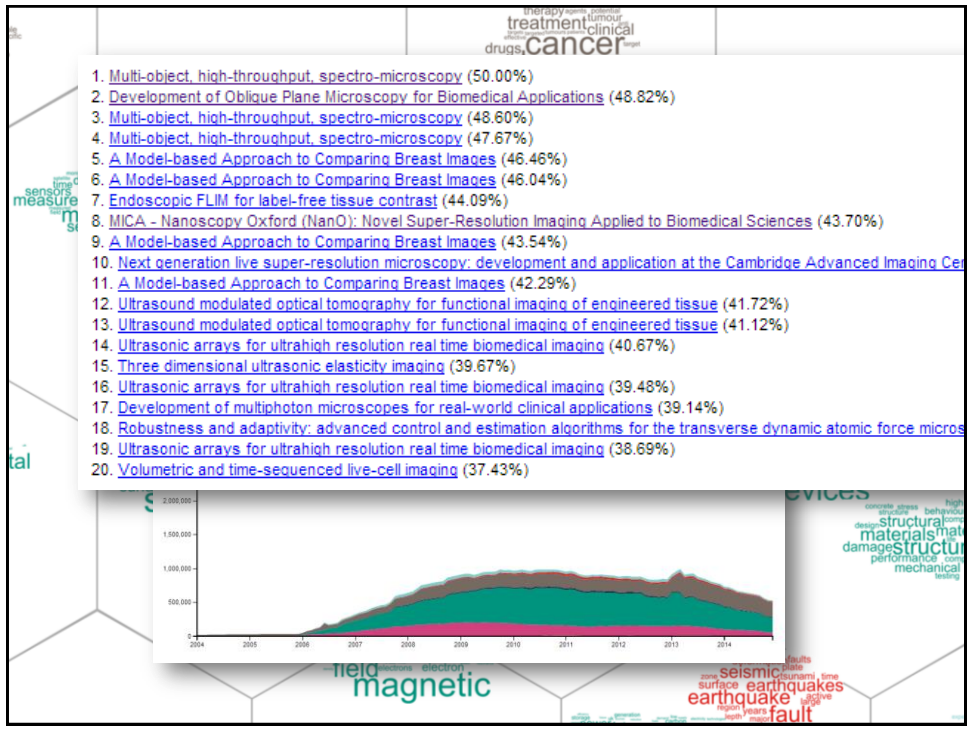
earthquake
earthquakes
fault

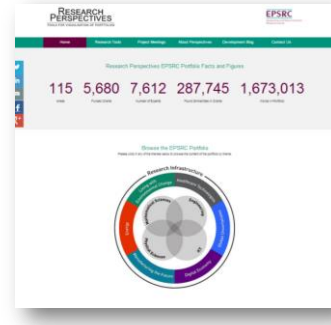


Topic modelling

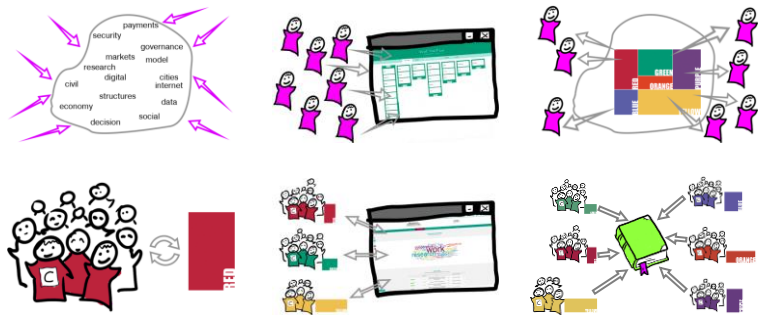
- Gives accessible overview
- Encourages browsing
- Provides ‘independent’ classification
  - avoids politics
  - allows comparison across different sources
  - shows trends

tools

- Portfolio visualisation
  - researchperspectives.org
- Meetings
  - www.well-sorted.org

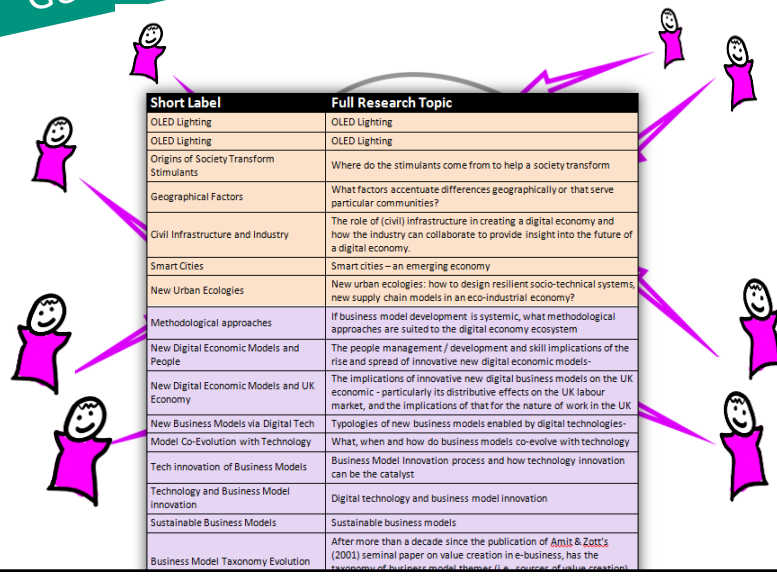


Six-step Process for organising strategy meetings



Strategy document

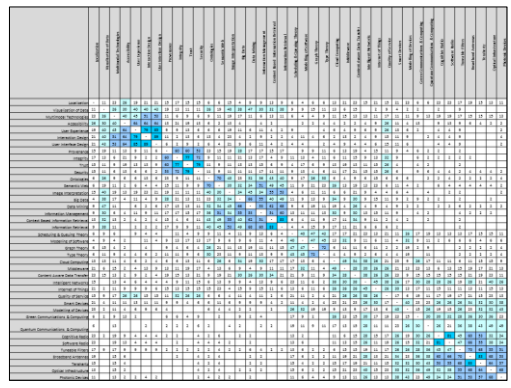
Step 1 – Idea Generation



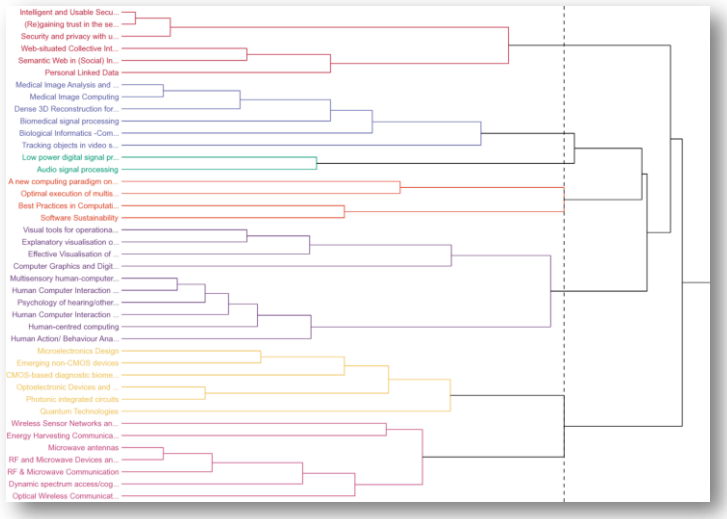
Short Label	Full Research Topic
OLED Lighting	OLED Lighting
OLED Lighting	OLED Lighting
Origins of Society Transform Stimulants	Where do the stimulants come from to help a society transform
Geographical Factors	What factors accentuate differences geographically or that serve particular communities?
Civil Infrastructure and Industry	The role of (civil) infrastructure in creating a digital economy and how the industry can collaborate to provide insight into the future of a digital economy.
Smart Cities	Smart cities – an emerging economy
New Urban Ecologies	New urban ecologies: how to design resilient socio-technical systems, new supply chain models in an eco-industrial economy?
Methodological approaches	If business model development is systemic, what methodological approaches are suited to the digital economy ecosystem
New Digital Economic Models and People	The people management / development and skill implications of the rise and spread of innovative new digital economic models-
New Digital Economic Models and UK Economy	The implications of innovative new digital business models on the UK economic - particularly its distributive effects on the UK labour market, and the implications of that for the nature of work in the UK
New Business Models via Digital Tech	Typologies of new business models enabled by digital technologies-
Model Co-Evolution with Technology	What, when and how do business models co-evolve with technology
Tech innovation of Business Models	Business Model Innovation process and how technology innovation can be the catalyst
Technology and Business Model innovation	Digital technology and business model innovation
Sustainable Business Models	Sustainable business models
Business Model Taxonomy Evolution	After more than a decade since the publication of Amit & Zott's (2001) seminal paper on value creation in e-business, has the taxonomy of business model themes (i.e., sources of value creation)

Step 2 - Sorting

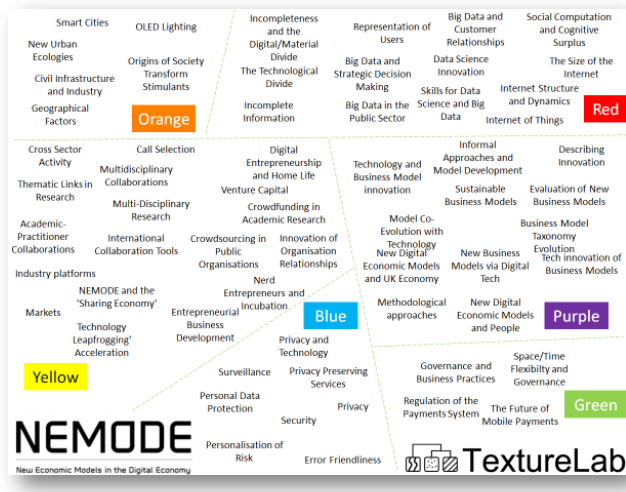
Step 3 - Clustering



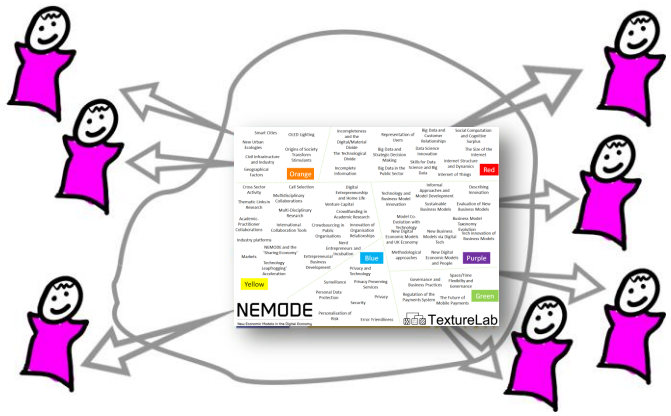
Step 3 - Clustering



Step 3 - Clustering



Step 3 - Dissemination



Step 4 – Group Selection

Incompleteness and the Digital/Material Divide
The Technological Divide
Incomplete Information
Representation of Users
Big Data and Strategic Decision Making
Big Data in the Public Sector
Big Data and Customer Relationships
Data Science Innovation
Skills for Data Science and Big Data
Social Computation and Cognitive Surplus
The Size of the Internet
Internet Structure and Dynamics
Internet of Things
Red

Step 5 –Breakout

Incompleteness and the Digital/Material Divide
The Technological Divide
Incomplete Information
Representation of Users
Big Data and Strategic Decision Making
Big Data in the Public Sector
Big Data and Customer Relationships
Data Science Innovation
Skills for Data Science and Big Data
Social Computation and Cognitive Surplus
The Size of the Internet
Internet Structure and Dynamics
Internet of Things
Red

Big Data and Strategic Decision Making	How can 'big data' support strategic decision making, for instance at board level in organisations?
The Size of the Internet	How big is the internet? What metrics are appropriate and how can we reconcile publicly available indicators such as traffic through internet exchanges with commercial trends such as traffic contained in content delivery networks (CDNs) and other private and commercial networks?
Internet Structure and Dynamics	What is the structure and dynamics of the internet and how does it change?
Social Computation and Cognitive Surplus	How can we use social computation to access cognitive surplus, third actor and informal actors to enable co-production of a range of services (e.g. Health and Care)?
The Technological Divide	I would like to see the NEMODE agenda contribute towards bridging the widening technological divide between the least developed countries (LDC), the emerging economies and the technologically advanced countries.
Incompleteness and the Digital/Material Divide	How does incompleteness span the digital/material divide?
Incomplete Information	In a material world of incomplete or malleable artefacts and services is there a corresponding world of incomplete information and how does this provide a platform for design, experiment and production of such goods and services?
Representation of Users	Representation of Users
Data Science Innovation	Data science, innovation and business productivity
Skills for Data Science and Big Data	Skills for data science and big data

Step 5 - Gateway to Research Data

	Relevance			
	55.52%			
	54.55%			
	54.09%	ESRC	The Big Society, Localism & Housing Policy	
	53.92%	STFC	Big Science - Big Telescopes	
	53.92%	STFC	Connecting Early Universe Physics to Modern Advances in Observational Astronomy	
	53.87%	STFC	Branes, Strings and Defects in Cosmology	
	53.61%	STFC	Astronomy and Cosmology with the Planck Experiment	
	53.61%	STFC	Theory from the Planck Experiment	
	53.61%	NERC	Assessing the size of explosive super-eruptions: how big is big?	
	53.09%	STFC	Twistor String Theory and Time-dependent Backgrounds	
	52.91%	STFC	PATT Linked Grant Support for the Bristol Astrophysics Group	
	52.91%	STFC	Project support for the Wide Angle Search for Planets	

Step 5: output

Big and Open Data

Red

NEMODE TextureLab

Raconteur Name: Richard Vidgen
Raconteur Email: r.vidgen(at)hull.ac.uk

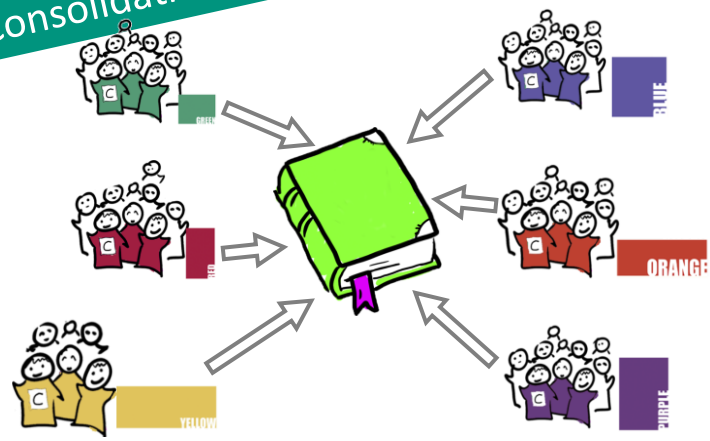
Group Members:
Richard Vidgen
Hasan Bakhshi
Maureen Meadows
Nina Marshall
Carla Bonina

Research Question #1:
What is the value to the UK of open data?
- Value and benefits in terms of economic, social, political and environmental dimensions
- Issues, tensions, and challenges for the nation, organisations and citizens

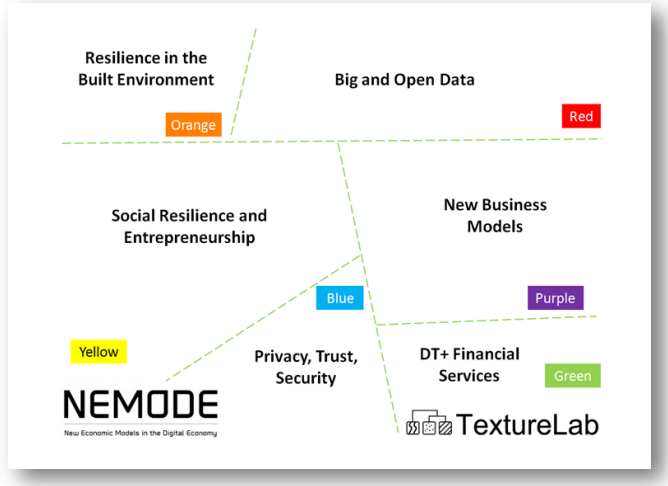
Research Question #2:
What skills and capabilities do UK organisations need to create value from 'big data'?
- Value of impact on: UK organisations and their business models; creation of new and skilled jobs (e.g., data scientist); and the competitiveness of the UK economy
- Scope includes all stages of big data management, e.g., data collection, data analysis, using big data for business operations, using big data in strategic decision-making,,
- Implications for training, education, and policy

Research Question #3:
What are the opportunities and ethical challenges for randomised controlled experiments (RCTs) around 'big data'?
- We predict that public and private sector organisations will make greater use of big data to run RCTs to test business and public sector offerings
- Although RCTs are a powerful way of getting evidence about what works they also raise ethical concerns: firstly, about the conduct of the RCT itself, and secondly, about how RCT data is used to guide business and policy decisions

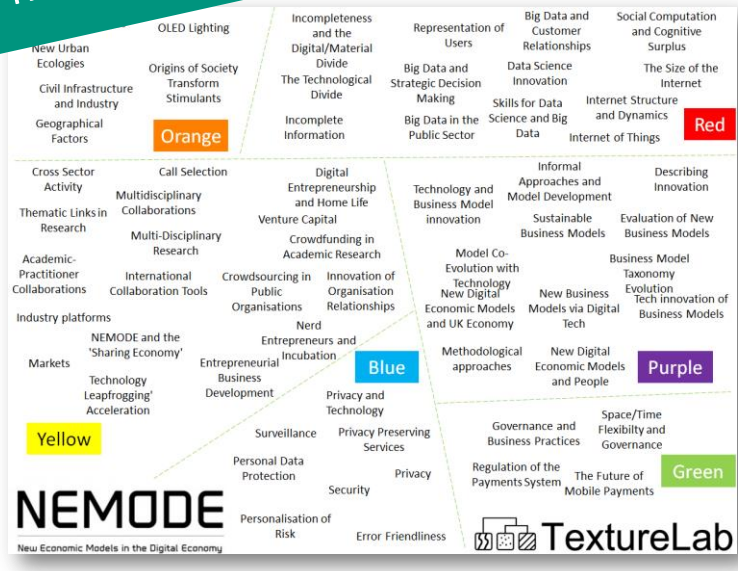
Step 6 - Consolidation



Result: top-level

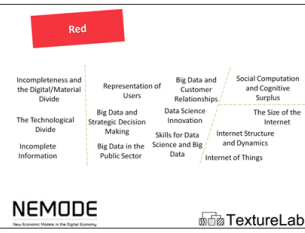


Result - detail



Research questions

Big and Open Data



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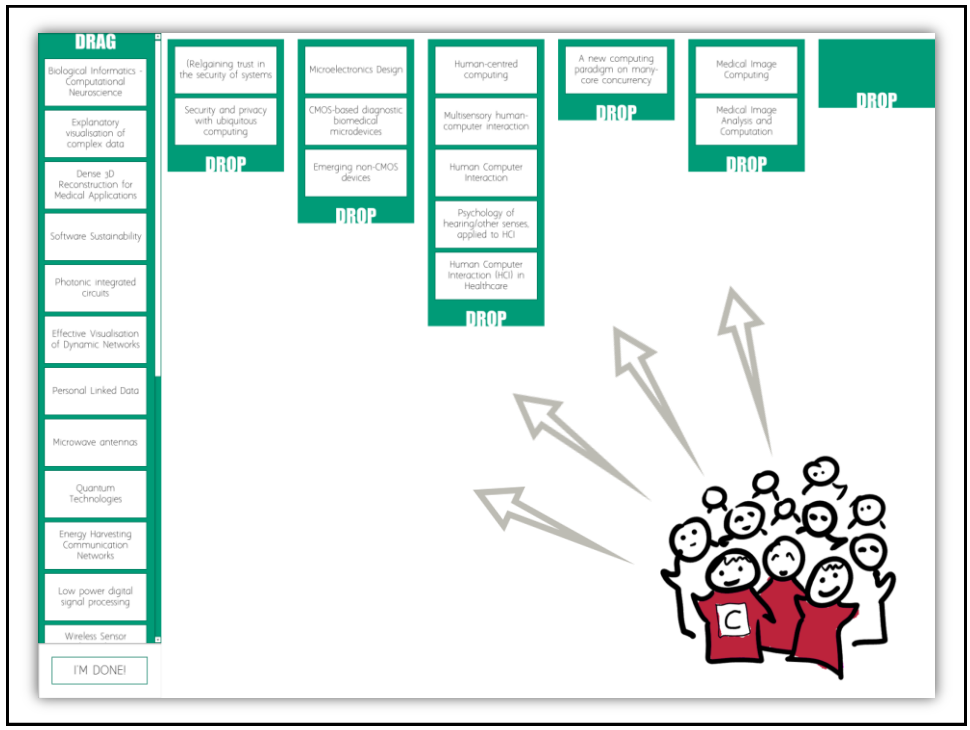
This Meeting


DRAG
Biological Informatics - Computational Neuroscience
Explanatory visualisation of complex data
Dense 3D Reconstruction for Medical Applications
Software Sustainability
Photonic integrated circuits
Effective Visualisation of Dynamic Networks
Personal Linked Data
Microwave antennas
Quantum Technologies
Energy Harvesting Communication Networks
Low power digital signal processing
Wireless Sensor
I'M DONE!
(Re)gaining trust in the security of systems
Security and privacy with ubiquitous computing
DROP
Microelectronics Design
CMOS-based diagnostic biomedical microdevices
Emerging non-CMOS devices
DROP
Human-centred computing
Multisensory human-computer interaction
Human Computer Interaction
Psychology of hearing/other senses applied to HCI
Human Computer Interaction (HCI) in Healthcare
DROP
A new computing paradigm on many-core concurrency
DROP
Medical Image Computing
Medical Image Analysis and Computation
DROP
DROP
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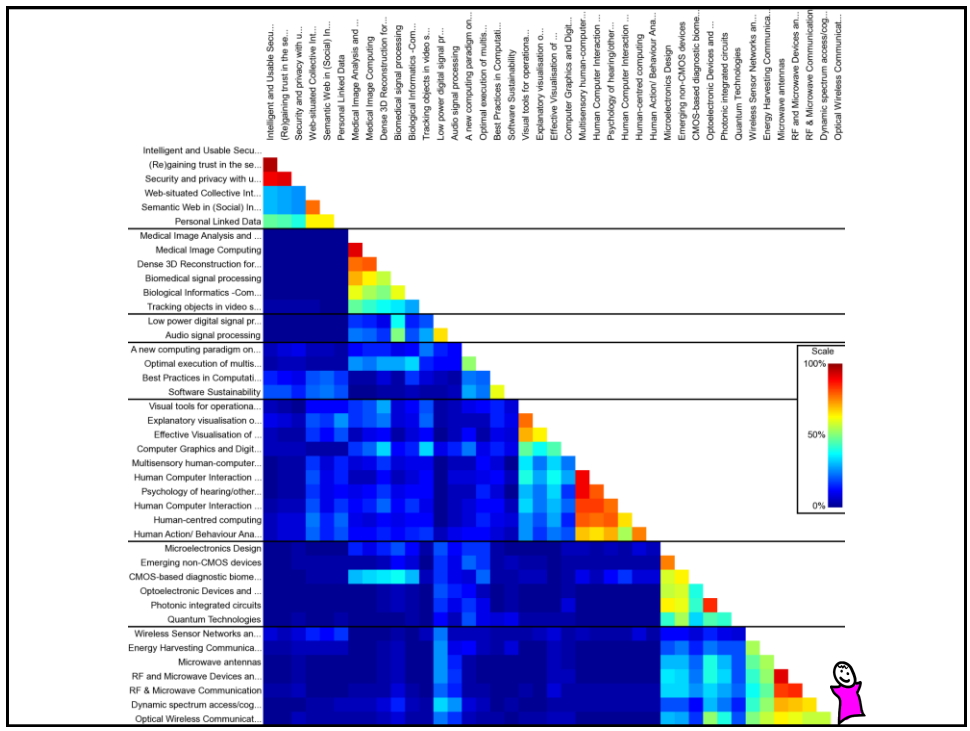
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Security and privacy with u...
Web-situated Collective Int...
Semantic Web in (Social) In...
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RF and Microwave Devices an...
RF & Microwave Communication
Dynamic spectrum access/cog...
Optical Wireless Communicat...
Scale
100%
50%
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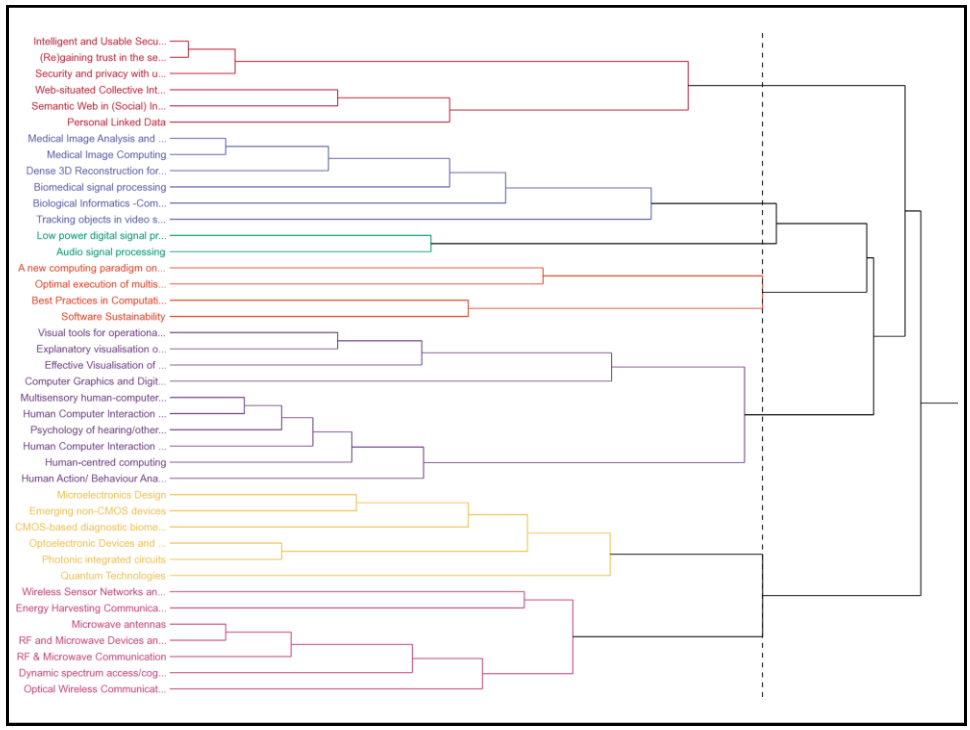
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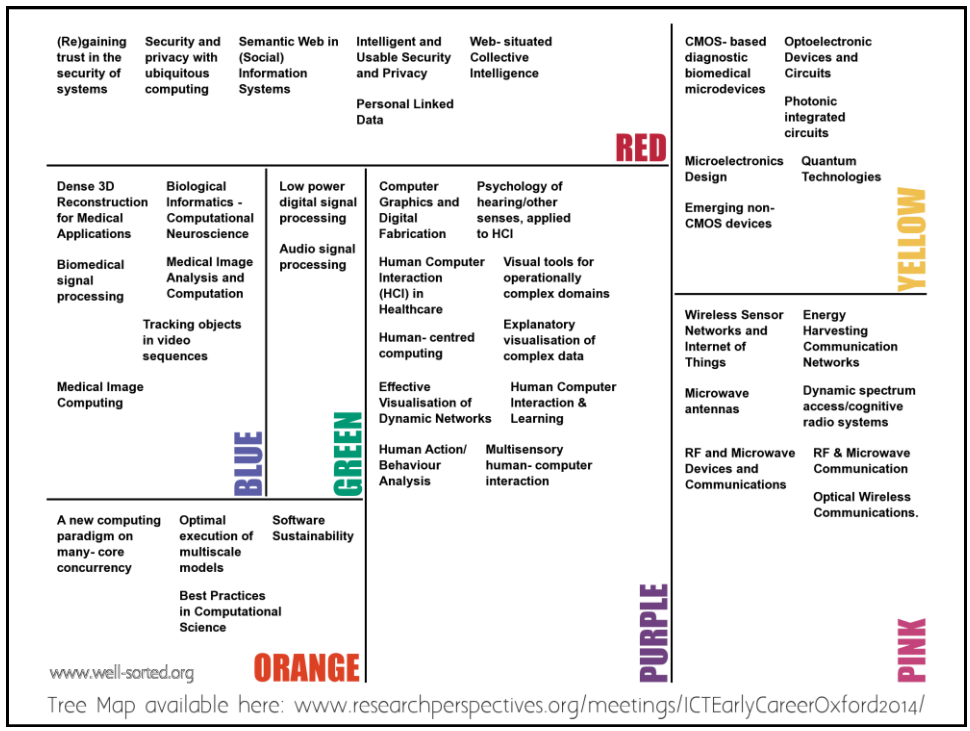
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ORANGE
www.well-sorted.org
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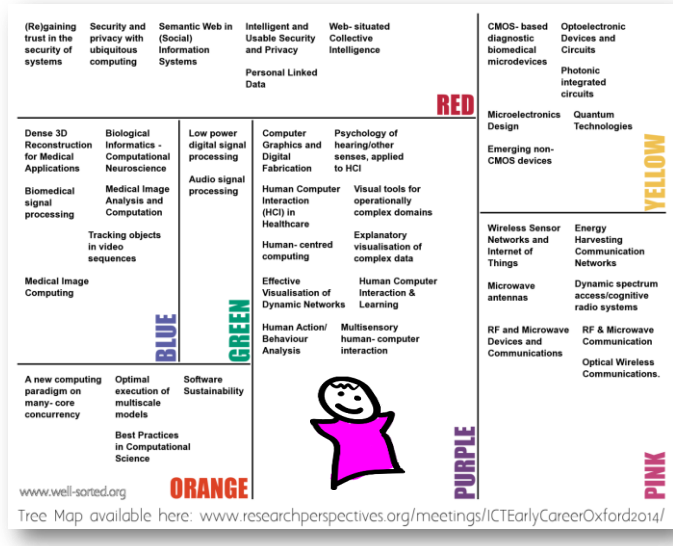
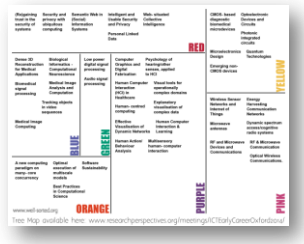
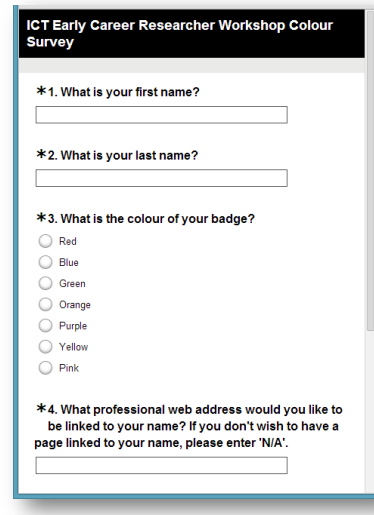
Optoelectronic Devices and Circuits
Photonic integrated circuits
Microelectronics Design
Quantum Technologies
Emerging non-CMOS devices
YELLOW
Wireless Sensor Networks and Internet of Things
Energy Harvesting Communication Networks
Microwave antennas
Dynamic spectrum access/cognitive radio systems
RF and Microwave Devices and Communications
RF & Microwave Communication
Optical Wireless Communications.
PINK
Tree Map available here: www.researchperspectives.org/meetings/ICTEarlyCareerOxford2014/

Networking



Meeting record





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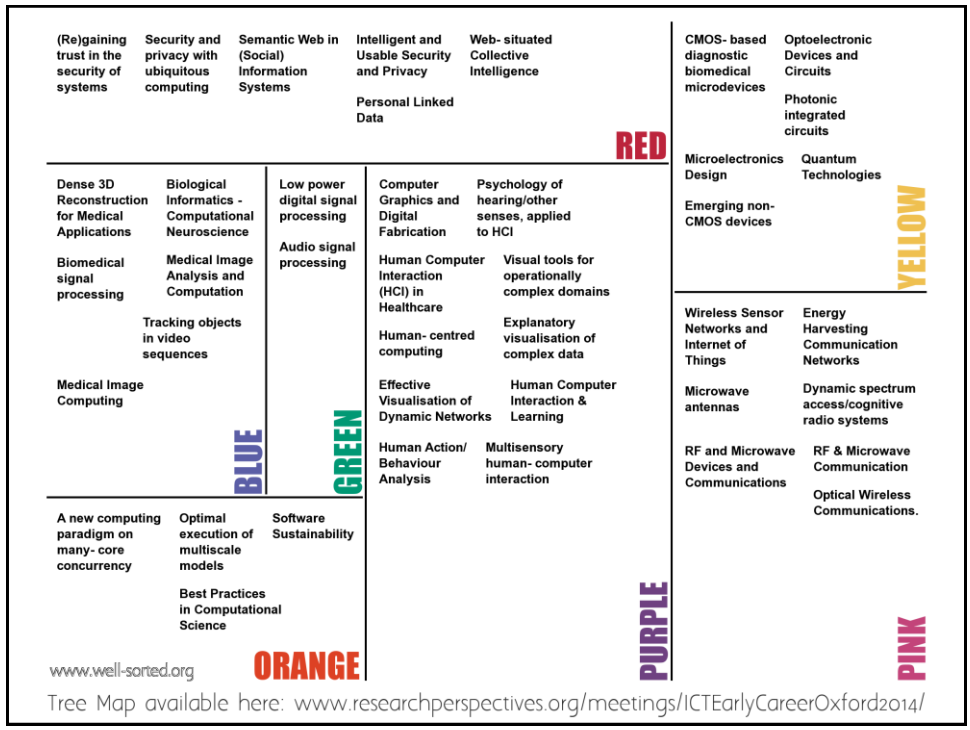

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This Meeting

- Provide an overview of interests
  - Illustrate the wide variety of ICT research to attendees
- Ice breaker
- Networking tool and reference
- List of experts
- Provide EPSRC with snapshot of up-and-coming research capability

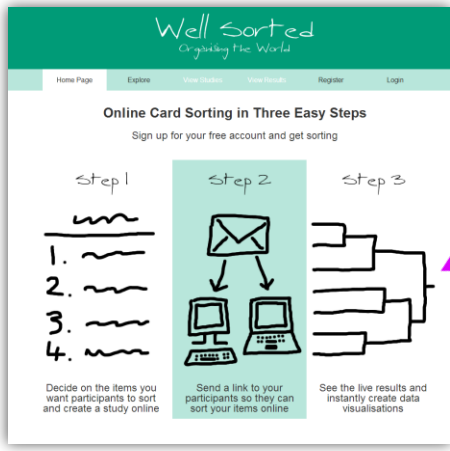
Suggestions

- Explore
  - GOW, GTR, researchperspectives.org
- Meet lots of folk
  - decide quickly if you can work with them
  - explore **dual complementarities**
  - be polite
    - treat everyone is a potential speaker/reviewer ;)
- Remember the innertube of opportunity
  - Look at other complementary communities
  - **but** maintain your publishing base
- Use the groups diagram
- Organise events
  - and use our tools

http://bit.ly/ECROxford

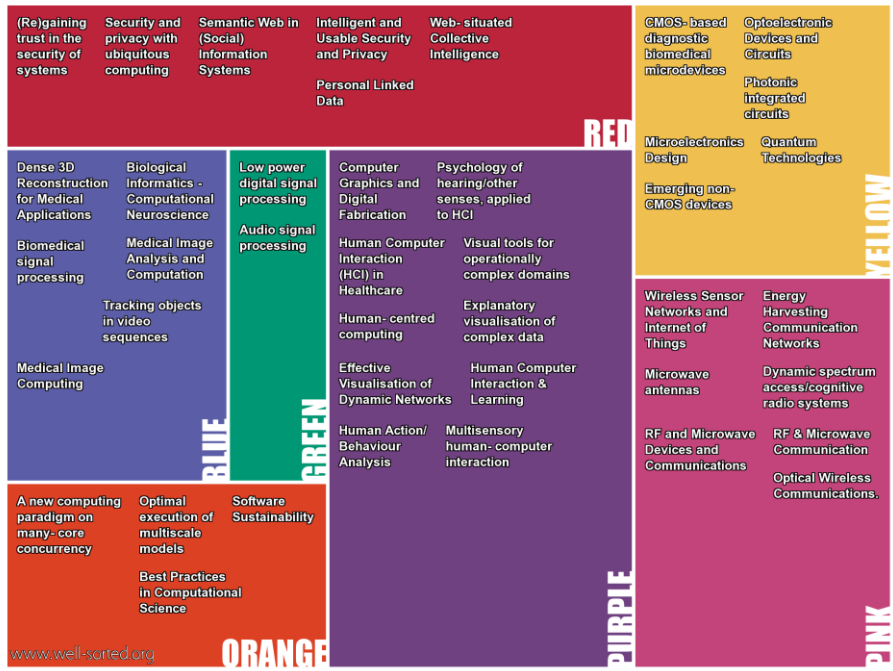
http://bit.ly/ECROxfordS

Results



Tom Methven

http://www.well-sorted.org/



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Red	Intelligent and Usable Security and Privacy	I focus on Intelligent solutions to Cybersecurity (Artificial Intelligence, Multi-agent Systems, Privacy, Identity Management, Access Control, Trust and Reputation) in Social Media, Social Network Sites, Cloud Computing and e-Commerce.
	(Re)gaining trust in the security of systems	Even rigorously analysed security systems, e.g., by cryptographic proofs or model checking, can often still be attacked because the analysis did not cover all aspects. How can we improve the analysis methods to (re)gain trust in the security of systems?
	Security and privacy with ubiquitous computing	The increased metricisation of us and the world around us becomes significant, the opportunities and threats associated with security (both cyber and physical) and personal privacy are both interesting and challenging.
	Web-situated Collective Intelligence	It is shown that Web-based CI is effective. However, a better understanding of the interdependencies of social and technical elements is required for the further development of social computing. So, how can we design socio-technical systems empowering CI?
	Semantic Web in (Social) Information Systems	The Semantic Web supports knowledge management and can facilitate systems combining AI and human reasoning. This raises challenges such as data integration, utilising big data, ensuring user privacy, and assessment of e.g. data quality and trust in users.
	Personal Linked Data	Applying Linked Data technologies to personal information to improve the way we work with and control our data.
Blue	Medical Image Analysis and Computation	Using computational techniques to understand the content of medical imaging data, to detect abnormalities, to assist diagnosis and treatment planning, and hopefully to predict clinical outcome.
	Medical Image Computing	My research topic focuses on anatomical shape modelling for image guided surgical intervention. In particular, I am using medical images to develop geometric and motion models of anatomy for improved navigation in minimally invasive surgery.
	Dense 3D Reconstruction for Medical Applications	The ability to reconstruct accurate 3D models of physical objects in real-time enables exciting applications for medical augmented reality.
	Biomedical signal processing	My research area lies on the synergy of digital biomedical signal processing and machine learning. I am interested in automatic detection of knee disease (osteoarthritis) by developing methods for multimodal signal analysis and machine learning.
	Biological Informatics -Computational Neuroscience	Computational neuroscience is a highly interdisciplinary science that studies brain function and behaviour through modelling and analysis, in terms of neural information processing. It is also classified under EPSRC's Biomedical Neuroscience.
	Tracking objects in video sequences	I am interested in applying image processing techniques to following moving objects in complex visual scenes: following cars moving on busy junctions, farm animals roaming, workers at construction sites, etc.
Green	Low power digital signal processing	Circuit and technology innovations for low power hardware giving mobile digital signal processing in wearable sensors for the ageing population. Creating innovative applications and new digital signal processing algorithms.
	Audio signal processing	Audio signal processing is a cross-disciplinary ICT area that combines digital signal processing, machine learning, as well as speech, music, and acoustic technology. My work is on developing models and systems for audio signal analysis.

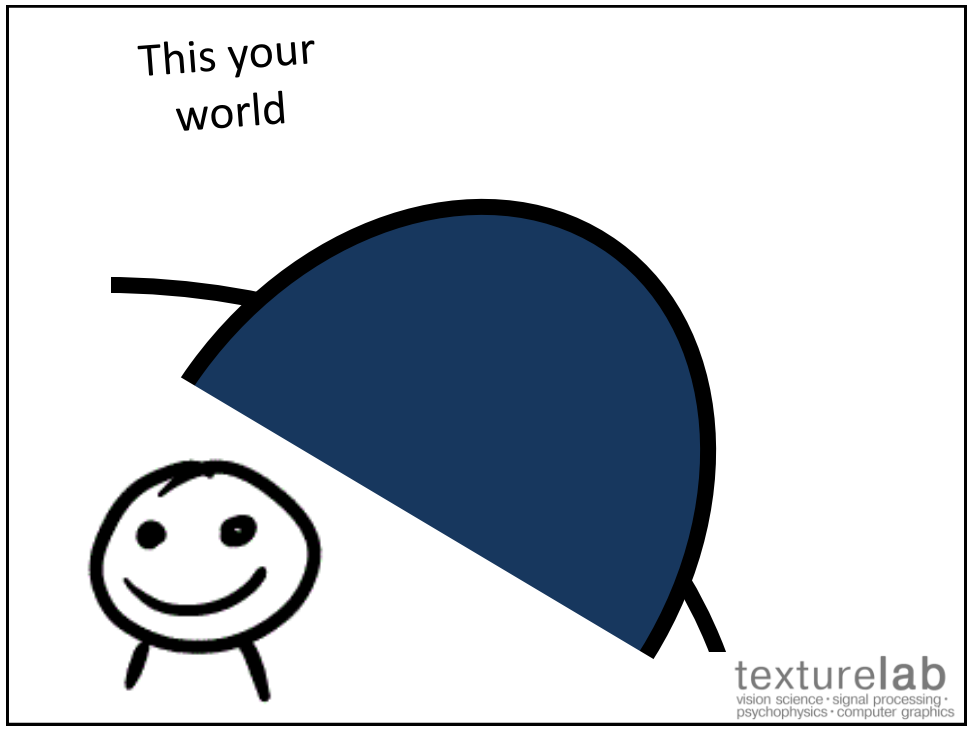
Orange	A new computing paradigm on many-core concurrency	I am interested to translate my concurrency programming knowledge in many-core architectures onto the image processing area. I aim to provide system-wide solutions to visual information processing area for low energy consumption, high performance.
	Optimal execution of multiscale models	Multiscale models couple multiple mathematics and numerics, posing a challenge wrt the optimisation for distributed computational architectures. How they impact on the execution of biomedical multiscale models? Which strategy optimises performance?
	Best Practices in Computational Science	Scientists in many fields publish research based on computational results, but are not usually well-trained in programming or software engineering. Can best practice and cloud computing improve the quality and reproducibility of computer experiments?
	Software Sustainability	Software sustainability has been identified as one of the key challenges in the development of scientific and engineering software. My current research focuses the role of architectural-level reasoning about sustainability.
Purple	Visual tools for operationally complex domains	I am interested in applying graphics and visualisation tools to operationally complex service domains. Tools are linked to AI-enabled information systems, supported by HCI interfaces. Also, I aim to transfer ICT research to built-environment domains.
	Explanatory visualisation of complex data	The design and evaluation of dynamic, interactive visualisations to communicate complex data from one disciplinary area to people from other disciplines, who could apply the data in their own context if it was understandable and in an accessible format
	Effective Visualisation of Dynamic Networks	I am interested in perceptually effective techniques for the interactive visualisation and drawing of dynamic networks. This topic lies within the areas of HCI and Graphics & Visualisation in the ICT portfolio and draws from the field of psychology
	Computer Graphics and Digital Fabrication	I am interested in developing novel user interface tools, hardware devices, and geometric 3D modelling techniques for advancing the field of computer graphics and for realising the emerging area of digital fabrication.
	Multisensory human-computer interaction	Novel modes of interaction with information aim to simulate embodied interaction and multisensory experiences using virtual reality and related technologies. How might HCI methodologies keep pace with these technological advancements?
	Human Computer Interaction & Learning	Considering the relationship between users and technology, including games, within the context of learning - from promoting health-related behaviour change and public engagement to supporting citizen science and formal educational environments.
	Psychology of hearing/other senses, applied to HCI	I am interested in the psychology of hearing, as well as of multi sensory interaction, to underpin the design and implementation of human computer interfaces that can support wellbeing and rehabilitation.
	Human Computer Interaction (HCI) in Healthcare	HCI helps design and develop new techniques and technologies to address national and global health challenges. Novel technology development within healthcare can raise many challenges including the ethical and social implications of computer interaction.
	Human-centred computing	Using models of human behaviour/cognition/perception to drive technology development.
	Human Action/ Behaviour Analysis	Vision based human behaviour analysis, emotion analysis and facial expression analysis. Multi-sensor signals including image and depth signal processing. Methods I am interested in include machine learning, cognitive and psychological methods

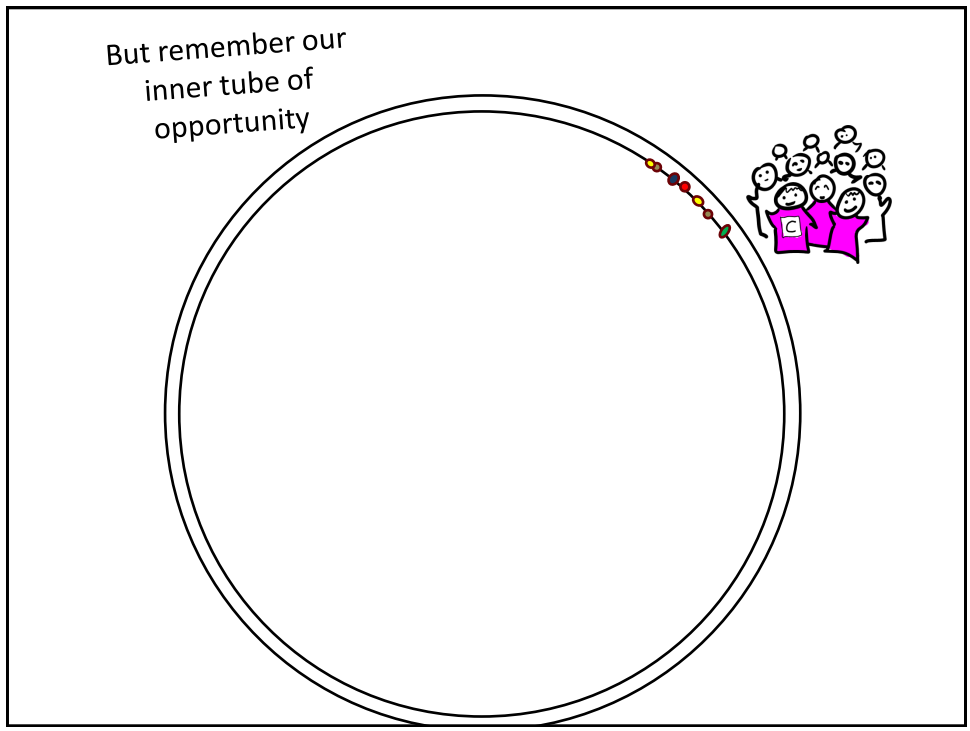
Yellow	Microelectronics Design	My research interests include neural engineering and neural prostheses. The overlying goal of my research is to learn from biology to create more efficient electronic systems and develop technologies for medicine and healthcare.
	Emerging non-CMOS devices	CMOS technology is approaching the nanoscale floor, imposing significant challenges on the performance, reliability, and manufacturability of electronic systems. It is imperative thus to substantiate "beyond-CMOS technologies".
	CMOS-based diagnostic biomedical microdevices	The design of CMOS analogue and mixed-signal microelectronic systems-on-chips and CMOS-compatible sensors, to be combined with microfluidic platforms for low-power, easy-to-use portable and miniaturized biomedical devices for point-of-care diagnostics.
	Optoelectronic Devices and Circuits	Research into the molecular beam epitaxial (MBE) growth of narrow bang-gap semiconductors and nanostructures, and the investigation of the underlying physics which determine the efficiency limiting processes in infrared light sources.
	Photonic integrated circuits	Developing novel photonic materials and optoelectronic devices for manipulating and moulding the flow of light. This also involves developing new nanoscale fabrication techniques and combining multiple device elements into a single integrated circuit.
	Quantum Technologies	The transformation of quantum information science into quantum technologies, and eventually a new industry, is very topical given recent funding announcements. I want to know how universities and industry can optimise the chances of success in this area.
Pink	Wireless Sensor Networks and Internet of Things	Topics related to the efficiency and robustness of WSNs' structure, routing and in-network localization; also things on a higher level about sensor and WSNs data modelling, processing, aggregation and sharing both in-network, cross-network and on IoT.
	Energy Harvesting Communication Networks	Wireless networks of nodes running on harvested ambient energy present unique design challenges. My research focuses on the design of intelligent communication protocols to exploit limited and intermittent energy in the most efficient manner.
	Microwave antennas	Design and optimisation of antennas for wireless communication at microwave frequencies. This includes wearable (incl. embroidered) or inkjet printed antennas; use of metamaterials; 3D printed substrates and advanced synthetic materials
	RF and Microwave Devices and Communications	My future research area will be on 4G and 5G communication systems including power amplifiers, receivers and transmitters up to 100GHz. I am also interested in wireless energy harvesting using rectennas.
	RF & Microwave Communication	Body-Centric antennas & propagation for healthcare applications. Enabling technology for intelligent wireless sensor networks.
	Dynamic spectrum access/cognitive radio systems	Cognitive spectrum and radio resource management, spectrum monitoring/measurements, statistical modelling of spectrum occupancy, spectrum sensing techniques, prototyping and experimental evaluation of DSA/CR solutions.
	Optical Wireless Communications.	Providing ubiquitous connectivity via the application of Optical Wireless as a complementary technology to the currently established wired and conventional RF wireless systems.

Ice Breaking

5 Feb 2014 Mike Chantler, Stefano Padilla, Tom Methven

http://researchperspectives.org/


This your world
textureLab
vision science · signal processing · psychophysics · computer graphics

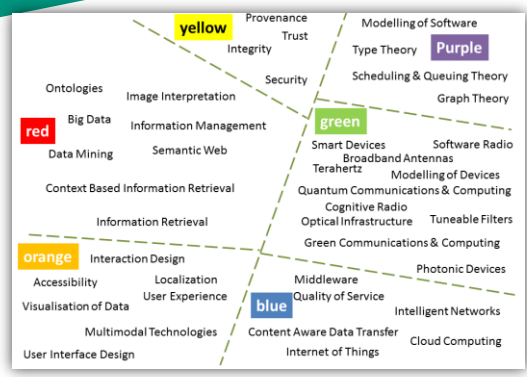

But remember our inner tube of opportunity

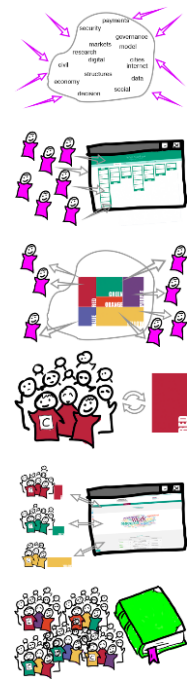
http://researchperspectives.org

http://www.well-sorted.org

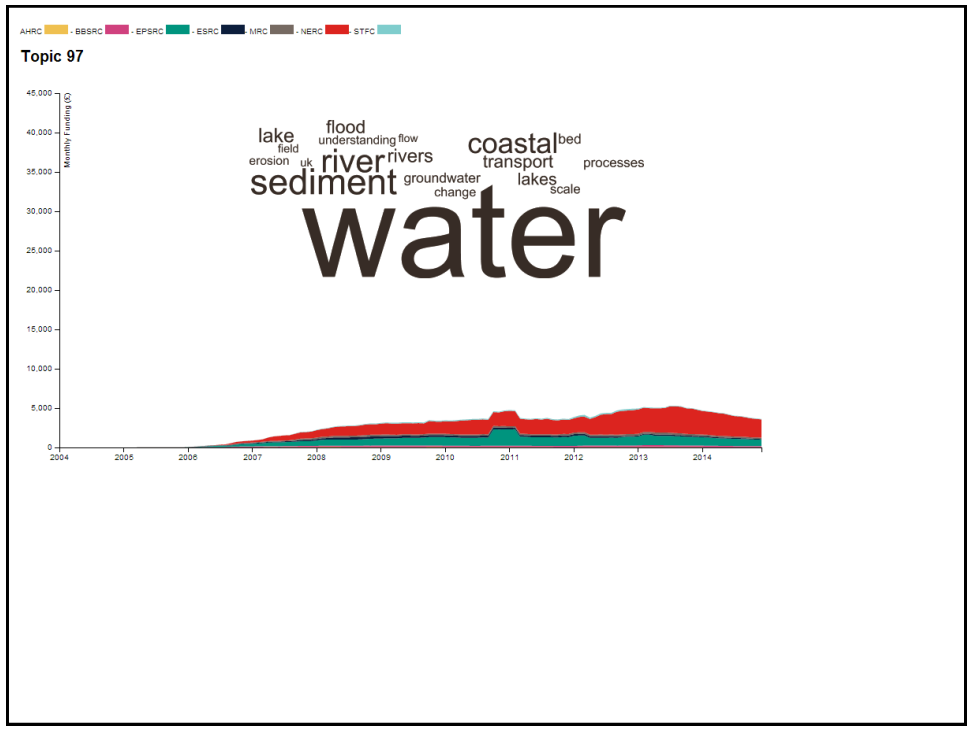
http://www.researchperspectives.org/meetings/ICTEarlyCareerOxford2014/index.php

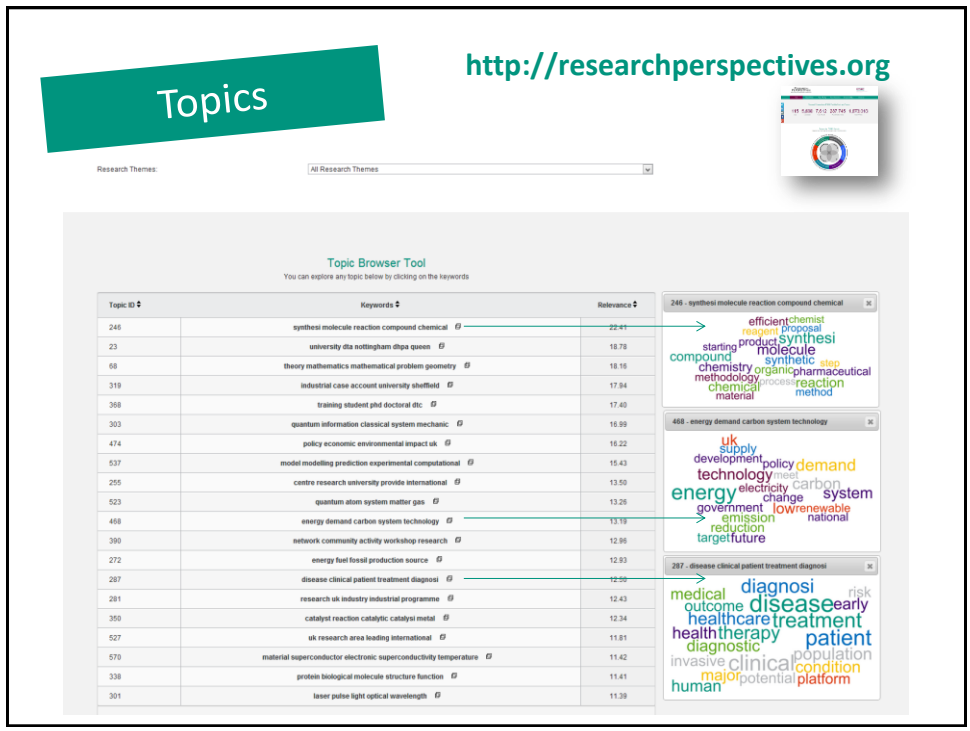
Meeting Support





- 6 step process
- Exploits data analytics and simple remote tools
- Speeds expert meetings up x3…x10
- Strategy doc provided in real-time


AHRC - BBSRC - EPSRC - ESRC - MRC - NERC - STFC
Topic 97
Monthly Funding (£)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
lake
field
flood
understanding
flow
erosion
uk
river
rivers
coastal
bed
transport
processes
sediment
groundwater
change
lakes
scale
water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468 - energy demand carbon system technology
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287 - disease clinical patient treatment diagnosi
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272	energy fuel fossil production source	12.93
287	disease clinical patient treatment diagnosi	12.58
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350	catalyst reaction catalytic catalysi metal	12.34
527	uk research area leading international	11.81
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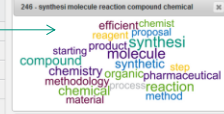
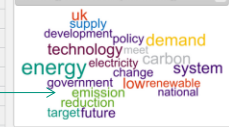
246 - synthesi molecule reaction compound chemical



468 - energy demand carbon system technology



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106	organisation trust information policy domain	2.87
209	social people life online individual	2.46
185	people older social health care	2.37
227	people work life technology communication	2.24
390	network community activity workshop research	1.97
144	rural community enterprise scale project	1.97
420	art interactive project internet story	1.75
56	identity stream social individual privacy	1.48
426	feedback technology smart user sensor	1.43
113	ict community citizen perspective issue	1.40
44	creative creativity software artefact cultural	1.30
430	mobile phone user place personal	1.18
224	computing ubiquitou involved challenge embedded	1.17
268	datum information analysi large set	1.15
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