Working Together

25 Feb 2014, Glasgow
Mike Chantler, Heriot-Watt, Edinburgh

Imagine this is all human knowledge
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
You continue, postdoc, lecturer, prof, and have graduate students.

This is the world, according to you.
This is the world, according to everyone else.

the inner tube of opportunity.
Exploring the ICT Portfolio
Navigate this?

Texture Lab, Heriot-Watt University

Grants on the web

5591 Grants
7546 People
115 Research Areas
10 Themes
It is accepted that a balance between investment in ageing facilities and the replacement of existing systems is necessary. The UK is one of the countries that is experiencing the need to modernise its power grid. The current grid infrastructure is reaching the end of its useful life, and the need for new, more efficient infrastructure is becoming increasingly urgent. The UK government has announced plans to invest in new power generation capacity, particularly in renewable energy sources, to reduce the country's dependence on imported energy. The government has set a target of generating 40% of the country's electricity from renewable sources by 2030.

The UK's electricity grid is currently facing several challenges, including the need to upgrade and modernise outdated infrastructure. This is necessary to ensure the grid remains reliable and resilient as the country transitions to a low-carbon future. The government has identified several key areas for improvement, including grid flexibility, transmission infrastructure, and the integration of renewable energy sources.

The proposed research programme will focus on challenging technical and economic issues faced by integrating large-scale grid-scale energy storage systems. The programme will address the following key areas:

1. Grid infrastructure investment: The programme will investigate the most effective strategies for investing in new power generation capacity, particularly in renewable energy sources, to reduce the country's dependence on imported energy.
2. Grid flexibility: The programme will explore ways to improve the grid's ability to respond to changes in demand and supply, ensuring reliability and resilience.
3. Transmission infrastructure: The programme will examine how to improve the efficiency and reliability of the grid transmission system, ensuring that power is reliably transmitted from generation sources to consumers.
4. Integration of renewable energy sources: The programme will investigate the best ways to integrate renewable energy sources into the grid, ensuring that the grid remains stable and reliable.

The proposed research programme will involve collaboration between industry partners, including grid operators, renewable energy developers, and technology providers. This will ensure that the research is driven by real-world needs and will have a direct impact on the development of new technologies for the UK grid.

The research will be conducted through a series of workshops and seminars, bringing together experts from different sectors to share knowledge and collaborate on solutions. The findings will be disseminated through publications, seminars, and conference presentations, ensuring that the research has a wide reach and is accessible to all stakeholders involved in the UK grid.

The programme will be funded through a grant from the Engineering and Physical Sciences Research Council (EPSRC). This funding will cover the costs of research activities, including the salaries of research fellows, equipment, and travel for workshops and seminars.

Overall, the proposed research programme will play a crucial role in ensuring the UK's grid remains reliable and resilient as the country transitions to a low-carbon future. By addressing the key challenges facing the grid, the programme will contribute to the development of new technologies and strategies that will enable the grid to meet the country's energy needs and support its commitment to reducing carbon emissions.
### Words in Context

**Topic Browser Tool**

You can explore any topic below by clicking on the keywords.

<table>
<thead>
<tr>
<th>Topic ID</th>
<th>Keywords</th>
</tr>
</thead>
<tbody>
<tr>
<td>557</td>
<td>imaging, mri, image, tissue, medical</td>
</tr>
<tr>
<td>19</td>
<td>resolution, imaging, optical, microscopy, image</td>
</tr>
<tr>
<td>140</td>
<td>visual, image, video, scene, human</td>
</tr>
<tr>
<td>639</td>
<td>ray, imaging, image, tomography, resolution</td>
</tr>
<tr>
<td>182</td>
<td>image, camera, datum, pixel, frame</td>
</tr>
</tbody>
</table>

Search: [image] Showing 1 to 5 of 6 entries (filtered from 1,000 total entries) Show: 20 entries

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**Words in Context**

Explore any topic below by clicking on the keywords.

<table>
<thead>
<tr>
<th>Keywords</th>
</tr>
</thead>
<tbody>
<tr>
<td>called, method, scanner, medical, diagnosis</td>
</tr>
<tr>
<td>mri, image, scan, resonance, technique</td>
</tr>
<tr>
<td>imaging, disease, tissue, contrast, mri, technique</td>
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<tr>
<td>magnetic, clinical, brain</td>
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</tbody>
</table>

Search: [image] Showing 1 to 5 of 6 entries (filtered from 1,000 total entries) Show: 20 entries

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Texture Lab, Heriot-Watt University
RP Website

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

Topics

http://researchperspectives.org

1. Visualisation
2. Words
3. Key Grants
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
• 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

Step 1 – Idea Generation

<table>
<thead>
<tr>
<th>Short Label</th>
<th>Full Research Topic</th>
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</thead>
<tbody>
<tr>
<td>B2B Enabling</td>
<td>E2E Enabling</td>
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<td>O2O Enabling</td>
<td>O2O Enabling</td>
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<tr>
<td>Origins of society transformation</td>
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<td>Segmentation</td>
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<td>Segmentation Value</td>
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<tr>
<td>What factors contribute to differences in the particular context?</td>
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<tr>
<td>Network Infrastructure and Industry</td>
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<tr>
<td>The role of policy infrastructure in creating a digital economy and how the industry can collaborate is shown through the influence of a digital economy.</td>
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<td>Smart Cities</td>
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<td>Smart other new interconnectivity</td>
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<td>Urban Uplift</td>
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<td>How urban revitalisation can drive commercial and technical systems</td>
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<td>Green Economy</td>
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<tr>
<td>The implications of green digital business models on the urban environment, and the possibilities of the new digital economy</td>
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<tr>
<td>New Business Models and Business Models</td>
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<tr>
<td>Typology of new business models created by digital technologies</td>
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<td>Business Model Innovation and Test</td>
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<tr>
<td>Tech Innovation of Business Models</td>
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</table>
Step 2 - Sorting

Step 3 - Clustering
Step 3 - Dissemination

Step 4 – Group Selection
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 counties (LDC), the emerging economies and the technologically advanced countries.

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

Big Data and Customer Relationships

How can ‘big data’ be used to support effective customer relationship management, for example in the financial services sector in the UK?

Big Data in the Public Sector

How can ‘big data’ support effective and efficient commissioning of services in the public sector in the UK?
Step 5: output

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 analytics, 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 trials (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
Result: top-level

Result - detail
Research questions

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This Meeting
<table>
<thead>
<tr>
<th><strong>Photonic and lasers</strong></th>
<th><strong>Methods &amp; Models in Geographic Information Systems</strong></th>
<th><strong>Grounding symbolic knowledge in robot experience</strong></th>
<th><strong>Technology for non-intrusive behavioral monitoring</strong></th>
<th><strong>Human-Computer Interaction/Interactive Design</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Non-CMOS device technology and displays</strong></td>
<td><strong>Dynamic Data Matching and Interpretation</strong></td>
<td><strong>Mathematical Foundations of Fuzzy Logic</strong></td>
<td><strong>Human-centric systems for critical environments</strong></td>
<td><strong>Video Games to Improve Quality of Life</strong></td>
</tr>
<tr>
<td><strong>Photonic integrated circuits</strong></td>
<td><strong>Dynamic detection of unusual patterns</strong></td>
<td><strong>Adaptive Software Systems</strong></td>
<td><strong>Social, Local Interaction</strong></td>
<td><strong>Use of ICT to Improve Human Health</strong></td>
</tr>
<tr>
<td><strong>Nanoscience EM devices and networks</strong></td>
<td><strong>Signal and image processing and modelling</strong></td>
<td><strong>Variety of BigData</strong></td>
<td><strong>Computer vision, graphics, and HCI</strong></td>
<td><strong>Participatory sensing</strong></td>
</tr>
<tr>
<td><strong>Smarter photonic systems</strong></td>
<td><strong>Energy Considerations in ICTs</strong></td>
<td><strong>HPC for the Masses</strong></td>
<td><strong>Human operator modelling</strong></td>
<td><strong>ICT for Civic Engagement</strong></td>
</tr>
<tr>
<td><strong>Photonics for future systems</strong></td>
<td><strong>Privacy-aware computation in untrusted networks</strong></td>
<td><strong>Natural Language Processing for Cyber Security</strong></td>
<td><strong>Smart grid cybersecurity</strong></td>
<td><strong>Cybersecurity</strong></td>
</tr>
</tbody>
</table>

**Oxford Results**
Networking

Paper Surveys!
• 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 as 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

Results

Tom Methven
http://www.well-sorted.org/
Texture Lab, Heriot-Watt University
<table>
<thead>
<tr>
<th>Color</th>
<th>Research Area</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>Adaptive Software Systems</td>
<td>Developing self-managed software systems that provide high-level abstractions. Systems that can configure themselves on the fly, automatically adapting to the changing problem conditions. Machine Learning and Optimisation to solve real-world problems.</td>
</tr>
<tr>
<td></td>
<td>Mathematical Foundations of Fuzzy Logic</td>
<td>Mathematical logic has been a lifelong interest. For the last 10 years, I have been researching fuzzy logic, a practical, applicable form of logic, when combined with ICT. Recently, with type-2 FL, I have extended my investigations to include complex FL.</td>
</tr>
<tr>
<td></td>
<td>Grounding symbolic knowledge in robot experience</td>
<td>Innovative interaction/interactive design human operator modelling of human and robot experience. The challenge is to develop autonomous robots integrating such symbolic reasoning with sub-symbolic learning from robot sensors.</td>
</tr>
<tr>
<td>Orange</td>
<td>Energy Considerations in ICTs</td>
<td>Addressing perceived ICT has accounted for at least 2% of the world’s energy consumption, however, a breakthrough for reducing the energy consumption while not sacrificing the performance of the communication systems is yet to be found.</td>
</tr>
<tr>
<td></td>
<td>HPC for the Masses</td>
<td>Supporting groups can surge core into next core systems. We are now entering a world where (virtually) all systems are parallel. However, making the best use of this is not easy with only a few niches areas having been able to exploit parallelism.</td>
</tr>
<tr>
<td>Yellow</td>
<td>Cybersecurity</td>
<td>I am particularly interested in the development of statistical approaches to solving challenges in Network Security and Privacy.</td>
</tr>
<tr>
<td></td>
<td>Natural Language Processing for Cyber Security</td>
<td>Emphasis is on applying Natural Language Processing techniques, such as authorship attribution and deception detection, to countering cyber security issues, such as social engineering attacks, fraud, spam, and phishing.</td>
</tr>
<tr>
<td></td>
<td>Smart grid cyber security</td>
<td>In smart grid every component at every level of the electric grid is Internet connected. Inevitably, this also increasing attack surface to the critical infrastructure for cyber attacks. A holistic security approach is needed to address the issue.</td>
</tr>
<tr>
<td>Purple</td>
<td>Privacy-aware computation in untrusted networks</td>
<td>Privacy-aware computation aims at realizing secure services which can process, provision and protect private and confidential data without compromising end-to-end privacy. It will consequently assist in privacy-aware data analysis on public data.</td>
</tr>
</tbody>
</table>

- **Participatory sensing**
  - ICT enabled policy modelling and urban governance of Smart cities.
- **Social, Local Interaction**
  - Mobile interaction has lead to an increase of geo-tagged social media. In the context of Smart Cities, how can we best re-integrate media back into the location of its creation, in a way that informs both visitors and tourists about a place.
- **ICT for civic engagement**
  - Exploring how ICTs can be used in engaging members of the public in political discourse and with the running of their own communities, for example, this might include the use of technologies that lower barriers to participation and involve excluded groups.
- **Video Games to Improve Quality of Life**
  - I am interested in the design and application of interactive technologies such as video games to improve the quality of life of persons with special needs, e.g., older adults in long-term care or persons with disabilities.
- **Use of ICT to improve human health**
  - ICT technologies are changing our society at an incredibly high pace. The ageing population poses huge challenges on our current living standards. ICT is a key element to ensure a high quality of life for ageing individuals and their social integration.
- **Technology for non-intrusive behavioral monitoring**
  - Recent research shows the importance of non-intrusive monitoring particularly for ageing population. What are the suitable ICT for non-intrusive behavioral monitoring and discriminating the abnormal behaviours?
- **Human operator modelling**
  - Investigating the role of feedback loops in interactive systems, using a control-theoretic approach to modelling the interaction between the human and the device.
- **Human-Computer Interaction/Interactive Design**
  - Human-Computer Interaction, cognitive ergonomics and development of quantitative and qualitative research methodologies for examination of interaction with innovative technologies in complex systems.
- **Computer vision, graphics, and HCI**
  - My research focus on interactive graphics and human computer interaction, especially on intuitive exploration of data. My long term goals is to apply internet-scale data processing to computer graphics and human computer interaction.
- **Human-centric systems for critical environments**
  - Human experts, know-how and specialised cognitive skills are attributes that are very highly valued in critical environments (e.g. in manufacturing, healthcare). Via new advanced ICT technologies such tools can be an integral part of complex systems.
Ice Breaking

5 Feb 2014 Mike Chantler, Stefano Padilla, Tom Methven

http://researchperspectives.org/

This your world
But remember our inner tube of opportunity

http://researchperspectives.org

http://www.well-sorted.org

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