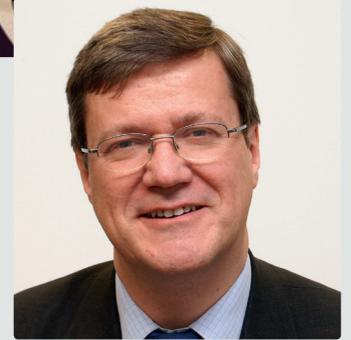
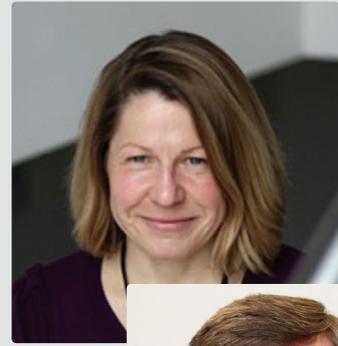


Exchanging ideas



Principal Investigator **Professor David Butler** and Project Manager **Dr Helen Butler** discuss the value of an ambitious project which aims to bridge the gap between different disciplines and aid young researchers

To begin, could you offer an overview of your background and how you came to be the Principal Investigator for Bridging the Gaps: The Exeter Science Exchange?

DB: I have some 32 years working experience, 27 in academia and five in practice. My professional background is in civil engineering and I am a chartered engineer and fellow of several engineering and environmental management institutions. My specialism is water engineering, with most of my research focusing on understanding and helping to improve the management of water services in cities. Over the years, I've been involved in many research projects, some as leader and some as team member, and these have become increasingly multidisciplinary in nature up to the present day. So it was that I was an obvious candidate to pull together a multidisciplinary team from across the University of Exeter and bid for this UK Engineering and Physical Sciences Research Council (EPSRC)-funded project.

What needs does Bridging the Gaps fulfil which were not catered for before its creation?

HB: The University of Exeter had previously recognised the importance of interdisciplinary collaboration, having invested in five interdisciplinary science strategy themes and reorganised its academic structure into six colleges, with the aim of breaking down disciplinary boundaries. However, opportunities for interaction between colleges, and particularly between the sciences and the arts, humanities and social sciences were still limited. The many demands on academics' time leave few opportunities for casual meetings with those from other disciplines.

Through a series of events with a wide variety of topics and formats, Bridging the Gaps has acted as a catalyst. These events and the project team's help in identifying collaborators have been particularly useful for new staff, helping them to develop their research networks quickly.

Bridging the Gaps also provided the seedcorn funding and practical support to enable newly formed collaborations to develop through activities such as consortium building, proposal development, holding workshops and meetings, and carrying out pilot work. Several new interdisciplinary networks have been initiated and have gained sufficient momentum to be sustainable beyond the end of the project.

The Exchange has created a number of projects and networks that will continue after the funding period ends in September 2013. One of these is the Exeter Initiative for Statistics and its Applications (ExIStA). How did this initiative come about and what benefits has it brought?

HB: ExIStA was initiated with funding from the second round of our development fund. Under the direction of Steve Brooks, it has become the regional centre for statistical expertise, bringing together statisticians and promoting interdisciplinary statistical activity in the University and within local public and private-sector organisations. It also raises awareness of the use and value of statistical methods and supports statisticians in continuing to develop and apply their skills. Following its launch in November 2011, ExIStA has gone from strength to strength, with over 250 members signed up and good attendance at its series of seminars

and networking events. ExIStA held a very successful conference – Talking Data South West – in June 2013 and has also started an early-career section.

How is the project helping early-career researchers?

HB: Bridging the Gaps has run workshops for PhD students and early-career researchers on interdisciplinary working, through the University's Effective Researcher Development Programme. These gave early-career researchers a chance to explore the benefits and pitfalls of interdisciplinary working; hear case studies from Bridging the Gaps-funded projects; and create and test an idea before a panel of interdisciplinary experts.

The Bridging the Gaps development fund has also given early-career researchers a valuable opportunity to gain experience of applying for funding, as well as leading and participating in interdisciplinary teams.

Has the Exchange benefited your own research?

DB: I think it has benefited me directly and indirectly. In the direct sense, and by way of example, we ran a workshop Water @ Exeter which a psychology colleague attended. She subsequently joined our team at the Centre for Water Systems in bidding for an EU Seventh Framework Programme (FP7) project which was successfully funded and is now ongoing. In the indirect sense, I have been exposed to many different ideas and have met many new colleagues I wouldn't have done otherwise. I've also had the opportunity to see and engage with even more disciplinary research methodologies.

Collaboration is here to stay

Facilitating interdisciplinary collaboration both within science and between the sciences and humanities, **Bridging the Gaps: the Exeter Science Exchange** represents a unique effort to catalyse new relationships between otherwise disconnected research groups. The value of such relationships is clear from the numerous novel and exciting research proposals created by the programme based at the University of Exeter

ONE OF THE most prominent patterns in modern science is the movement towards interdisciplinary research. Scientific advancement is almost always coupled with increasing complexity. This in turn necessitates a range of expertise to efficiently conduct most modern research. As such, teams now include experts from a range of disciplines. It is clear in this context that collaboration is crucial for scientific progress. While many have embraced the need for collaboration within science, often experts do not immediately see the value of collaboration outside of science.

Today, this culture is being challenged by an innovative programme at the University of Exeter called Bridging the Gaps: the Exeter Science Exchange (BTG). The project, designed to facilitate and enable interdisciplinary collaboration both within science but also between scientists and experts from non-science disciplines, represents one of the most progressive programmes in the world.

BTG is part of a far-reaching scheme funded by the UK Engineering and Physical Sciences Research Council (EPSRC). By securing this funding and identifying the right people to lead such a project, Exeter has taken a step in the direction of enabling

true interdisciplinary working. The programme is led by experienced engineer Professor David Butler. In conjunction with his engineering experience, Professor Butler is also well versed in the difficulties and ultimate value of interdisciplinary collaboration. Supporting Professor Butler in his role as Principal Investigator is his colleague Dr Helen Butler, BTG Project Manager. Under this leadership, the programme is a thriving example of the enablement of interdisciplinary research in a university setting.

OVERCOMING THE LANGUAGE BARRIER

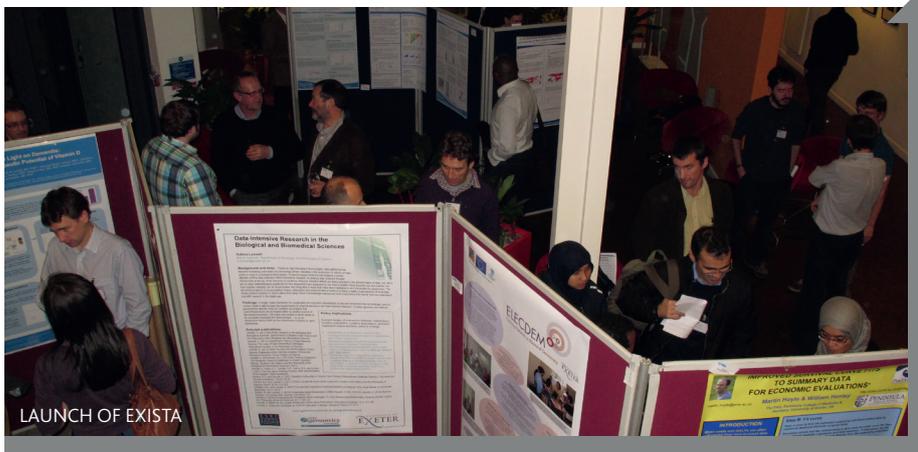
To facilitate this collaboration, the programme defined four strands of activity: Communication, Innovation, Policy and Development. Central to BTG's activities is Communication. It is vital that the researchers involved can find a common language which straddles their specialisms. Dr Butler explains: "The same term can mean very different things to people working in different areas; and cultures and norms vary between disciplines". By protecting the time and resources that researchers require to get to know one another and find a common language, the BTG programme has acted as a catalyst in the formation of many productive interdisciplinary research groups.

GETTING OUT OF THE OFFICE

A great success within BTG has been the organisation of 'residential retreats' where researchers from different fields gather to discuss the latest developments in a common area. The retreats have been valuable in allowing academics to be removed from day-to-day commitments and distractions in order to focus on discussion, exploration and thought: "One recent retreat brought together researchers and clinicians interested in diagnostics from different disciplines, many of whom had not previously met each other and would not usually encounter each other," explains Dr Butler. Quantifying the value of these retreats is challenging, but the BTG programme in its entirety is clearly producing measurable results. To date, the programme has funded 68 projects which encompass a vast range of topics. Examples of the research now being conducted include an investigation into how religio-spiritual contexts change emotional, psychophysiological experiences and perceptions of pain, and a pilot project on the safe design of next-generation nanomaterials, taking a green chemistry approach. The former of these two examples is now being funded by the UK National Institute of Health Research and has been invited to contribute to a research film, book chapter and radio broadcasts, as well as producing four academic papers.

Alongside the physical space created by the residential retreats is the electronic space provided by the programme to facilitate discussion. The initial vision was to provide a virtual environment to promote the exchange of ideas and stimulate joint working. From this starting point, programme staff have now developed and launched a tailored online portal – Elgg – which serves as a freely available and customisable tool for networking, collaborating and file sharing.

Despite the potential value of such a resource, the portal has enjoyed limited engagement.



LAUNCH OF EXISTA

DIAGNOSTICS RESIDENTIAL RETREAT ON DARTMOOR



The project coordinators have struggled to compete with other networks with similar tools and believe that most project participants still prefer face-to-face engagement. While this has acted as a barrier to this specific objective, there seems little doubt that online collaboration will become increasingly critical in the facilitation of global multidisciplinary research. Hence, BTG offers advice on using a wide range of social networking resources – Twitter, Facebook, LinkedIn, Academia.edu, etc. – to suit all preferences.

PARTNERING THROUGH POLICY

Under the Policy strand of BTG, participants are encouraged to form relationships with policy makers. The benefits of such relationships are numerous. Politicians gain from the knowledge and research of scientists, and in return scientists are able to better understand the policy environment – allowing the design of more politically and socially valuable research.

Within this objective, Dr Annette Plaut, a physicist at the University of Exeter, was paired with MP Ben Bradshaw through a scheme funded by the Royal Society. Plaut shadowed Bradshaw for a week at Westminster, gaining an insight into how policy decisions are made. In return, Bradshaw was invited to Exeter where he was able to learn about some of the numerous research projects being conducted. The value of such a relationship was evidenced by the impact that it had on Bradshaw, who later stated: “We need more scientists at the heart of policy making and more politicians who know about and understand the importance of science”.

BEYOND 2013

In the near future, EPSRC funding of BTG will end. However, the programme has clearly shown its value. As such, the University of Exeter seems positioned to provide the necessary resource to continue the project into the future: “The University has always had a commitment to multidisciplinary working and we are currently looking to finalise a suitable financial model to ensure its continuation,” explains Professor Butler.

Such long-term commitment is essential to the survival of the project, but perhaps less intuitively, it is also critical for the perception of such efforts. With a committed university providing resources, expertise and tools for promoting interdisciplinary collaboration, participants will

Alongside the physical space created by the residential retreats is the electronic space provided by the programme to facilitate discussion

invest more time and energy into engaging with these efforts.

While the benefits may not be immediately tangible, collaboration is a fundamental component of modern research. There is little doubt that the trend towards increasingly complex networks of scientific and non-scientific specialists will continue, as necessitated by the social, technical and ethical complexity of cutting-edge science.

BTG strands of activities

STRAND 1 – COMMUNICATION

To promote greater communication between disciplines and provide information and activities aimed at sparking research interests across disciplines. Research methodologies in different areas may contrast greatly, and a great deal of commitment, time and mutual understanding is required to make multidisciplinary progress

STRAND 2 – INNOVATION

To encourage translation of research results into products, processes and services with widespread economic and social impact, and increase researchers’ understanding of the innovation process as well as the issues involved in effective entrepreneurship and innovation management

STRAND 3 – POLICY

To promote research at the interface of science, technology and policy making

STRAND 4 – DEVELOPMENT

To provide funding to foster new cross-disciplinary collaborations through supporting cross-disciplinary workshops, retreats, project development, feasibility studies, academic visits, etc.

INTELLIGENCE

BRIDGING THE GAPS: THE EXETER SCIENCE EXCHANGE

OBJECTIVES

- To create a physical environment to promote the exchange of new ideas and stimulate joint working
- To bring online a 24/7 virtual environment to promote the exchange of ideas and stimulate joint working
- To design and implement specific activities to support interdisciplinary communication
- To design and implement specific activities to develop the links between innovation, entrepreneurship and interdisciplinary research
- To design and implement specific activities to sponsor joint research on the interface between science, technology and policy
- To design and develop a range of functional and financial measures to foster new multidisciplinary collaborations

TEAM MEMBERS

For a list of key team members, please visit www.exeter.ac.uk/btg/people.

FUNDING

Engineering and Physical Sciences Research Council (EPSRC)

CONTACT

Dr Helen Butler

Project Manager, Bridging the Gaps:
The Exeter Science Exchange

University of Exeter
Research & Knowledge Transfer
The Innovation Centre
Rennes Drive
Exeter, Devon
EX4 4RN, UK

T +44 13 92 726 208

E h.g.butler@exeter.ac.uk

www.exeter.ac.uk/btg

.....
DAVID BUTLER is Professor of Water Engineering at the University of Exeter and co-Director of the Centre for Water Systems. He specialises in urban water management, having authored/co-authored over 250 technical papers and 12 books, published reports and edited conference proceedings. Butler is co-Editor-in-Chief of the *Urban Water Journal*. He has been funded without interruption by EPSRC since 1995 and is currently an EPSRC established career fellow.

