

Supporting cross-institutional research themes

A view increasingly expressed by practitioners and policy-makers is that today's most challenging issues cannot properly be addressed by individual disciplines; topics such as climate change, sustainability, migration, security, education and health, need a range of interdisciplinary approaches. Support for this view is evident in the encouragement given to interdisciplinarity proposals by those who fund research, even if their enthusiasm is not always followed through in their awards. It is also apparent in the growing number of interdisciplinary research centres and institutes in academic institutions and in the development of truly interdisciplinary academic courses (see *Times Higher Education*, 20 March 2008). While these are, in part, a response to the external research environment, they also reflect the recognition by academics that their research can be enriched by moving beyond disciplinary boundaries and that interdisciplinary collaborations can be interesting and fruitful.

Since 2004 the University has supported interdisciplinarity through the Oxford Institute for Sustainable Development and the Institute for Historical and Cultural Research. Their work has now been supplemented by eight cross-institutional Research Themes which provide exciting opportunities for innovative approaches to research and interdisciplinary co-operation.

Launched early in 2008, the themes are intended to be unstructured and fluid to enable them to welcome new participants, to respond to the interests of members and to external funding opportunities and, if appropriate, to change focus and direction.



Professor Diana Woodhouse
Pro Vice-Chancellor (Research)

It is early days, but it is interesting to see that the themes are already developing in a variety of ways. As the reports featured in this publication indicate, there is much happening and planned. Longer term it is hoped that at least some of the themes will become key areas around which the University can focus, not only in terms of publications and grant applications but also master's courses, PhDs, visiting academics and external collaborations.

Professor Diana Woodhouse
Pro Vice-Chancellor (Research)

Sustainable Technology

Theme Co-ordinator: Professor Allan Hutchinson, School of Technology

Most human activities have some sort of impact on the environment and consume resources. As the world population grows (see chart), the extent of such impacts increases and human activity becomes less sustainable in the long term. Technology has brought many benefits to society but there are also penalties such as excessive use of fossil fuels and mineral resources, creation of pollution, CO₂ emissions and contributions to global warming. In addition, despite the landfill tax imposed by government to control the wastage of resources, too much 'scrap' material continues to be sent to landfill. One of the topics that has grabbed the headlines recently is the environmental problems caused by plastic carrier bags. The recognised 'Rs' of sustainability include: Reduce, Repair, Re-use, Re-manufacture and Recycle, and on a positive note the perception of goods made from recovered materials is fortunately changing.

This theme, Sustainable Technology, brings together under the umbrella of the Sustainable Technology Group (STG) researchers who share an interest and passion in the development of technological solutions to a wide range of challenges in different sectors, including some of those outlined above, and in the exploitation of *common technical competencies* and *cross-cutting technologies* in a multi-sectorial approach.

Purpose and aims

The Sustainable Technology Group held its first meeting on 4 February 2008 and used the occasion to discuss the purpose and aims of the Group and the themes relating to sustainable technology with which it intended to engage. Discussion was followed by individual presentations from:

- Matt Todd, Centre for Environmental Studies in the Hospitality Industry, School of Business
- Peter Jarrett, Business School
- Pat Winfield, Joining Technology Research Centre, School of Technology

- Stephen Samuel, Advanced Vehicle Engineering Group, School of Technology.

There are a number of known examples of relevant research activity at Oxford Brookes, including:

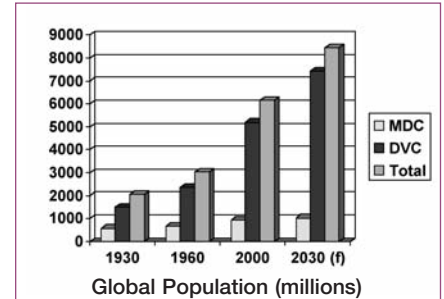
- Automotive engineering: DRIVENet Network for End-of-Life-Vehicles; alternative fuels; additives for alternative fuels; hybrid vehicles; emissions analysis
- Aircraft: use of composite materials for weight reduction in airframes
- Building and Construction: thermally-efficient building panels; repair and strengthening of existing structures using bonded composite systems
- Energy: extraction of heat from the ground
- Hospitality: composting of food waste; recycling of glass.

Engaging with the policy debate

A key objective of the Group is to define all relevant current, and planned, activities related to sustainable technology within the University. It also plans to identify common technical themes and research priorities through discussions/questionnaires; identify barriers to progress for particular market sectors and topics; and compile collaborative research themes and develop some joint research proposals.

Some of the themes to be explored by the Group are those identified by the Committee on Waste Reduction (a sub-committee of the House of Lords Select Committee on Science and Technology) in December 2007. They include:

- **Resource efficiency and cost:** namely, the increasing scarcity of resources globally and the consequent need to use less material; increase the lifespan of products; reduce energy consumption and re-use waste; as well as the development of cost-effective processes and materials recovery and market-led resource management.
- **Design:** including better and environmentally sensitive design; the better selection of materials; the light-weighting of products; design for disassembly to facilitate repair, re-manufacturing, re-use and recycling; emotionally durable design; and the use of knowledge-based engineering and extended life-cycle analysis.
- **Manufacturing and production:** including lean manufacturing (because waste = extra cost); de-materialisation; reduced energy consumption; reverse manufacturing; take-back schemes, for



MDC = More developed countries:

Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Irish Republic, Italy, Japan, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, UK, USA

DVC = Developing countries: all other countries not identified in MDC

example, Xerox, and free car take-back since January 2007.

- **Consumers and owners:** focusing on developing a recycling mindset and culture which includes buying green products; being less wasteful and abandoning the throw-away culture; accepting less packaging; using second-hand and re-manufactured goods; repairing rather than replacing; leasing rather than owning; developing markets for residual waste; and not replacing on the grounds of fashion.
- **Regulation:** including Integrated Product Policy (IPP); Landfill Tax; End-of-Life Vehicle (ELV) Directive; Waste Electrical and Electronic Equipment (WEEE) Directive; Restriction of Hazardous Substances (RoHS) Directive; Registration, Evaluation and Authorisation of Chemicals (REACH); and the Energy Using Products (EuP) Directive.
- **Retail:** namely, buying a service, not just a product (this means purchase, repair and service), which could actually increase UK employment.
- **Higher Education:** creating better links between science and design, and between science and engineering; whole life and end-of-life modules in product design and engineering; and more research groups in sustainability.

The Group would be very pleased to hear from potential new members who would like to discuss their ideas, make a presentation or simply become more aware of the activities of this Group.



Professor
Allan Hutchinson

Welfare and Welfare Policy

Theme Co-ordinator: Dr Virginia Crossman, School of Arts and Humanities

At a time when there is a growing political consensus around the provision of a high level of welfare and other services, how can we assess the effectiveness of the welfare system or the ability of the state to provide for the marginalised and disadvantaged? Embracing all aspects of welfare from the historical context to the political, social and economic impact, the welfare research theme aims to address these questions by generating positive interaction between academic research and welfare policy and encouraging links between scholars of welfare and policy makers, and between academic and non-academic commentators on welfare issues.

Research funding today is increasingly linked to economic and end-user benefit. In this climate, successful research projects need to have demonstrable economic benefits and knowledge transfer potential. The welfare theme will provide a crucial stimulus to new individual and collaborative research projects that can fulfil these criteria whilst also constituting an important focus for interdisciplinary research activity within the University. The focus will be on recipients as well as providers of welfare. For instance, the investigation of topics such as the experience of ethnic minorities and migrant workers in negotiating welfare systems is essential to the promotion of a broader and more inclusive understanding of the impact of social and economic marginalisation.

Welfare spaces and places

An inaugural theme meeting took place in January and brought together colleagues from the Schools of Arts and Humanities, Social Sciences and Law, Built Environment, Health and Social Care, and Westminster Institute of Education. This was followed by the formal launch of the theme on 7 February. Discussion at these events revealed a wide range of common interests including the interface between public and private welfare provision, social attitudes and social citizenship, issues of entitlement and social inclusion and exclusion, negotiating welfare bureaucracy, and the design and utilisation of social and public space.

The next meeting on 10 June will take the form of an afternoon discussion group on welfare spaces and places. Possible issues for debate include the location and design of welfare institutions from workhouses and asylums to old people's homes, the conception and utilisation of space within institutions, negotiation of social and public space in a welfare context, and the

development of social housing and regeneration projects. Through an exchange of information and research perspectives it is hoped to generate new ideas and approaches thus identifying potential areas for collaborative research.

Future direction

Future theme activities include a number of networking events to promote collaborative projects and a series of interdisciplinary research workshops aimed at bringing together welfare scholars within the University and beyond. The first of the workshops on welfare institutions is planned for November 2008, with a second on social citizenship following in March 2009.

The welfare research theme emerges out of the Centre for History of Welfare based in the School of Arts and Humanities. As part of the theme, the Centre will host an international conference on 5-6 September 2008 entitled '*Numbers, norms and the people: statistics and public sphere in modern Britain c. 1750 - the present*'. This will explore the role of statistics in enabling and transforming the modern public sphere. Modern governance places enormous emphasis on targets and planning, both of which are dependent on data but how is such data derived and interpreted? Addressing these issues in historical context will not only reveal new perspectives on the past but will also contribute to contemporary debates on the role of targets in government. Abstracts of the conference papers are available at

http://ah.brookes.ac.uk/conference/presentations/statistics_in_the_public_sphere/

In addition, an interdisciplinary conference on representations of poverty in Britain and Ireland is planned for June 2010. Recent work has demonstrated how interest in the poor was stimulated as much by fascination with the exoticism and eroticism of poverty as by a desire either to help or control the poorer classes. Exploration of the ways in which poverty was imagined, represented and experienced will afford new perspectives on the social construction of poverty and its historical and contemporary resonances.

The welfare theme has already brought together staff from across the University to discuss their research in what has proved to be a stimulating and supportive environment. It is clear that the potential for exciting interdisciplinary work is considerable and developing the theme promises to be a fascinating process.

Dr Virginia Crossman



Emotional Well-being and Social Justice in Education Policy and Practice

Theme Co-ordinator:
Professor Kathryn
Ecclestone, Westminster
Institute of Education

Developing the emotional well-being of children, young people and adults throughout education and social policy addresses numerous goals: raising educational and social attainment; providing a better measure of social justice than narrow targets; encouraging emotional labour as part of human and personal capital; remedying the emotional damage of exclusion; encouraging engagement with personalised public services; and creating an emotionally literate, self-aware citizenry. One effect of these diverse goals is a rapid rise in policy-related activity in universities, private consultancies, think tanks, local authorities, campaigning organisations and charities, and a growing array of assessments and interventions.

Such activities and their diverse underlying goals present the human subject as a legitimate focus for state intervention and raise new questions about the purposes and activities of state education. Interrogating these questions is crucial because policy plays a central role in shaping a culture's account of human potential and the social relations that follow from it.



Professor
Kathryn Ecclestone

Bringing perspectives together

The theme, emotional well-being and social justice in education policy and practice, is intended to bring together perspectives from education, political studies, history, sociology, psychology, philosophy and theology and to explore the conceptual and practical relationship between emotional well-being and social justice and evaluate how this relationship creates new types of interventions, new ideas about educational purposes and practices and new images of human potential.

Perspectives from politics and sociology are important in illuminating how strategies are influenced by domestic policy concerns in the United States and parts of Europe and concerns about the emotional well-being of populations influence strategies. These concerns include the World Bank's poverty reduction approaches, humanitarian aid programmes, and global security strategies in the war on terror. In addition, concerns about emotional well-being are integral to the shift from geopolitics to bio-politics, where an emphasis on non-material aid affects ideas about how to change subjectivity.

A philosophical perspective shows the subtle ways in which political preoccupation with emotional well-being both reflects and responds to cultural ideas about identity and about what it means to be human. A view that everyday experiences cause emotional distress and need psychological or therapeutic interventions reflects underlying images of a victimised, 'diminished' or 'demoralised' view of the human subject. Yet, optimistic images of the human subject have also long been contested in philosophy, theology and psychology, raising questions about appropriate health and educational interventions.

For their part, different psychological perspectives enable the exploration of how interventions to measure and develop emotional well-being draw extensively on cognitive and developmental psychology and on more recent developments in positive psychology. Both implicitly and explicitly, these developments and their underlying psychological assumptions offer particular views of identity, human development and about ways of changing or influencing one's sense of self. This relates cognitive, socio-cultural and psycho-analytical perspectives to philosophical ones, thereby illustrating the theme's interdisciplinary nature.

Policy and practice

Historical insights are also informative in showing how notions of resilience, optimism, stoicism and a positive view of life as new themes in policies for emotional well-being contrast with more diminished images in the first manifestations of New Labour social policy, and with other images in earlier periods. Historical perspectives illuminate continuity and change in conceptualisations of well-being, social justice and the human subject, and their relationship to debates about moral education and moral risk, schooling's role in children's health and welfare and about provision for groups with special educational needs.

More practically, policies which support interventions for emotional well-being require schools and welfare and health agencies to collaborate more closely than ever before. This has significant implications for educational goals, practices and outcomes and for professional roles and the knowledge, skills and practices they require. An overriding question that therefore needs to be addressed is whether education can and should attempt to develop emotional well-being as a response to deep-seated social problems

The relevance of an interdisciplinary approach to the theme was evident at the launch event in February 2008 which attracted over 30 participants from psychology, education, politics, publishing, philosophy, theology and health and social care and provided an opportunity for discussing the varied but related interests.

The key event around which the theme will initially be located is a seminar series, entitled '*Changing notions of the human subject: interdisciplinary perspectives on emotional well-being and social justice in education policy and practice*', for which an application to the Economic and Social Research Council (ESRC) has already been made. Running throughout 2008-09, it will enable the perspectives outlined above to be considered within a structured framework. To facilitate focus the seminars will be restricted in numbers and will include practitioner and policy-based groups and academics from other universities as well as Brookes. However, the intention is to disseminate ideas and encourage debate much more widely, through, for instance, video conferencing and on-line discussions, and through a final seminar comprising some 50 participants.

To be put on our mailing list, please contact Margaret Pye (email mpye@brookes.ac.uk).

Corporate Social Responsibility and Socially Responsible Investment

Theme Co-ordinators:
Professor Tim Dixon, School of the Built Environment and Dr Samantha Miles, Business School

The roots of Corporate Social Responsibility (CSR), or what is increasingly referred to as 'Corporate Responsibility' (CR), can be traced back to ancient Mesopotamia. For example, King Hammurabi of Mesopotamia in 1750 BC introduced a code in which builders and innkeepers were executed if their negligence caused death or major inconvenience to the general public! Further on in time, in 1622 disgruntled shareholders in the Dutch East India Company are said to have issued pamphlets complaining about management secrecy and self enrichment. More recently, in the 19th century, entrepreneurial philanthropists such as Titus Salt and Joseph Cadbury created model villages for factory workers in the spirit of what has become known as CSR.

CSR has a long history

Today, however, the emphasis of CSR is focused primarily on companies and the way they do business, and this is important in the context of the climate change and sustainability agendas. For example, property (or real estate) is responsible for about 40% of carbon emissions and 30% of waste materials in the UK. The UK real estate sector (comprising developers, property companies and financial institutions with real estate investments), through its involvement in urban regeneration and the development of 'sustainable communities', also has an important impact on people's lives, jobs and wellbeing. Over the last five years the sector has therefore focused increasingly on the sustainable development agenda, which seeks to ensure that real estate is economically, environmentally and socially sustainable.

At the same time, companies are under increasing pressure to ensure that they are fully accountable to shareholders for their actions and the way in which they engage with key stakeholders. Although accounting for sustainability is currently a voluntary activity, the Turnbull report, UK Company Law Review and related guidance from

organisations such as the Association of British Insurers means that companies are increasingly reporting their social and environmental performance. This has also evolved in the context of the mainstreaming of the twin concepts of CSR and SRI (Sustainable and Responsible Investment), and through an increased focus on FTSE4Good companies. CSR involves the incorporation of social, environmental and governance (to internal and external stakeholders) into these systems and processes, whereas SRI involves the combination of social, environmental, governance and financial goals in the application of capital ie the actual investment process. In other words CSR is concerned with *'how the company conducts itself in the community and the environments it touches'* whereas SRI is about *'the manner in which an investor applies its capital'*.

Despite these improvements there has so far been little co-ordinated research which has attempted to bring a multidisciplinary approach, combining the real estate and business disciplines, to research in the real estate sector, or to link the existing research work in an international context.

Addressing the research gap

The theme, Corporate Social Responsibility and Socially Responsible Investment, which was launched on 12 February 2008 and was attended by researchers from planning, architecture, real estate and construction, and business, is intended to address this research gap.

The key aims of the theme or network are therefore:

- to bring together key researchers in the Oxford Institute for Sustainable Development (OISD) and the Business School with others at Oxford Brookes to develop a joint research agenda in the field of CSR and SRI in the real estate and construction sectors
- to develop the first steps in building an international network of researchers in the field.

The related objectives are to:

- develop new collaborative bids for industry/research council funding from these two main activities
- develop joint papers from these two main activities.

The workshop has already led to a joint bid between OISD and the Business School to the Association of Chartered Certified Accountants (ACCA) and Building Research Establishment Trust on a proposal based on a detailed analysis of Corporate Social Responsibility and Company Reporting in the property and construction sectors.

Other planned activities include a number of workshops, among them one entitled *'Developing a research agenda'*, which will be for selected end users and invited researchers and which will form the basis of a joint proposal to the ESRC and/or an industry funder; the development through a programme of joint work of further bids; and website development.

Anyone interested in the topic or in the activities of the theme should contact **Professor Tim Dixon** (email tdixon@brookes.ac.uk).

Professor Tim Dixon



Dr Samantha Miles



Systems Biology

Theme Co-ordinator:
Professor David Fell,
School of Life Sciences

Systems Biology represents a changing emphasis in many areas of biological research. For many decades, a dominant tendency has been the discovery of the components involved in biological mechanisms, passing from organisms to cells, from cells to subcellular structures, and thence to molecules. Amongst the major achievements of this approach has been the detailed analysis of the DNA molecules of bacteria, plants and animals - including humans - which transmit genetic information from generation to generation. At the same time, it has become increasingly clear that detailing the properties of an ever expanding list of components is not sufficient to provide explanations of how biological systems work.

What is needed is a synthetic approach that provides explanations of how biological phenomena arise through the interactions of the many individual components, working up from molecules to cells, from cells to multicellular organisms, and from organisms to populations and communities. Systems Biology aims to provide this complementary approach to traditional biological research, but the complexity of the problems requires additional areas of expertise. There is an analogy with engineering, where it is necessary to understand how the properties and behaviours of a finished artefact depend on those of the components it contains, and this suggests that there could be applications in biology of the mathematical and computing approaches used in engineering.

Research potential

It is for this reason that the Engineering and Physical Sciences Research Council (EPSRC) and Biotechnology and Biological Sciences Research Council (BBSRC) have provided substantial streams of funding in a number of initiatives and programmes to

promote collaborations between biologists, mathematicians, computer scientists and engineers in order to develop Systems Biology. Professor Mike Pidcock, School of Technology, and the writer of this piece were successful last year in securing funding from the BBSRC for a collaborative project with colleagues at the University of Bordeaux 2 under a scheme promoting UK-France research in Systems Biology. It seemed to us that there would be potential for other colleagues in Life Sciences and Technology to develop research in this area: several researchers in Life Sciences are pursuing topics with unmet requirements for mathematical analysis and computer modelling, and, in Technology, there are researchers whose work has biological applications but who have not been in contact with potential collaborators in Life Sciences. A major obstacle to doing anything about this has been the decreasing contacts between staff of the two Schools, especially following the completion of the move of Technology to the Wheatley campus. Hence the introduction of the Interdisciplinary Research Themes initiative seemed an ideal opportunity to promote Systems Biology and catalyse interactions.

The launch meeting of the theme, which took place in Headington Hill Hall on 19 February was attended by about 30 participants drawn from both Schools, started with an introduction to the concept of Systems Biology. In the discussion that followed, there was a general feeling that people needed to be given some concrete examples of the sorts of approaches that were underway in this area. Participants also recognised the need for researchers from both Schools to gain a better understanding of what the others were doing in order to identify areas of potential collaboration. Here a major difficulty is the highly specialised terminology used by both sides. Moreover, even when the same words are used, their interpretation is often different.

The issues raised at the launch have informed the programme of events. Thus it is intended to organise some seminars to illustrate the approaches used in Systems Biology, together with workshops in early summer where researchers can explain what they are doing and where they would welcome help. This will enable participants to gain greater insight into current research in the University with the aim of identifying new directions this research could take. Even the launch meeting had some successes in this respect: several colleagues met for the first time and found they had interests that could well fit together. Devoting some time to information-exchanging activities, under the auspices of the theme, will enable more synergies to be found and will ensure that Oxford Brookes University is contributing to the development of Systems Biology research.



Professor David Fell

Health

Theme Co-ordinator: Professor Mary Boulton, School of Health and Social Care

This Theme builds on the success of the Multidisciplinary Health Research Network (MDHRN), established in 2003 to promote interdisciplinary and multidisciplinary research on health, medicine and health care within Oxford Brookes University and more broadly with other research institutions in Oxford. The aim is to consolidate the achievements of the MDHRN, harness evident enthusiasm for collaboration and, through securing external research funding, forward the University's commitment to developing research at the interface of biomedicine, health care and technology.

Interest in the Health Theme has been considerable, with 26 people attending the launch on 20 February 2008 and others making contact by phone and email. The event provided the opportunity for people to meet others from across the University – all eight Schools and the Research and Business Development Office were represented – and to describe their particular interests in health research to other participants. A number of areas of common interest quickly emerged and some imaginative links were immediately made. As a result, the initial focus of the Health Theme will be on four related substantive areas:

- Cancer
- Disability, Rehabilitation and Enablement
- Food, Alcohol and Drugs
- Children and Families.

There will also be two cross-cutting sub-themes: history, policy and practice; health services research.

Champions and collaborations

A 'champion' has been identified for each substantive area (see below) and individuals indicating interest in a particular topic have been invited to one of four follow-up meetings in May. These meetings will be facilitated by the four champions and will allow a more focused discussion of research ideas. In the meantime, a number of research collaborations have already been established and bids for funding to support the development of their work have already been made. The following give a flavour of the range of innovative, multi-disciplinary, cross-School research projects which the Health Theme and the MDHRN can foster.

The **Cancer Care** group (champion: Professor Eila Watson, School of Health and Social Care) is looking at the impact of cancer on non-traditional families. While there is now a substantial research literature on the impact of cancer on family members of cancer patients and on the role of families in providing care and support, the notion of 'family' underpinning this is that of the traditional married couple with children. Little attention has been paid to the increasing

diversity of family forms characteristic of late modern society and the issues these raise for cancer patients and their families. In preparing a draft grant application to the ESRC, this group has applied for funding to carry out a review of the literature on cancer and non-traditional family forms.

The group looking at **Disability, Rehabilitation and Enablement** (champion: Dr Helen Dawes, School of Life Sciences) has bid for funding to carry out a pilot study to support the development of a grant application. The pilot work would involve recruiting nine youngsters (six with Developmental Coordination Disorder, three controls) to come to the Movement Science Lab on four occasions for assessment and to attend twelve intervention sessions (twice a week for six weeks) involving an exercise programme.

The **Food, Alcohol and Drugs** group (champion: Professor Margaret Harris, School of Social Sciences and Law) has bid for funding to undertake two literature reviews. To date, most research on problem drug use has focused on the dramatic aspects of drug users' lives, such as high-risk injecting behaviours, HIV/AIDS, criminal activity, drug overdosing etc. Research on drug users' everyday health and self-care practices is small by comparison. Recognising this deficiency, the two separate but related literature reviews focus on a) illicit drug use and diet/nutrition and b) illicit drug use and exercise/physical activity. These reviews will form the basis of two research proposals. It is anticipated that the first proposal will explore the nutritional status of drug users in residential settings and the implications of this for their recovery. The second proposal is likely to investigate the activity levels of problem drug users and the barriers and factors that might enable them to participate in more exercise.

The research of the **Families and Children** group (champion: Professor Margaret Harris, Social Sciences and Law) is underpinned by that already being undertaken within the Institute of Research in Child Development.

To facilitate communication amongst Health researchers, those who expressed an interest in the Theme were asked to provide information for an online Register of Research Interests. There are currently 32 entries on the Register, which can be found on the MDHRN website at <http://shsc.brookes.ac.uk/content/view/73/172/>. The Register provides details of individuals' research interests, expertise and proposed projects and is searchable by substantive research area, cross-cutting research theme and researcher's name. Other information relevant to the Health Theme – for example, conferences, courses and research resources – will also be posted on the MDHRN website.

Professor Mary Boulton





Professor Chris Hawes

Sarah Taylor from Brookes' Research and Business Development Office, interviews Professor Chris Hawes from the School of Life Sciences.

Chris joined Brookes (then Oxford Polytechnic) in 1989 as a senior lecturer teaching on the then new Cell Biology degree course. He came from the Department of Plant Sciences at the University of Oxford where he was a Royal Society Research Fellow working on microscopy of the plant endomembrane system (also known as the secretory pathway). This is a series of compartments within the cell that is responsible for the production and processing of proteins and carbohydrates that are used, for example, in storage in seeds and for making the cell wall. Prior to this he gained his PhD at Bristol University working on electron microscopy and the development of fungal spores.

Chris currently leads the Plant Cell Biology Research Group in the School of Life Sciences, is Director of Research in the School and oversees the bioimaging unit. He has just finished a term as President of the Royal Microscopical Society and is currently Vice-President. He is a Biological Editor of the *Journal of Microscopy* and on the editorial board of the journal *Traffic* and is a member of the BBSRC Biochemistry and Cell Biology Committee. With the help of a number of postdoctoral and PhD students he has published over 150 papers and reviews and edited two books. The work of his group is currently funded by two BBSRC grants and a Leverhulme Trust Award. He has just finished his contribution to a multi-million European Framework Six project on the production of therapeutic antibodies in plants.

Q: What first sparked your interest in your current field of research?

I always wanted to be a Botanist (we are called Plant Scientists these days), but have no idea why, but there again how many people have an A-level in Botany? Plants are pretty important; they are responsible for our atmosphere, for all the food we eat, for much of our building material, a large portion of our pharmaceuticals and increasingly as a source of energy. My interest in microscopy grew at university where we were given access to electron microscopes which at the time was a relatively new technology. So when a postdoctoral research position was advertised at Oxford to work on the million volt electron microscope, a simply huge machine, in the Department of Materials Science, there was no way I could resist. It was here I started to work on the membrane systems within plant cells as they were particularly amenable to this form of electron microscopy.

Q: What is the most recent/current project (research project, book, article etc) you are involved in and what particularly interested you about the work?

In science, research projects tend to continually evolve, so rarely do you ever completely finish one piece of work and start something totally new. So over the past 25 years my work has mainly been on the organisation of compartments of the secretory pathway in plant cells. Currently in the team there are three postdoctoral students (Imo Sparkes, Eric Hummel and Anne Osterrieder) and one PhD student (Peng Wang) backed up by three brilliant technicians (Barry Martin, Jan Evins and Anne Kearns), working on various aspects of the endomembrane system using molecular biology, biochemistry, laser scanning confocal microscopy and electron microscopy. The work that really got our group known was the application of fluorescent protein technology. We were one of the first groups to observe internal membrane systems in living plant cells by tagging proteins with a green fluorescent protein (GFP) from jelly fish. This means that experiments can be carried out in real time within living cells. Just to observe the internal workings of a live cell with a fluorescence microscope is amazing. This all started in the mid-nineties when we managed to fuse GFP to a protein that acts as a marker for the Golgi apparatus. This is the key processing compartment in the endomembrane system which sends product to its final destination in the cells and exists as hundreds of tiny stacked discs of membrane each about one thousandth of a millimetre in diameter. When looking at tobacco leaves with a fluorescence microscope, I noticed that these organelles, as they are called, were not static but were extremely mobile, rapidly moving around inside the cell. It now turns out that in order to move the Golgi uses a combination of the proteins actin and myosin, which are exactly the same proteins

that produce the force generation in our muscles. Pretty amazing when you think about it.

In terms of articles, we have just had two papers accepted for publication on movement of the Golgi and the production of antibodies in plants, are currently working on a review paper and within the group we hope to write at least another two or three this summer on various aspects of our plant endomembrane research.

Q: How do you see research in your field developing and in what ways will this affect what you do?

My area of research is starting to become quite popular with more and more groups worldwide starting to work on the secretory pathway. This obviously makes obtaining funding more competitive. However, the idea is that if we can improve the performance of the components of the pathway then we may be able to make cells more efficient in terms of acting as factories for the production of useful compounds, from enhanced foodstuffs through to cheap pharmaceuticals for the developing world. With the looming food crisis that has been hitting the news headlines recently, one of the options we have is to enhance the ability of plants to produce high value (in terms of nutrition) food products at high yield. It would be nice to think that funding agencies worldwide will start to realise that the returns in funding basic plant science could be extremely high. Perhaps the obsession with ploughing most of bioscience research funding into biomedical research just to increase our 'Western' life expectancy by a few months will soon start to appear a bit selfish compared to the problem of feeding the world.

Q: Multi-and interdisciplinary work is increasingly important these days – what other disciplines/subject areas would you like to work with and why?

The system (research funders and universities) is becoming almost obsessed with interdisciplinary work - as if there is not enough left unknown in our own disciplines! Having got that off my chest I have to admit that a biophysicist and a mathematician in the group would be really useful as we are just starting to attempt to model some of the membrane systems we are working on.

Q: What are your research plans for the next five years and how does applying for research funding fit within these plans?

There is plenty left to do on working out the mechanics of the secretory pathway in plants to keep my team occupied for the next five years. We have just applied for a European Research Agency Plant Genomics grant as part of a small consortium for funding to continue our new work on proteins that shape the first compartment of

the secretory pathway, the endoplasmic reticulum. By the time you read this we will also have heard about the outcome of a current BBSRC application to work on these same proteins with collaborators at the University of Warwick. However, my next really large project is to replace the electron microscopes in the School of Life Sciences. There are now 18 and 20+ years old respectively so if anyone had a spare £500K to hand I can easily relieve you of it!

Q: How do you see your research career developing over the next ten years?

What kind of question is this Sarah? I only have ten years left! Just to keep producing data and papers at the rate we are currently doing will be a big enough challenge. Does this mean I have peaked – who knows? I don't think I have ever planned my career, things have just seemed to happen and opportunities have to be grasped as they occur. Mind you I have turned down a few offers as well, but it is not worth dwelling on what might have been. Not a very good advert to students who come looking for career advice I'm afraid!

Q: Who do you think has most shaped your research career and why?

My PhD supervisor at Bristol, Alan Beckett, kindled my love for electron microscopy when I carried out my honours project with him. He was obsessive about the quality of the micrographs (photographs from microscopes) produced in his lab and I hope some of his obsession with quality has rubbed off on me. There is an American cell biologist that I have always admired, a guy called Peter Hepler, who probably has contributed more to plant microscopy than anyone else in the world and he is a very committed socialist as well! Again he is obsessive about the quality of his microscopy, a trait that is sadly missing in much of today's researchers. If I was considered by others to be half as good as him I would retire happy. Finally, David Beadle, the last Dean of the School of Biological and Molecular Sciences, as we used to be called, gave me the opportunity to build up a research group here at Brookes and I will always be grateful to him for that.

Q: If you did not have a job in a higher education institute, where would you like to work and why?

This is an easy one. For years I have wanted to run a microbrewery. I used to be a very nifty home brewer until the tap on the boiler I used for mashing the malted barley jammed and I never managed to unstick it. Perhaps taking up brewing again would be a nice retirement project!

Art, Culture and Sustainability

Theme Co-ordinator:
Dr Shelley Sacks, School of
Arts and Humanities

Art, Culture and Sustainability is a new transdisciplinary research group, linking academics and practitioners within and beyond Brookes. Convened by Shelley Sacks, Reader in Art and Director of the Social Sculpture Research Unit (SSRU), it has met three times since early 2008.

Foregrounding the role of culture in shaping a viable and sustainable future, the group explores interfaces between how we think and what we do, between frameworks, perspectives, values and practices. This relationship between culture and sustainability, between thinking and action, is becoming increasingly significant in many fields of research and engagement. These include: eco-art and connective aesthetics, attitudinal change and campaign design, material culture processes and documentary film; education for sustainable development; facilitating social enterprise; eco-tourism; lifestyle questions; food and farming; restorative and environmental justice; redefining wealth and progress; organisational and participatory learning; citizens' juries and other forms of democratic participation; life ethics; intercultural dialogue and understanding; sustainable architecture and urban regeneration.

Building on expertise across the University and creating opportunities for cross sector work between the university, community and cultural networks, and NGOs, the group has identified a number of common questions such as:

'How do we do *connective practice* and how do these ways of working serve the social and ecological changes we need for a more sustainable future?'

We have also identified several common interests that include:

- exploring different forms of knowing that extend beyond traditional notions of expertise and facilitate local and global dialogue and reflection on the ecological crisis
- transdisciplinary working as a means of revealing new knowledge for sustainable design and evaluation
- identifying and developing non-verbal means as a way in which individuals or groups can express their concerns and aspirations about sustainability
- developing 'new methodologies of engagement' to facilitate new connections to ourselves, our environment and our future
- exploring approaches to understanding and developing 'human well being'
- redefining 'capital' and rethinking money as a social form in shaping people's actions, aspirations and futures
- employing methods (eg from anthropology and co-operative inquiry) to understand the difference between what people say they will do and what they actually do in a sustainable development context
- exploring the scope for working across Brookes' Schools on research projects and on projects which span industry, communities and NGOs in some combination.

Motivated by such concerns and commitments, the group – which currently includes around 18 people – has embarked on a number of initiatives as starting points for exploring methodologies, exchanging insights and developing ideas for transdisciplinary research projects, processes and programmes of study.

Our first two initiatives

Connective Practices: a research symposium and network development process

This two-day inquiry event will take place on 17-18 June 2008 at Brookes. This is, of necessity, a small, exploratory think tank linking transdisciplinary researchers and practitioners within and beyond Brookes. Its purpose will be to explore the potential for working together; generate a proposal for a funded international network to further develop our work in the field of connective

practices; and document the research dialogue towards a refereed journal paper.

We are using the phrase 'connective practices' to refer to forms of knowing, methodologies and practices that:

- facilitate connected thinking, respectful action and social and ecological justice
- help close the gap between information and action and work toward overcoming denial
- connect inner and outer work and explore the relationship between aesthetics and ethics
- enable people to become internally active, overcome habitual thinking and new possibilities
- explore new forms of knowing and 'new organs of perception'
- understand responsibility as the ability-to-respond.

This first symposium is co-hosted by the SSRU and the Institute of Historical and Cultural Research.

A University-NGO-Community and Cultural Networks Forum

This is intended to facilitate new forms of research and practice-based collaborations and will begin with small group meetings between university researchers, NGOs and the wider community exploring the potential for working together in areas of art, culture and sustainability. A larger group meeting will follow to explore what kinds of collaboration are possible and sustainable; what specific areas of engagement participants can support; and ways of ensuring continuity and development. This initiative is convened by Dr Graham van Wyk (SSRU/Brookes) and Kathryn Tulip (Corporate Watch).

Connecting culture, transformative process and sustainability, this transdisciplinary group sits at a particularly fascinating and important juncture between the social and the more technical aspects of shaping a humane and ecologically sustainable future. Its concern with new vision and attitudinal change has currency in many fields, offering opportunities to build on specialist expertise within and beyond Brookes, whilst enabling new thinking and practice that we might not come to in our separate disciplines.

The theme welcomes new members. If you are interested in participating please contact Dr Shelley Sacks (email ssacks@brookes.ac.uk).



Dr Shelley Sacks

Safety Technology

Theme Co-ordinator:
Professor Hong Zhu,
School of Technology

Safety technology is concerned with protecting human life, property and the living environment from actual or potential damage, even in adverse conditions such as earthquake, tsunamis, fire, storm and flood. The theme of safety technology stems from research on the safety of critical systems which has been active in computer science since the early 1990s, and which initially focused on how to ensure the dependability of computer applications in safety critical systems, such as nuclear power plants.

Technological developments

Concerns about the safety of computer control systems became more widespread as the use of complex computer software to control critical systems increased and it resulted in significant funding for research from the EPSRC and the DTI, as well as from industry in safety-related sectors, such as nuclear energy, air and railway transportation, medical devices and equipment, and process control systems. While support from national and international government funding bodies has significantly reduced, the research on the topic remains active, with a number of annual international conferences and funding from the industry still being pumped into research institutes, such as the Safety Critical Systems Research Centre at the University of Newcastle, the Software Reliability Research Centre at the City University of London, and the Safety Systems Research Centre at the University of Bristol, which are more or less self-sustainable.

In the meantime, the rapid development of the internet and pervasive computing means that a wide range of new types of systems and applications related to safety have become possible through the application of computer and information technology. For example, in the automobile industry the combination of wireless communication and embedded systems could provide closer monitoring of motor cars/motorcycles in the

context of the road conditions to enhance their safety. In architecture, the combination of sensor networks and artificial intelligence technologies (such as multi-agent systems) could provide much better monitoring of buildings to detect hazardous conditions, such as fire and structural failure (eg in an earthquake), and intelligent context-aware responses, such as evacuation instructions to the public when a hazard situation happens. In healthcare, the combination of robotic technology and sensor network techniques can provide more intelligent equipment and devices to ensure the safety of the patient and to help patients to recover.

This shift in research focus from ensuring the dependability of computer systems in safety critical systems to the uses of computer and information technology to enhance safety in a much wider application domain, offers opportunities for research which could have a significant and profound impact on human life and society and respond to the strong market for safety technology.

Pioneering interdisciplinary research

The Safety Technology theme capitalises on these developments. Launched on 13 March 2008 and attended by ten researchers from computer science and technology, electronic engineering and mechanical engineering, its aim is to provide key technology solutions for monitoring, enhancing and supporting safety in all aspects of human life, including developing better equipment and systems for health and social care; designing buildings, complex systems and equipment and devices to withstand adverse conditions; and dealing with emergent conditions more effectively and efficiently.

The idea of safety technology as an interdisciplinary research theme is novel and exploratory. There is no branded research activity on this topic within Oxford Brookes University or outside, although the School of Technology has run an honours level module, Safety Critical Systems, for many years and the Applied Formal Methods research group (Department of Computing) actively researches the formal specification of software systems and software testing, which is closely related to the safety issue.

However, it is hoped that the theme will provide the opportunity for researchers with knowledge and expertise in areas such as computer science, software engineering, electronic engineering, mechanical engineering, social science on behaviour and society, health and social care, and the built environment and architecture to come together to solve practical problems.

A number of promising ideas, arising from the launch meeting, will be pursued through a programme of research activities which include a series of research seminars, the first having been given on 1 May by Dr Mary Zajicek who spoke on the safety issues in the design of an in-car speech guidance system for older drivers; two internal workshops and two international workshops.

A website will also be constructed, whose address will be:
<http://tech.brookes.ac.uk/SafetyTechnology/>. This will host research information, announce research activities and be a platform for all people interested in Safety Technology. Anyone interested in this research theme should contact Professor Hong Zhu, School of Technology (email: hzhu@brookes.ac.uk, tel: 01865 484580).

Professor Hong Zhu



Diary

Details of research training events throughout the year are available on the Research and Business Development Office website:
www.brookes.ac.uk/res/news/training

Details of research supervisor and student training are available on the Graduate Office website:
www.brookes.ac.uk/research/Graduate/Graduate.html

Details of research seminars taking place in each of the Schools are available at: www.brookes.ac.uk/res/news/seminars

News in brief

Congratulations on the conferment of the title of Professor to **Munira Kadhim**, School of Life Sciences; **Walter Kugler**, School of Arts and Humanities; **Denise Morrey**, School of Technology; **Wenhua Shan**, School of Social Sciences and Law; **Andrew Spicer**, School of Arts and Humanities and **Lucy Vickers**, School of Social Sciences and Law.

Dr David Evans and **Dr John Runions** in the School of Life Sciences have been awarded £135,990 over three years by the Leverhulme Trust to study novel proteins in the membrane that surrounds the plant nucleus. The grant builds on the work of their research student Katja Graumann, who has shown the presence of a family of proteins - the Sun Domain proteins - in plants. In animals, the Sun Domain proteins are key members of the LINC (Linker of Nucleoskeleton and Cytoskeleton) complex. This complex provides physical connections across the nuclear membrane that are important in transmitting signals into and out of the nucleus and in positioning the nucleus within the cell. The work will therefore permit exploration of a key system never previously studied in plants with implications for a wide range of cell functions.

Professor Jo Neale, School of Health and Social Care and Dr Sarah Nettleton from the University of York have been awarded more than £267,000 from the Economic and Social Research Council (ESRC). The study - a sociological investigation of the everyday lives of recovering heroin users - will be conducted over two years and will increase understanding of how everyday practices and routines facilitate or inhibit processes of recovery from dependent heroin use. Findings from this research will be relevant to many audiences, including academics and those working within the substance misuse field.

Following the success of her handwriting test published last year (the DASH - Detailed Assessment of Speed of Handwriting), **Dr Anna Barnett**, School of Social Sciences and Law, is now embarking on a project to extend

the test for use with older students. She has successfully secured funding of £29,957 from Pearson Education Ltd, with which she will co-ordinate the collection of normative data for 17-25 year olds in schools, colleges and universities across the UK. This will provide an assessment tool for quantifying handwriting performance and identifying students with handwriting difficulties from primary through to higher education.

Dr David Nash, Reader in History in the School of Arts and Humanities, made an appearance at the Guardian Hay-on-Wye Literary Festival at the end of May to talk about his book *Blasphemy in the Christian World*.

A collaborative research grant between Lancaster, Leeds and Oxford Brookes worth £1.2 million over three years was recently awarded by the Engineering and Physical Sciences Research Council (EPSRC) with **Tim Jones**, School of the Built Environment as the Co-Investigator for Brookes. The ways in which travel decisions are made remains poorly understood especially in the context of complex and contingent household travel arrangements. 'Understanding walking and cycling' seeks to fill this research gap through an in-depth analysis of household decision making with respect to short journeys in urban areas and commences in October 2008.

Dr Constantine Sandis, Westminster Institute of Education has accepted an RSA Fellowship. The RSA (Royal Society for the Encouragement of Arts, Manufactures & Commerce) works to remove the barriers to social progress by undertaking influential and varied research projects and hosting a free lecture series.

Professor Mark Saunders, Business School, has recently obtained funding for three separate pieces of research following successful bids to Worcestershire County Council, the University of Cambridge ESOL Examinations and, jointly with Elspeth McFarlane, the Department for Business,

Enterprise and Regulatory Reform. The projects concern respectively the carrying out of a staff attitude survey and related interviews, the exploration of sales support perception-expectation gaps, and a Knowledge Transfer Partnership with the on-line recruitment company Eteach centred around the identification and development of online best practice human resource services to clients. In total, funding from the projects amounts to approximately £168,000.

Dr Tina Miller, School of Social Sciences and Law, has had her current qualitative longitudinal research project on transition to first-time fatherhood accepted as an affiliated project to the ESRC 'Timescapes' study. The study is the first major qualitative longitudinal study to be funded in the UK. Running over five years, the study explores the ways in which personal and family relationships and the identities that flow from these relationships, unfold over time and over the life course. The affiliated status will mean that Tina's research data will become part of a much larger data archive, enabling future secondary analysis and collaborations with other researchers working in the area.

Professor Laura Spira, Business School, has been invited to co-chair the 5th European Institute of Advanced Studies in Management international workshop on corporate governance in Brussels in November 2008.

The Medical Research Council (MRC) has awarded **Dr David Meredith**, School of Life Sciences, a Doctoral Training Grant. The award, worth approximately £110,000 over four years is in collaboration with AstraZeneca, one of the world's leading pharmaceutical companies, and will fund a PhD research studentship. as part of his research programme, David will work in the AstraZeneca laboratories for six months, under Dr Sarah Kelly's supervision.

Research Forum, the research magazine of Oxford Brookes University, is published three times a year.

Contributions are welcomed from all sections of the University and should be sent to The Editor, **Research Forum**, The Research and Business Development Office, Oxford Brookes University, Buckley Building, Headington Campus, Gypsy Lane, Oxford, OX3 0BP or by email to researchforum@brookes.ac.uk

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