Focus on Reading research

Hello, and welcome to the Summer 2009 edition of Research Review. Over the past few months Reading’s broad research strengths have been recognised with major grant awards across a range of subject areas, including climate science, polymer science, biomedical science, agricultural economics, archaeology, law and security studies. The high esteem in which many of our leading researchers are held has also been recognised by their being appointed to major Research Council positions. Our staff continue to publish internationally excellent outputs and, later this year, our digital Institutional Publications Repository will come online, showcasing our research outputs and giving worldwide access to many of our publications. It will play a key part in our future research assessment. The award of a JISC Repositories start-up grant is funding a new post in the Repository team, enabling the incorporation of past publications.

Particular highlights in this Review include an article written by Professor Steven Mithen about an exciting archaeological dig in Jordan; the acquisition of the Knowlson collection to enhance our world-class Beckett collection; news about research to help halt bee declines in Europe; and a behind the scenes look at the Hugh Sinclair Unit of Human Nutrition.

The article on page 10, describes how digital technologies are revolutionising the construction industry and the way in which it is managed. These are very exciting times, and the University is also looking to make the most of the digital technologies which are available to us in order to enhance our online presence. We already have a series of very popular research showcase films, and to build on this we will be starting to add a diverse range of multimedia material to the website over the next few months. We hope that this will serve to further develop the way in which we communicate the exciting research which takes place at the University, and make it more accessible to a wider audience.

I hope you enjoy reading about the exciting research developments contained within these pages. Research Review can only contain a small selection of our outstanding research, though, and much more information can be found on our website.

Professor Dianne Berry
Pro-Vice-Chancellor (Research)

www.reading.ac.uk/research

New research grants and contracts

Some of the larger recently awarded grants from October 2008 to end of April 2009 include:

- **AHRC**
  An award of £93,250 to Dr Philippa Hardman from English and American Literature entitled ‘Charlemagne in England: The matter of France in Middle English and Anglo-Norman Literature’.
  Professor Roberta Gilchrist from Archaeology has been awarded £339,641 for the Glastonbury Abbey archaeological archive project.

- **BBSRC**
  Dr Geoff Brown from Chemistry was awarded £390,644 for a project on the biosynthesis of artemisinin.

- **EPSRC**
  A grant of £5.97M for an industrial doctoral training centre for polymeric materials.
  A grant of £5.97M for an industrial doctoral training centre for sustainable built environments in the School of Construction Management and Engineering (Dr. Hazem Aabi is the project leader).

- **MRC**
  An award of £396,239 has been made to Dr Tamara Critsian and Professor Ian Jones from Biological Sciences to investigate the molecular basis of tick-borne flavivirus transmission. Kerstin Thrillwall from Psychology has received a Fellowship for £278,696 entitled ‘The treatment of child anxiety disorders via guided CBT self-help: a randomised controlled trial’.

- **National Institute of Health Research**
  Dr Graham Shaffer has been awarded £197,281 from the Research for Patient Benefit scheme to research ‘A parental report assessment for early cognitive delay in at risk children’.

- **Carnegie Corporation of New York**
  A grant of £262,578 was awarded to Dr Dominic Zaum from Politics for ‘Power after peace: the political economy of post-conflict international state building’.

- **British Heart Foundation**
  Professor Jon Gibbins (Institute for Cardiovascular and Metabolic Research) has been awarded a grant of £199,094 for ‘Investigation of the role of the receptor tyrosine kinase EphB2 in the regulation of platelet function, haemostasis and thrombosis’.

- **European Commission**
  Professor Bruce Truill from Agriculture Policy and Development is co-ordinating a European Commission Framework 7 grant worth a total of 2.5 M Euros (of which £516,000 is for the University of Reading). The project is ‘Interventions to Promote Healthy Eating Habits: Evaluation and Recommendations – EATWELL’, and there are 9 partners involved in the research. A grant of £722,384 has been awarded to Dr Chris Reynolds from Agriculture, Policy and Development for ‘Innovative and practical management approaches to reduce nitrogen excretion by ruminants (REDNEX)’.

- **ESRC**
  Dr Lawrence McNamara from Law has been awarded £255,838 for a project investigating ‘Law, terrorism and the right to know’.
Climate Change and its dramatic consequences...

Current research at the Walker Institute of Climate Systems Science is focussed around climate change and the impacts that this has on the world we live in. In general, many climate models produce average predictions of future weather and climate, which can mask important changes which occur on a day-to-day basis. Two new research projects have focussed on this variability which occurs during real-life situations. Using high-tech modelling, and building on knowledge from previous studies, this research will enable more accurate predictions to be made, and strategies to be put into place, to deal with the consequences of living with climate change.

Heat-related deaths

Heat-related deaths occur annually, but new research from the Walker Institute has shown the numbers are set to double by the end of the century. The increase in temperatures cause particular problems for cities where the heat is maintained in buildings and roads, often making them several degrees warmer than the surrounding countryside. Very hot conditions can cause serious cardiovascular and respiratory problems, particularly in vulnerable groups such as the very young and the very old.

Simon Gosling, of the Walker Institute, said: ‘On average, about 120 deaths occur each summer due to high temperatures in London. Our study shows that by 2080 this could increase to nearly 500 as a result of climate change, even allowing for some acclimatisation to higher temperatures.’

The unique study concentrated on the increase in day-to-day temperature variability as well as the average temperature, which alone would ignore the rise of extremely hot days and underestimate the number of deaths that could result from hotter conditions in cities. In fact the lack of research into variability is thought to have underestimated the current deaths by a half. Cities need to be prepared for periods of very high temperatures, the probability of which is likely to increase in a warmer world.

Indian monsoon rains

Research from the Walker Institute has shown that climate change will have a dramatic effect on the summer monsoons that fall over India. These monsoons provide a relatively stable source of water for millions of people across Asia for use in agriculture and for drinking water. Previous studies have shown that, on average, India is likely to become wetter, but this study concentrates on the variability of the monsoons. It warns that these average measurements can mask the changes in day-to-day rainfall, which may have a more dramatic effect.

Dr Andy Turner who led the research said: ‘Our study shows that climate change is likely to bring heavier rainfall bursts over India, increasing the risk of the sort of devastating flooding we saw in Mumbai in July 2005 when nearly 1 metre of rainfall fell and many hundreds of people died. Over India, these extreme events typically occur only once every few years. If levels of carbon dioxide in the atmosphere reach double their pre-industrial level (something that is almost certain to happen this century), then rainfall events like this could be around 10-15% heavier according to our model.’

The work, published in the Quarterly Journal of the Royal Meteorological Society, also found that the breaks in the monsoon are likely to become more prolonged, in the study they ranged from 12.2 to 14.0 days. These are average figures but they imply an increased risk for longer breaks, which cause agriculture and water supplies to suffer. The extended monsoon break of July 2002 led to a reduction in both agricultural output and economic growth in India and shows the sensitivity of Indian society to climate change.

Reading academics making a difference

Academics from the University of Reading make outstanding contributions to research in a variety of ways. Here is a selection of recent high-profile announcements.

Making key decisions

Professor Peter Grindrod CBE has been appointed to the Council of the Biotechnology and Biological Sciences Research Council (BBSRC). The appointment was made by Lord Drayson, Minister for Science and Innovation. BBSRC is the UK Funding agency for research into life sciences and helps with contributing to the quality of life of UK citizens. Professor Grindrod, who was awarded a CBE in 2005, is an internationally known mathematician and is Professor of Mathematics and its Applications at the University.

Advising on policy

Professor W Bruce Trail, from the Department of Agricultural and Food Economics, has been appointed to the Council of Food Policy Advisors. The Council of Food Policy Advisors was established in 2008 to provide advice on a variety of food policies, and is part of DEFRA’s new role to co-ordinate the growing importance of food policy across Government. The council will give advice on how to achieve sustainable production, distribution and consumption of food; ensuring food is available and affordable for all sectors. Professor W Bruce Trail has also previously worked as a Consultant at the UN Food and Agriculture Organisation in Rome.

Taking plans to the next phase

Ken Norris, Professor of Agroecology, has been appointed to lead the Biodiversity theme from the Natural Environment Research Council (NERC). The theme, one of seven, will look for scientific solutions to the global environmental challenges of today and the future. Professor Norris, who is also Director of the Centre for Agro-Environmental Research (CAER) at the University, has broad experience in research spanning through individual, population, community and ecosystem approaches to understanding biodiversity.

The ultimate accolade for 20 years contribution to science

Keith Shine, Professor of Physical Meteorology has been elected to the Fellowship of the Royal Society. The Royal Society, founded in 1660, prides itself as being at the forefront of enquiry and discovery. The fellowship is made up of the most distinguished scientists from the UK; previous members include the likes of Charles Darwin and Isaac Newton. Keith Shine, who joined the University in 1988, is Director of Research in the Department of Meteorology. His research focuses on understanding how human activity triggers climate change and the role of water vapour in the Earth’s energy balance. Professor Shine is also heavily involved in the UN’s assessment of both climate change and stratospheric ozone depletion.

Leverhulme Early Career Fellowships

Dr Derek Dunn and Dr Christopher Venditti from the School of Biological Sciences have both recently been awarded a Leverhulme Early Career Fellowship. The Leverhulme Trust, established at the wish of William Hesketh Lever, makes awards for the support of research and education in the UK. The Early Career Fellowships aim to provide career development opportunities for those who are at a relatively early stage of their academic careers but who have a proven record of research. Competition is fierce for this prestigious award, with 500 applications this year, and just 74 Fellowships awarded.

Leviathans Early Career Fellowships
Major grant success for Reading’s Chemistry department

The Department of Chemistry has recently been awarded over half a million pounds in four major grants from the Engineering and Physical Sciences Research Council. The research funded by these grants will, in the future, help us to investigate drug synthesis, reduce our energy consumption, help design new materials, and learn more about Alzheimer’s Disease.

The grants will support activities involving collaborations between researchers at the University and at Harwell Science and Innovation Campus facilities, including the Diamond Light Source and ISIS. The award will support four PhD studentships and builds on existing links and funded collaborations.

Dr Roger Bennett is the Principal Investigator on a project to discover why metals spread out on polar oxide surfaces such as zinc oxide whereas they grow as droplets on other oxides. He said: ‘This research will enable further developments of useful devices and catalysts in the future which speed up devices, reduce our energy consumption, or enable us to manufacture low carbon, efficient fuels and chemicals.’

Professor Ian William Hamley is the Principal investigator on a project which will investigate the structure of molecules relevant to protein misfolding (amyloid) diseases such as Alzheimer’s. Professor Hamley said: ‘We will use x-ray scattering at Diamond and neutron scattering at ISIS to probe the nanostructures of molecules similar to those involved in the disease process. This will also enable us to investigate possible therapeutic approaches to diseases such as Alzheimer’s Disease.’

Dr Ann Chippindale and Simon Hibble have received a grant for a project to explore the new chemistry and physics of transition-metal cyanides, which have interesting structural and physical properties. Dr Chippindale said: ‘Underlying all this work is the need to know the detailed structures of the materials on the atomic scale in order to explain their chemical and physical behaviours. This research will help us to determine how the structure of transition-metal cyanides changes with temperature and pressure. The knowledge of how structure evolves as a function of temperature and pressure is important for the design of new materials of potential technological importance.’

Dr Georg Held is the Principal Investigator on a project which will use a technique known as surface X-ray diffraction to study the arrangement of atoms at the surfaces of specific molecules. This will have particular importance for the synthesis of drugs. Dr Held said: ‘Most molecules that play an important role in Biology are chiral, meaning that their mirror images cannot be matched with the original by any rotation in space – just as our left and right hands. These molecules exist as “left-handed” or “right-handed” versions. Although both versions are identical in their physical properties, all living organisms on earth only use or produce one of each biomolecule which can have an effect on function.’

Digging for our Neolithic Origins: the turning point of human history

Steven Mithen, Professor of Early Prehistory and Dean of the Faculty of Science describes a major archeological dig in Jordan with Bill Finlayson, Visiting Professor of Archaeology and Director of the Council for British Research in the Levant.
'I think there might be something here,' I called to Bill, who was also walking with head bowed across an equally anonymous gravel knoll a short distance away. That was during the first week of April in 1996 and my eyes had just fixed upon a scatter of flint flakes on the ground, each having the distinctive look of having been made by a prehistoric hand. It was the moment when the Early Neolithic site of WF16 was discovered, a site which has come to dominate our academic lives. It was the last day of our reconnaissance survey in Wadi Faynan, an arid but spectacularly beautiful landscape in southern Jordan, the home of traditional Bedouin and their goats. To archaeologists, the Wadi was already well known for its Roman and Byzantine settlement: the ruins of the ancient town of Phasma, a centre of copper mining and smelting, a cemetery where the slaves who worked in the mines had been buried, a reservoir, an aqueduct and a field system. We also knew there to be the remains of Bronze Age farmsteads and a Neolithic village known as Ghuwyer dating to about 8500 years ago. Our interest was with what went before: could we find evidence of stone-age hunter-gatherers in the Wadi? The most prized discovery of all would be the trace of a settlement at the transition from the original hunting-gathering lifestyle of humankind to that of farming – from the Palaeolithic (Old Stone Age) to the Neolithic (New Stone Age). That was the turning point in human history, happening in the Near East between 11,500 and 10,000 years ago. We didn't know it at the time, but that was precisely what we had found. It was the 16th site discovered in Wadi Faynan, and hence it received the appallingly unromantic name of WF16. Thirty years later - April 2009 - we have just completed the second of three major excavation seasons at WF16. The scatter of flints has now become a dense cluster of mud-walled dwellings, human burials and the debris of Early Neolithic life from 12,000 years ago. The excavation had lasted for six weeks with team numbering 40 archaeologists, students and workmen. Once again, our expectations at what lay buried below the ground were surpassed: not only the mundane waste from making tools, cooking and eating food; nor just the burials of the dead from below the house floors of the living; we also found a unique range of art objects, stone beads, shells that had been brought from the Red Sea and Mediterranean, ritual deposits of goat horns and - most astonishing of all - the one meter high mud walls and substantial floor of a 12 metre diameter structure, appearing to be a communal meeting place for members of the Neolithic village. The scale of that structure is a clear sign that something momentous was happening at this date in prehistory: the shift from a lifestyle of constantly shifting camp sites to one of a settled existence, the latter being a key driver towards cultivating plants and herding animals, and ultimately farming lifestyles. This is what the great archaeologist Gordon Childe described as the ‘Neolithic Revolution’ in the 1930s, the signs of which were first identified by Kathleen Kenyon at her excavations at Jericho in the 1950s. This was indeed the turning point in human history: after millions of years of hunting and gathering, farming lifestyles provided the economic basis for the origin of towns, trade and ‘civilisation’. Ever since the antiquity of human was established in the late 19th century, archaeologists have been asking why this transition from hunter-gathering to farming occurred. A wealth of theories and hypotheses has been developed but the archaeological evidence has never been sufficient to judge between them. This stymied state of academic affairs is beginning to change: during the last decade there have been important new discoveries of Early Neolithic sites in southern Turkey and Syria, providing much larger structures remained buried between our small evaluation trenches. With this report completed, we applied to the Arts & Humanities Research Council for funds to undertake a large scale excavation, and were awarded £734,196 – one of the largest grants ever awarded by the AHRC. That funds the three seasons of fieldwork. We will need to raise at least the same amount to cover the post-excauation costs, primarily to employ a team of specialists to study the stone artifacts, animal bones, plant remains, art objects and so forth. If all goes to plan, we hope to get the final report of the site - a three volume monograph – published by 2016. Twenty years after first finding the site that is the time frame that world class archaeological research requires. We direct the project but it is a team effort. The Jordanian archaeologist Dr Mohammed Najjar co-directs the excavation, while Dr Sam Smith and Dr Emma Jenkins, post-docs at Reading, play a critical role in the planning and management of the excavation, especially with regard to vast quantities of data that are generated on a daily basis. The professional field archaeologists we employ, most of whom are ex-Reading students, are not only remarkably skilled excavators but also supervise the current undergraduate students who are just beginning to acquire such skills. The Bedouin workmen, some of whom have become long-term friends, also play a critical role, especially with regard to the sieving and meticulous searching of every bucket of sediment that we excavate. We all live in Wadi Faynan for the duration of the excavation; the students have the opportunity to visit nearby archaeological sites on their one-day-off-a-week, such as Petra and crusader castles, and we enjoy the hospitality of the Bedouin with invitations to their traditional ‘mensaif’ within their tents. For almost 12,000 years the collapsed mud buildings and debris of early Neolithic daily life had lain buried and forgotten in Wadi Faynan. Bringing that village back to life and using what we learn to further our understanding of when, how and why human farming lifestyles arose is an enormous challenge. It is one being watched closely by archaeologists throughout the world. aware that the University of Reading has now positioned itself at the forefront of research on one of the greatest questions about the human past: the origin of Neolithic, the turning point of human history.
Digital technologies in construction

Within the School of Construction Management and Engineering there is a growing expertise in studying design and construction in the digital economy. Information and communication technologies are impacting and transforming all aspects of business, society and government. As digital technologies become used extensively on large construction projects, such as the London 2012 Olympics and the CrossRail projects, they are fundamentally changing the methods and outcomes of work. This is a dynamic area of research at the University, where researchers work closely with industrial collaborators to understand the opportunities and challenges of digital technologies in large building and infrastructure projects. Rather than focusing narrowly on tools and applications and their intended benefits, the focus is on practices and how these practices are institutionalised. This approach is important because technology often claims to have substantial benefits, but these can be hard to achieve in practice.

Heathrow Terminal 5 was the first construction mega-project in the UK that introduced a centralised system for computer-aided design, document management and project control. Dr Chris Harty and Dr Jennifer Whyte have conducted separate studies of technologies and practices at Heathrow Terminal 5, and since Dr Whyte joined the School they have been working closely together to build on this area of work. Building Information Models (BIM) are a particular focus of this research, which investigates the new hybrid digital and physical practices that emerge as digital data is created, manipulated, searched and stored in design offices and on construction sites. The research is interested in the way work is distributed across multiple locations, sometimes across the globe, and so co-ordination happens in both digital and physical meetings. As rapid developments in computing are enabling a range of interactions on portable and handheld devices, as well as on desk-top computers, the term ‘digital technologies’ is used to discuss the models, prototypes and simulations that are used on all such devices.

The Innovative Construction Research Centre

This research on digital technologies is part of the Innovative Construction Research Centre (ICRC) at the University of Reading, which was established in January 2002 with a grant of £2.5M from the Engineering and Physical Sciences Research Council (EPSRC). The award was further extended in 2006 to provide continuity of funding through to 2011 – thereby confirming the University’s status as an international centre of excellence for construction research. The ICRC is committed to working collaboratively with leading players in the UK construction sector to encourage the development of a knowledge-based industry responsive to change. Its aim is to foster innovation, human resource development and an investment in advanced technology.

An inter-disciplinary approach to research

Understanding technology development and use, its implications, and its innovation in the built environment, requires consideration of both the technological and the social aspects of interaction. Therefore this is a multi and cross-disciplinary research area, involving researchers from backgrounds such as design, engineering, sociology, information systems and management. The School has a growing international reputation for research into socio-technical systems. This focuses on understanding the mechanisms, protocols and standards through which technologies become part of leading practice, and the unintended consequences and challenges which are associated with their introduction. This approach treats the technological and social as being inter-dependent and mutually shaped in specific contexts. It enables questions to be asked about the ways in which the content, meaning and use of technology is negotiated in practice, how particular technical configurations are elaborated in response to specific problems, and why certain paths or solutions are adopted rather than others.

Current research on digital technologies

The School has ongoing collaborations with a range of engineering, design and construction firms including Arup, Costain, Halcrow, Kier, Taylor Woodrow and Skanska. By working closely with industry, academics are developing new knowledge about digital practices. Academics from the School have given advice on construction for the London 2012 Olympics, and worked closely with practitioners to understand strategies and practices on a number of different projects including construction of the new Barts and the Royal London Hospitals. In research on ‘Infrastructure through Life: Technology Use in Global Projects’, Dr Jennifer Whyte and Dr Sunila Lobo are investigating the role of digital technologies in the design, co-ordination, project-management and governance of large projects and programmes. Other research involves a collaboration between the ICRC and the Informatics Research Centre at the University. For this, Dr Chris Harty, Professor Kecheng Liu and Mr Bill Collinge are working together to examine ways that stakeholder engagement within construction projects occurs, and how it might be improved through the use of new information systems. Further research, that brings together lean construction and building information modelling techniques, is being conducted by Dr Milan Radioujevic in collaboration with Dr Rafael Sacks, who is a co-author of the BIM Handbook and visiting from Technion University. Recent findings of the ICRC’s research in these areas were presented to industry at a joint CIOB (Chartered Institute of Building) and ARCOM (Association for Researchers in Construction Management) workshop, which was attended by over 90 architects, engineers and contractors.

Future directions

In the face of the rapid changes in practice, there are a number of broader research questions about the design, production and use of the built environment in the 21st century. The work at Reading is considering new areas such as the dynamics of innovation within construction processes in the context of increased digitisation of information, and the growth of the use of coordination and collaboration based ICT tools in the sector. This work rests on the growing recognition that the primary barriers to sustainable construction are social and organisational, rather than technical, and of the consequent need for research which integrates social and technical dimensions.

For more information please see
www.reading.ac.uk/icrc
www.icrc.reading.ac.uk

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Samuel Beckett: The Knowlson Collection

Samuel Beckett (1906–1989) was one of the leading authors and intellectual figures of the twentieth century. In the summer of 2008, the University purchased the James and Elizabeth Knowlson Collection, making Reading’s collection of Beckett material the world’s premier resource. The material collected by the Knowlsons over forty years is a considerable addition to the Samuel Beckett archive already held by the University. Seán Lawlor, a post-doctoral researcher from the Faculty of Arts and Humanities, is working with colleagues across the Faculty, to attract research grant funding to support work using the Beckett collections. Here, Seán sets out some of the highlights of the Knowlson Collection.

Damned to Fame

When James Knowlson’s biography of Samuel Beckett, Damned to Fame, was published in 1996, it was immediately recognised as an outstanding work of its kind, combining the facts of Beckett’s life with a compelling style which appeals to the ordinary reader, but is supported by scrupulous research and a vast collection of material.

Happy Days

The new collection consists of several thousand items. It includes many books signed by Beckett, some remarkable replies to the queries Knowlson addressed to Beckett called ‘Questions to Sam’, an extensive collection of audio and video tapes, a unique collection of 150 recorded interviews with family and friends, two copies of Happy Days (one in English, one in German) with Beckett’s annotations and his address book from the 1960s.

There are over 180 letters from Beckett to Knowlson written between 1970 and 1989, the year of Beckett’s death. As the manner of address changes from the familiar ‘Dear Dr Knowlson’ to the familiar ‘Dear Jim’, the letters become more personal, and by October 1972 Beckett is confiding in Knowlson about the dental treatment he is about to undergo, ‘his dark night of the teeth’.

The highlight of the letters, however, must surely occur in September 1987 when Beckett poses the manuscript of a French poem, ‘La (meaning ‘there’), in two drafts headed ‘for Jim affectionately from Sam’. The poem is in reply to a letter from Knowlson in which Beckett thanks him for ‘good news of yr holiday and foundation’ (The Beckett International Foundation), adding the poem as a ‘fleebie mark of my affection and gratitude’. Knowlson must surely have been delighted to receive this by no means ‘fleebie’ accolade – for Beckett to dedicate a poem to a recipient is a rare event – and he must have been bowled over three days later when he received the untitled English translation.

‘Drunkcn Boat’

The collection includes the important typescript of Beckett’s translation of Rimbaud’s ‘Drunken Boat’ which was published in facsimile by The Whitework Press in 1976. The story of its discovery by Felix Leakey following a chance encounter, while on holiday in Ireland, with Nuala Costello, is now well known to Beckett scholars, but it bears repetition. Beckett had given the translation to Nuala in the mid-1930s and she had folded it away in her copy of The Oxford Book of French Verse between the pages in which Rimbaud’s original, ‘Le Bateau Ivre’ is printed. It survived a fire in the owner’s house as the charred folds down the centre of the poem testify. Beckett’s amendments to Knowlson and Leakey’s introduction are included. The Knowlson collection also includes transcriptions of two extraordinary letters which Beckett wrote to Nuala in 1934 (both of which were reproduced recently in The Letters of Samuel Beckett). These letters contain the text of two important poems, one of which I have identified as the lost poem ‘Seas of Honour’ – an indication of the secrets this collection may yet reveal.

Still in the field of manuscripts, there is a photocopy of an otherwise unknown version of Ill Serr Iii Sald. Jim Knowlson cannot remember how he acquired it or from whom – Beckett, he suspects. This has been placed with the other (original) typescripts of Ill Serr Iii Sald in the Beckett collection, so that it is immediately available to scholars.

Beckett’s German Diaries of 1936–7, which records his response to the many Old Master paintings he encountered during his visits to German art, are already in the Beckett archive. The Knowlson collection enhances this key document with a great deal of supportive and explanatory material. Knowlson has tracked down pictorial sources for much of the art described, and has even integrated some of these into certain sections of his transcriptions. Beckett has become an engaging illustrated version. There are also dozens of files on the Old Masters, modern painters, European galleries and collectors; there is a file on picture references in Dream of Fair to Middling Women; collections of the catalogue entries in the Beckett and the Visual Arts. It provides an extremely rich resource on Beckett and the Old Masters, Beckett and German expressionism, and Beckett on medieval architecture and statuary, on all of which little so far has been written.

The pioneering work that Knowlson carried out on Beckett’s wartime career is attested by a fine collection of books on the French Resistance including some obscure publications that detail the work of Beckett’s Paris cell. Glória SMH. There is interesting documentary evidence too, including the identity card reproduced above, and an extensive oral history of tape-recorded interviews with members of the Resistance with whom Beckett worked, all of whom are now dead.

There is much other documentary evidence, on Beckett himself and on the Beckett family, and dozens of interviews with friends, family and collaborators in the theatre, in the arts and in publishing. Some of this material has found its way into a recent book by Jim and Elizabeth Knowlson, Remembering Beckett, Remembering (London: Bloomsbury, 2006) but there is much more in the archive. There are also copies of Beckett’s correspondence (more than 6,500 letters to over 160 recipients), which has been made available to Knowlson for the biography (and now included in the collection with the permission of the owners). The originals of many of which are still with the recipient. This greatly improves access to Beckett’s unpublished correspondence.

Drunkcn Bottle

In addition, there are family photographs of Beckett, photographs of Beckett at work in the theatre, photographs of actors and actresses, an extensive collection of theatrical programmes and Sotheby’s catalogues with details of the sales of Beckett manuscripts, sometimes helpfully annotated with the prices fetched. There are many association texts, including limited editions of poems published by Beckett’s friends in the 1930s and 1940s, and modern French first editions, some of which are signed. There are oddities, such as the three puzzling manuscript sheeets by Guillaume Léoncœur; many offprints, including articles by Beckett himself; and Knowlson’s extensive correspondence with other scholars. But it is not all serious scholarship. One of the oddest items in the collection is a brandy bottle (sadly now empty) but of interesting provenance. The donor of Beckett studies, Ruby Cohn, presented it to Beckett who passed it on to Jim Knowlson while it still had a little brandy in it. This curious tale of cultural transmission is heightened by a look at the label. It was produced by a company called Godet frères – one of Samuel Beckett’s best known works is the play Waiting for Godot. Perhaps Cognac was on Pozzo’s mind as he considered Vladimir’s decision to be going at the end of the first act of Waiting for Godot: ‘what happens in that case to your appointment with this … Godot … Godot … Godin … anyhow you see who I mean’.

The Beckett Collection at the University of Reading was pleased to receive support in the purchase of the James and Elizabeth Knowlson Collection from the Friends of the National Libraries.
Bees under threat

A drop in bee numbers in the UK in the last 15 years has led the British Beekeepers Association to declare that there might be a ‘calamitous’ loss of bees by 2018. The consequences for agriculture are likely to be severe, since many British crops depend upon bees for pollination. Our bee populations are in crisis – what is research from the University of Reading doing to help?

Why are bees important?
Insects, and particularly bees, are the primary pollinators of most agricultural crops and wild plants, and so are crucial for ensuring that we have enough food and that our ecosystems stay healthy. Recently there has been a lot of concern that numbers of both honeybees and wild bees are seriously declining in some areas of the world, though hard evidence to support this is very patchy and the reasons for this decline are unclear.

Life without pollinators
If we were to lose all our bees and other pollinating insects then life would be very different in the future. As so many of our crops depend upon bee pollination, our diets would change tremendously. We would have to say goodbye to many of our fruits and vegetables. There would be no more coffee and chocolate – both of which rely on insect pollination. We would struggle to raise so much livestock as part of many animals’ diets comes from insect pollinated plants such as clover. In addition, food would taste bland as many herbs and spices also depend on insect pollination. Our ecosystems would degrade as wild flowers could not reproduce, and all the other ecosystem services they provide would be eroded, such as carbon capture, water quality and soil protection.

While it is unlikely that all our pollinators would be lost, the current trends indicate that we are heading for a future with many fewer bees and other pollinating insects and so unless we take major actions now, the future looks bleak. High quality science can provide solutions to help protect against these risks, and the University of Reading is at the forefront of this cutting-edge research.

Research at Reading
The full consequences of this decline for people and for wildlife are largely unknown. As a result, the Convention on Biological Diversity, the European Union and many national governments have recognised the need to answer four crucial questions:

- How big are the declines in bees and where are they?
- What has caused these losses?
- What are the impacts on society?
- How can we protect our bees in the future?

Understanding and managing the threat
A team of scientists from the University’s Centre for Agri-environmental Research, and led by Dr Simon Potts, has taken up this challenge as part of a large integrated project called ALARM (Assessing large-scale risks for biodiversity with tested methods). This five year project has brought together more than 250 natural and social scientists from 36 countries to work together to understand the threats to Europe’s biodiversity.

The ALARM team were the first to demonstrate clearly significant losses of wild bee diversity and abundance at the national scale. They also found that at the same time that numbers of bees were declining, there was also a reduction in the numbers of bee-pollinated wild flowers in both UK and Holland.

Despite intense media speculation, the ALARM team found that very little scientific evidence exists of the actual scale of honeybee declines in Europe. It was important to fill this crucial knowledge gap, therefore they carried out an assessment of the trends in honeybee numbers throughout Europe over the last 50 years. They found that 16% of all colonies across Europe have been lost since 1985, with particularly severe declines of 25% in central Europe. The research that ALARM undertook highlighted the wide range of causes for observed losses and these included: habitat loss, climate change, pesticides, and pests and diseases.

A new large scale European project called STEP ‘Status and Trends of European Pollinators’, due to start in early 2010 and coordinated by Dr Potts, aims to build upon the findings of ALARM. This should further extend our understanding of the causes and consequences of pollinator loss. Over 5 years, a team of 100 researchers will produce the first ever European Red List of endangered pollinators, and work to develop management practices, as well as national and internal policies, to better protect our bees and other pollinators for the benefit of society.

Colony Collapse Disorder
Part of the decline in honeybee numbers is thought to be from Colony Collapse Disorder (CCD), which is a loss of colony viability previously reported in the United States. The exact cause of CCD is unclear but it has been attributed to a number of things over the years, including loss of rural habitat, pesticides and mite infestation. Several viruses have also been implicated, but a definite link with CCD has been difficult to establish. Recent research however, has suggested that hives which have suffered CCD may have been infected with a single virus, Israeli acute paralysis virus (IAPV), and that a combination of mite infestation and virus infection causes CCD. A full characterisation of IAPV will enable the development of diagnostics and strategies to help slow down the current decline in bee numbers.

Professor Ian Jones, from the School of Biological Sciences, is working with the National Bee Unit, to produce virus particles of IAPV using a combination of synthetic biology and recombinant methods. The genes that encode the coat of the virus are produced by a recombinant route that allows them to be isolated, the purified IAPV particles produced will enable a number of studies to investigate the biology of the virus. This work will also provide the tools needed to diagnose an affected hive early on, and so hopefully prevent further spread.

For more information please see www.alarmproject.net
Hugh Sinclair Unit of Human Nutrition

The Hugh Sinclair Unit of Human Nutrition at the University of Reading is part of the Department of Food Biosciences. It has an international reputation in the area of research that investigates the link between diet and health and risk of chronic diseases, such as cardiovascular disease (CVD), cognitive decline, type 2 diabetes, and cancer. Set up in 1995 with an endowment from the estate of the nutritionist Professor Hugh Sinclair, it aims to strengthen the scientific base for dietary recommendations to prevent such diseases.

Research expertise in the Hugh Sinclair Unit falls into a variety of areas, ranging from the science of food production and processing, to investigating the effects that plant phytochemicals have on cognition. Physiological and molecular mechanisms underlying the observed effects are widely investigated. A particular strength is the wide range of investigative techniques employed, including cell culture and molecular biology methods, model system studies and human intervention trials. The core of the Unit is a state-of-the-art human dietary intervention suite for conducting feeding studies in healthy volunteers, and in those at elevated risk of developing certain diseases such as cardiovascular disease and diabetes.

Examples of research being conducted within the Group include:

**Vascular function and reactivity**

The health and the reactivity of blood vessels are recognised as being important determinants of the development and progression of atherosclerosis, and highly predictive of future cardiovascular disease onset. Using a range of state-of-the-art non-invasive techniques, we are investigating the acute and chronic impact of dietary components on vascular function and reactivity in humans. The techniques used include Flow Mediated Dilation Laser Doppler Iontophoresis Pulse Wave Velocity and Digital Volume Pulse. We are currently investigating the impact of fat composition, and of a range of plant foods and phytochemicals on these end points. The Molecular mechanisms potentially involved are then investigated using molecular biology and cell culture techniques, with nitric oxide (NO) production and conservation being a particular focus. This research area forms an important part of the University’s new Institute for Cardiovascular and Metabolic Research – a joint venture with the School of Biological Sciences.

**Macronutrient intake and insulin sensitivity**

Insulin resistance is a common metabolic complication of excess fat accumulation, particularly in the ‘central’ body region, and it is closely linked with an increased risk of developing metabolic syndrome, CVD and type 2 diabetes. Scientists within the Unit are investigating possible mechanisms, genetic variation and optimum nutritional strategies, particularly the effects of the quality and quantity of dietary fat and carbohydrate, to reduce insulin resistance and the metabolic abnormalities associated with this common condition. Currently, members of the Unit are involved with the two largest human dietary intervention studies investigating the effect of the amount and type of fat and carbohydrate on insulin sensitivity (RIICK and LIPGENE). A number of state-of-the-art techniques are used to determine whole body insulin resistance, including euglycaemic clamp, Intravenous Glucose Tolerance Test, Oral Glucose Tolerance Test, and other surrogate measures. The ultimate aim of this work is to establish better dietary strategies to increase insulin sensitivity within the individual, and reduce risk of disease.

**Nutrition, cognition and food choice**

We use multidisciplinary approaches to unpack some of the factors driving food choice, with the aim of devising meaningful, practical and achievable interventions to address these. This includes investigating young people’s barriers to the consumption of fruit and vegetables using the theory of planned behaviour, and examining reasons for poor food intake in hospital settings. In addition to this, research undertaken in collaboration with the University’s Centre for Integrative Neuroscience and Psychology and in the newly-formed Executive Function Lab using computer-based tests of memory and executive function, and also functional MRI scanning.

**Plants, plant bioactives and cancer**

Epidemiological studies indicate that eating some types of plants can help to protect against many cancers. Epidemiology, however, only provides evidence of association. Obtaining support for causal relationships between the consumption of plant foods and cancer, and identifying which types of foods and phytochemicals might be important, are very difficult tasks. Our approach uses a combination of in vitro model systems and human dietary intervention studies, using biomarkers of cancer risk. This approach is being used to determine the effect of quantity and quality of fruit and vegetable intake on the risk of developing cancer.

The Hugh Sinclair Nutrition Group has a long history of working with industry – over half of the research we do is conducted in collaboration with industrial partners. The collaboration can take the form of industry-funded PhD studentships, industrial fully-funded research programmes, or programmes co-funded by industry and government agencies. Examples of such initiatives include BBSRC Case Studentships, the BBSRC DR/D5 and Industrial partnership projects, Knowledge Transfer Partnerships and European Commission projects. In addition, scientists within the group act as external consultants, and as members of industrial advisory boards.

Research informing teaching

The research which takes place at the Hugh Sinclair Unit has a direct effect on education within the university. Academic staff from the Unit are involved in teaching on a variety of different courses, including to Nutrition and Food Science, Agriculture, and Biomedical studies. This keeps the students at the forefront of learning and research, and helps to enhance their experience of this exciting area of science.

For more information please see www.reading.ac.uk/foodbiosciences

‘The Hugh Sinclair Group is ideally placed with the extensive pilot plant facilities available in Food Biosciences to facilitate the development of functional foods and ingredients, and to establish their efficacy in human subjects. By combining this with expertise in determining mechanisms of action, we are able to provide the necessary information for substantiating nutrition and health claims for functional foods as required under new EC legislation.’

Professor Ian Rowland, head of the Hugh Sinclair Unit of Human Nutrition
Dr Hella Eckardt is a researcher and lecturer specialising in Roman Archaeology from the Department of Archaeology.

How did your interest in your chosen research area come about?
I suppose my interest in archaeology was meant to be! My parents met on an excavation, and always encouraged my interest in the past. I studied Latin at school, and then attended a medieval excavation in Estonia as a teenager. During my university training I gradually specialised in the Roman period, and in particular the north-western provinces of the Empire. Britain was quite a backwater then, and I find the ways in which various aspects of Roman culture were adapted and adopted here fascinating. I also became especially interested in the ways in which Roman objects may have been used to express identity. For example, my PhD examined the use of lamps and other forms of lighting equipment in Roman Britain. Rather than just producing a catalogue of these objects, I tried to systematically record the context of their use. This showed that artificial light was only used by a very small part of the Romano-British population – essentially the military and people living in the largest urban centres.

Explain a bit more about your chosen area?
Much of my recent work has been concerned with artefacts and identity in various ways. Building on my PhD, I have also researched objects of personal adornment (such as brooches) and objects related to styling and grooming (such as combs and tweezers). All these objects relate to the ways in which people choose to present themselves, and their context and distribution can, for example, provide insights into how gender and status were expressed in Roman Britain.

Most recently, I have been involved in a project that explores whether ethnicity is reflected in burials in Roman Britain. The Roman world is characterised by the long-distance movements of people and inscriptions from Britain attest to the presence of soldiers, administrators and traders from all parts of the Roman Empire. The ‘Diasporas in Roman Britain’ project uses scientific techniques such as isotopic analysis to distinguish between locals and migrants in Romano-British towns.

How do you structure your research work?
Most of my work is based in the library – Romano-British artefacts are well published in journals and books, so the main task is to come up with a reason for studying specific objects, and then to gather a corpus of material together. I also do some hands-on work, mainly on artefacts in museum collections. I work with other specialists in commercial archaeology units. The Diasporas project has involved co-ordinating five scholars (three based in Reading, one in York and one in Nottingham), all with very different areas of expertise. I am also involved in the Archaeology Department’s training and research excavation at the Roman town of Silchester. I have published on the material culture from this important urban site, and luckily this research involves days spent out in the field during the summer, teaching students about the potential of artefacts for research.

What has your research shown so far?
The ‘Diasporas in Roman Britain’ project is beginning to show that several urban sites (such as York, Gloucester and Winchester) were home to significant numbers of peoples that appear to have come from elsewhere in Britain, and a smaller number of migrants who may have been born in Central Europe or the Mediterranean. This is sometimes, but interestingly not always, reflected in the ways in which they are buried, illustrating how flexible and malleable ‘ethnic’ identity was in the Roman world.

What are you currently working on?
The Diaspora project has just ended, but we are still involved in the publication of seven joint papers. I am also editing a volume based on a workshop held here in Reading last year.

How does your work benefit society?
Archaeology provides an important way for the general public to think about the past. For the Diaspora project in particular, we have tried to promote an image of Roman Britain as a diverse and multi-cultural place. Many people still have a somewhat simplistic idea of ‘the Romans’ but we want to show that both the archaeological and the scientific evidence point to significant migration and mixing of populations. This has obvious implications for the present, and we have worked with the Yorkshire Museum, and with the well-known children’s author Caroline Lawrence (author of the Roman Mysteries Series) to produce new educational materials.

If you had 15 minutes with Gordon Brown what would be your top two recommendations regarding Archaeology?
Archaeology provides important insights into the impact humans have had on the environment, so my first recommendation would be to really tackle climate change! Secondly, Britain has an excellent track record of promoting the past, but it would be great to see free museum access everywhere (not just the major London Museums).

What are your impressions of the University?
Great! In terms of daily life, I like the open, green campus, regularly go to the university cinema and I am rather addicted to the juice bar. In terms of my research, I am very lucky to work in one of the best Archaeology departments in the country. We have a bit of a tradition of RAE success, and an excellent research culture. I have benefited from the advice of senior colleagues for grant applications and research designs, and the excellent collegial atmosphere makes even the admin bearable. We also have a really nice mix of students, who are mostly drawn to the degree by a real love of the subject.

What qualities do you believe a successful researcher has to have?
Apart from enthusiasm for the subject – discipline and time management!

What is your proudest achievement?
I remember my first academic paper as quite a special moment. Outside of work, I try to switch off mainly through gardening. I guess one of my proudest achievements is not to have been evicted from my allotment for lack of weeding! Also, learning to make jam from my own fruit, and cooking veggie soup with my friends.

What do you enjoy most about your work?
I really like teaching, but in terms of the research process, I much prefer the feeling of beginning to write a paper over the final edits and proofs. I also love the process of collecting data.

Looking ahead, what are your aims for the next few years?
I am hoping to produce two books on material culture in Roman Britain, hopefully showing how we can use even quite humble objects to learn more about the peoples of Roman Britain.

For more information please see www.reading.ac.uk/archaeology

More Rising Stars can be found at www.reading.ac.uk/research