World-class research

The University of York had outstanding results in the official Research Assessment Exercise, with world-class departments in every discipline.
Welcome

This issue of Research & Innovation highlights the world-class research at the University of York, focusing on the results of the 2008 UK Research Assessment Exercise, which placed York firmly in the UK top ten universities for research.

York has built up a powerful reputation for research and its application in the last 45 years. We have strong departments across the full range of intellectual enquiry, in the arts and humanities, social, environmental, life and physical sciences, and engineering.

Successful research requires that the best minds are brought to bear on challenging and important problems in an environment that encourages their creativity and provides them with the necessary facilities. At York we believe that giving researchers freedom and support is the key to that success. Often they respond, as we have found, by breaking down the barriers between disciplines and developing wholly novel approaches to otherwise intractable problems – there are some good examples of that in this magazine.

York is an international university: most academic staff have active collaborations with researchers in other countries, and we are partners in the Worldwide Universities Network, the most successful international university partnership. We actively encourage the open and collaborative approach that is necessary for working across the globe in this way.

I hope that you find much in this magazine that is stimulating and exciting. If you would like to know more about our research, our staff or our facilities, please contact us.

Professor Alastair Fitter FRS
Pro-Vice-Chancellor for Research

Contents

1 York confirmed as international leader 2 English research at York is the best in Britain 4 Hard facts behind the tough choices 6 Unlocking the secrets of proteins 7 Faster diagnosis thanks to new scanning technology 8 Music scholarships open doors to research 9 International galleries look to York 10 Engineering learns from the complexity of nature 11 The science of conversation 12 Creating equality in world-class research Inside back cover Research and enterprise at York
Assessing research quality
York confirmed as international leader

The Research Assessment Exercise is the way in which the British Government measures the quality of research outputs in UK universities. The results determine the allocation of baseline funding for research to universities. It is a rigorous and large-scale exercise in which 67 panels of senior academics assess the work of 52,400 researchers in 159 universities. It is the most comprehensive survey of research quality undertaken anywhere in the world, and the results are seen as a clear statement of the standards of research across the UK.

In December 2008, the results of the most recent RAE were published – the first for seven years. They show that York’s research is in the top ten in the UK – eighth in the most widely-used analysis. Twelve of our 25 departments were in the top ten of their discipline and three were first. We submitted 91 per cent of our staff for assessment – an extremely high rate. There is no doubt that this is a tremendous accolade for our researchers.

The RAE graded research in five categories, of which the top two were defined as ‘world-leading’ and ‘internationally excellent’. At York, 62 per cent of our research was placed in these two top categories, and 94 per cent was defined as of international quality.

Highlights of the results were the clear first place achieved by the Department of English and the joint first place of both Sociology and Health Services Research, the latter confirming York’s international reputation in areas such as Health Economics. Some new departments appeared in the Assessment for the first time, including History of Art, which achieved a remarkable sixth ranking nationally.

Each Unit of Assessment panel considered three criteria in grading institutional submissions: research outputs, research environment and measures of esteem. There were differences in the ways in which panels treated and weighted each of the criteria and therefore direct comparisons between Units of Assessment is not appropriate. York’s score for ‘environment for research’ reflects the substantial investment that we have made in facilities for research and the support that we offer researchers and graduate students.

York has reason to be proud of this outcome which demonstrates the international quality of our research across the board, from the sciences to the humanities.

World-class and internationally excellent research at York

<table>
<thead>
<tr>
<th>York academic department</th>
<th>RAE Unit of Assessment</th>
<th>Proportion of 'world-class' and 'internationally excellent' activity</th>
<th>Grade point average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Archaeology</td>
<td>Archaeology</td>
<td>60%</td>
<td>2.75</td>
</tr>
<tr>
<td>Biology</td>
<td>Biological Sciences</td>
<td>60%</td>
<td>2.75</td>
</tr>
<tr>
<td>Chemistry</td>
<td>Chemistry</td>
<td>75%</td>
<td>2.90</td>
</tr>
<tr>
<td>Computer Science</td>
<td>Computer Science and Informatics</td>
<td>75%</td>
<td>2.95</td>
</tr>
<tr>
<td>Economics</td>
<td>Economics and Econometrics</td>
<td>60%</td>
<td>2.75</td>
</tr>
<tr>
<td>Educational Studies</td>
<td>Education</td>
<td>60%</td>
<td>2.65</td>
</tr>
<tr>
<td>Electronics</td>
<td>Electrical and Electronic Engineering</td>
<td>55%</td>
<td>2.55</td>
</tr>
<tr>
<td>English</td>
<td>English Language and Literature</td>
<td>75%</td>
<td>3.15</td>
</tr>
<tr>
<td>Environment</td>
<td>Earth Systems and Environment</td>
<td>60%</td>
<td>2.65</td>
</tr>
<tr>
<td>Health Economics</td>
<td>Health Services Research</td>
<td>75%</td>
<td>3.05</td>
</tr>
<tr>
<td>Health Sciences</td>
<td>Health Services Research</td>
<td>75%</td>
<td>3.05</td>
</tr>
<tr>
<td>History</td>
<td>History</td>
<td>55%</td>
<td>2.75</td>
</tr>
<tr>
<td>History of Art</td>
<td>History of Art, Architecture</td>
<td>70%</td>
<td>3.10</td>
</tr>
<tr>
<td>Language and Linguistics</td>
<td>Linguistics</td>
<td>65%</td>
<td>2.80</td>
</tr>
<tr>
<td>Management</td>
<td>Business and Management</td>
<td>50%</td>
<td>2.45</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Applied Mathematics</td>
<td>50%</td>
<td>2.55</td>
</tr>
<tr>
<td></td>
<td>Pure Mathematics</td>
<td>45%</td>
<td>2.50</td>
</tr>
<tr>
<td>Music</td>
<td>Music</td>
<td>75%</td>
<td>3.20</td>
</tr>
<tr>
<td>Philosophy</td>
<td>Philosophy</td>
<td>55%</td>
<td>2.65</td>
</tr>
<tr>
<td>Physics</td>
<td>Physics</td>
<td>55%</td>
<td>2.60</td>
</tr>
<tr>
<td>Politics</td>
<td>Politics and International Studies</td>
<td>45%</td>
<td>2.30</td>
</tr>
<tr>
<td>Psychology</td>
<td>Psychology</td>
<td>65%</td>
<td>2.80</td>
</tr>
<tr>
<td>Reviews and Dissemination</td>
<td>Health Services Research</td>
<td>75%</td>
<td>3.05</td>
</tr>
<tr>
<td>Sociology</td>
<td>Sociology</td>
<td>60%</td>
<td>2.85</td>
</tr>
</tbody>
</table>

UK research rankings in The Guardian league table

1 University of Cambridge
2 University of Oxford
3 Landon School of Economics
4 Imperial College
5 University College London
6 University of Manchester
7 University of Warwick
8 University of York
9 University of Essex
10 University of Edinburgh
11 Queen Mary and Westfield
12 University of St Andrews
13 University of Bristol
14 Durham University
15 University of Southampton
16 University of Leeds
17 University of Sheffield
18 University of Bath
19 Lancaster University
20 King’s College London

The institutional CPA was taken to form this independent national research ranking. For more details on York’s research activity and performance, visit www.york.ac.uk.

Staff from the new Department of Theatre, Film and Television were entered under English, Sociology and Electronics. Staff from the new Institute for Effective Education were entered under Educational Studies. The York Law School, as a new department, did not enter staff in this RAE.
Using methods usually employed by the Federal Bureau of Investigation to solve a longstanding literary mystery is the type of innovative research that has seen the Department of English and Related Literature recognised as the best English department for research in the UK.

Scholars in the Department lead the world with expertise in literature and culture in English and other languages, including Arabic, French, German, Hebrew, Irish, Italian, Latin and Old Norse, from 700 to the present day.

The Department has four research schools – Medieval; Early Modern; Eighteenth Century/Romantic; and Modern – and its work covers a huge range of diverse themes, including global literature, multilingualism, the history of the book, modernism, and contemporary writing.

It was Professor Lawrence Rainey, a specialist in Anglo-American modernism, who turned to the FBI for help as he attempted to answer key questions about TS Eliot’s poem *The Waste Land*.

Scholars had long struggled to understand the order in which Eliot had written the poem, despite the 1971 discovery of his early drafts and manuscripts. Professor Rainey spent two years examining documents as well as visiting libraries and private collections around the world. He used copies of the transparent templates used by the FBI to identify makes of typewriter while painstakingly measuring the properties of every sheet of paper.

His conclusion was that *The Waste Land* was composed between January 1921 and January 1922, and that the poet did not follow a plan but stitched together more than 50 previous drafts.

“When *The Waste Land* was published, its defenders insisted that the poem was planned from the beginning and that it was a poem of extraordinary unity. Now that we can trace the processes and the choices that Eliot made, the poem turns out to be something quite different,” Professor Rainey said.

“The *Waste Land* was not a seamless whole but something more radical. It is, at once, wild and unruly, violent and shocking and yet deeply compassionate.”

Rainey’s achievements have been widely recognised, not least as winner of the Robert Motherwell Book Award for his books, *Revisiting ‘The Waste Land’* and *The Annotated Waste Land with Eliot’s Contemporary Prose*.

The breadth of the Department’s achievements were recognised in the 2008 Research Assessment exercise when it was named as the best for research in the UK.

Professor David Attwell, Head of Department, said, “Our academics are doing exciting, creative, and world-leading work in a range of areas from *Beowulf* to *Banville*.

“We’re proud of the vibrancy and the quality of our research culture, and to be acknowledged as the UK’s premier research department for English literature is a great honour.”
Professor Harriet Guest explores how Britain’s sense of itself as a modern commercial society was shaped by encounters with South Pacific islanders in the late 18th century. Her recent book, Empire, Barbarism, and Civilisation, focuses on the extraordinarily vivid landscapes and portraits painted by the artist William Hodges as a result of his travels with James Cook from 1772 to 1775. She reads Hodges’s work alongside the journals of Cook and his fellow voyagers, and finds that both draw on theories of civilisation developed by philosophers of the Scottish enlightenment such as Adam Smith and David Hume.

The lively representations of exchanges with island cultures produced by Hodges and other voyagers profoundly modified Europeans’ sense of their own civilisation and modernity. “Hodges’s work is everywhere marked by the voyagers’ awareness of the fragility of European claims to be different to or more advanced than the islanders, and by their deep sense of uncertainty about their own place in history,” said Professor Guest.

She is co-Director of the Centre for Eighteenth Century Studies, which brings together the interdisciplinary research interests of historians, literary critics and art historians. Work on this project involved periods of research and collaboration at universities in Australia, New Zealand and California.

Detective work of a different kind is employed by Professor Linne Mooney in her research that has identified more than 200 scribes working in England between 1375 and 1525. She received widespread acclaim with her identification of Adam Pinkhurst as the scribe of two of the most authoritative copies of the Canterbury Tales. Last year she demonstrated that by identifying more than 150 documents written by the Middle English poet, Thomas Hoccleve, she could identify periods of his heaviest work as a clerk for the Privy Seal and periods when he appeared to be devoting more of his time to writing poetry. In 2007 she was awarded a four-year research grant from the Arts and Humanities Research Council to conduct further research into the scribes who copied major works of Middle English literature by Geoffrey Chaucer, Thomas Hoccleve, John Gower, William Langland and John Trevisa.

Professor Mooney is the University’s first Professor of Medieval English Palaeography, and the Director of the Centre for Medieval Studies, which draws staff from the Departments of Art History, Archaeology and History as well as from English and Related Literature.

The rediscovery of a first person account of experiences in the Auschwitz concentration camp almost half a century after it was written offered new insight into the horrors of the holocaust. If this is a man, by holocaust survivor Primo Levi, was thought to be his first account of his experience until Report on the Sanitary and Medical Organisation of the Monowitz Concentration Camp for Jews, now known to English-speaking readers as the Auschwitz Report, was uncovered by Italian critic and historian Alberto Cavaglion in 1993.

Dr Judith Woolf was asked to take on the task of translating this important find into English. She said, “Translation is always a challenging task, both because success involves pulling off a near-impossible conjuring trick while ensuring that the audience forgets about the presence of the conjurer, and because every text throws up riddles which often require considerable research to solve.”

A particular challenge was the amount of medical detail specific to the 1940s included by Levi’s co-author and fellow prisoner, Leonardo De Benedetti. Assistance from the University Library and Borthwick Archive and less conventional sources, such as online sales of old medicine jars and boxes which allowed Dr Woolf to view the packaging of some of the products she was trying to trace, ensured that the book could be accurately translated. Its release prompted critical interest from around the world.
Hard facts behind the tough choices

Should the State have a say over how organs are used after death? This is one of many contentious social questions examined by experts at York, which is known the world over for expertise in evidence-based public policy research.

Public policy debates revolve around how limited resources can be mobilised to achieve the best outcomes. Bridging the gap between the latest research in these areas and policy is a major theme of health and social policy research at York.

Researchers in the Department of Health Sciences, the Centre for Health Economics (CHE) and the Centre for Reviews and Dissemination (CRD) all work to improve the evidence base for policy and practice decisions in health and health care.

This type of rigorous analysis was recognised in the Research Assessment Exercise, when York was ranked joint top in the country for Health Services Research. These teams of researchers have together established a formidable reputation for providing the best evidence available to the policymakers who have to make tough choices and the charities and interest groups who want to establish an independent evidence base for their campaigns.

Researchers in the Department of Health Sciences consider diverse questions such as ‘is yoga effective in treating back pain?’, and ‘does computerised cognitive behavioural therapy reduce depression?’

Other policy-relevant research includes randomised trials to inform clinical decision-making and contribute to national and international guidance. Recent findings on interventions for treating alcohol dependence have informed guidance to clinicians from the National Health Service (NHS) National Treatment Agency, and were incorporated into policy reviews by the World Health Organisation.

Other CRD reviews have summarised the effectiveness of measures to control tobacco use and the merits of screening primary school children for obesity.

CRD Director Professor Lesley Stewart said, “Simply making research available does not mean that it is used in practice. That is why we work to ensure that those who need to know about our research get to know about it, and that our research provides relevant answers to important policy questions.”

CHE has revolutionised the way policymakers consider the value for money of taking a particular decision in the way healthcare is provided.

Work with the National Institute for Health and Clinical Excellence has helped patients benefit from new treatments and technologies faster, while helping the NHS to avoid spending money on interventions that are not worthwhile.

CHE research into chemotherapies used to treat advanced prostate cancer produced...
Homelessness, mental health and child well-being are included in the wide-ranging research carried out in the Department of Social Policy and Social Work

The University’s expertise in social policy enjoys national recognition. The wide-ranging Department of Social Policy and Social Work was rated among the top five departments in its field in the Research Assessment Exercise.

One of its centres, the Social Policy Research Unit (SPRU) has published influential reports on the impact of radical changes to the way personal care is funded, helping individuals with mental health problems back to work and highlighting the large proportion of disabled children living in unsuitable accommodation.

In January, SPRU research led to the creation of the first local index of child well-being. It takes into account a range of data including income, health and education and allows policymakers to identify the areas in most need of help.

This adds to the body of impressive work the Unit has amassed over 35 years in pursuit of its aim of supporting the development of better policies and services for some of the most vulnerable people in society. Among its many achievements was a body of research looking at the challenges facing children leaving care which spurred an Act of Parliament in 2000.

The Centre for Housing Policy (CHP), one of the leading housing research centres in Europe, is also part of the Department. CHP has expertise in a range of policy areas from homelessness to the links between ‘welfare regimes’ and housing policy.

A report on homelessness among ex-service personnel, published last year, found that six per cent of homeless people in London were former servicemen and women.

Their report made a series of recommendations on improved mental health care, more comprehensive settlement packages and better transitional accommodation for those leaving the Armed Forces. The report has become the basis for the Ministry of Defence’s new Veterans Homelessness Strategy.

Another landmark study, commissioned by the Department for Communities and Local Government, sets out to improve the way the private rented sector works. The Centre also publishes the definitive source of housing data in the UK Housing Review.

savings of between £1m and £1.2m a year with no reduction in health benefits. The Centre’s work also led to the use of the antiplatelet drug Clopidogrel in patients with particular heart conditions, reducing their risk of suffering a major heart attack.

More broadly, research has led to new ways to measure whether resources are being used efficiently, most notably through the concept of the quality–adjusted life year (QALY) which is now an international standard measure of the economic benefit of healthcare.

Professor Maria Goddard, CHE’s Assistant Director, said, “Substantial sums of money are directed towards the NHS and it is important to measure whether those resources are translated into benefits for patients and taxpayers. CHE has led methodological developments in measuring the output and productivity of the health system as a whole. The research is used in the construction of national accounts by the Office for National Statistics, individual European member states, and in the OECD.”

York’s health services research was ranked joint first in the country, and Social Policy and Social Work confirmed its place as a top 5 department – leaving our public policy research in a very strong position.
Unlocking the secrets of proteins

Knowing what protein molecules look like and how they work promotes a detailed understanding of how living organisms function. It can also provide key insights into what causes various diseases and help to guide the development of new medicines and treatments.

The University of York is conducting world-leading research in this area through the York Structural Biology Laboratory (YSBL), part of the Department of Chemistry and located in the biosciences building with the Department of Biology. Amongst many other projects, YSBL scientists are undertaking fundamental studies into how the growth of bacteria is controlled, looking at the structures of possible targets for therapies that tackle malaria, and working out the details of how bacteria recognise and invade human cells.

Professor Rod Hubbard of the Department of Chemistry said, “We work on projects that lead to new scientific discoveries and applications, and the laboratory is at the forefront of the development of many of the methods used by scientists working in this field around the world.

“For example, much of the development of crystallographic methods for analysing proteins and the computational software that supports that work has its origins at York.”

The current work builds on an impressive record of achievement. YSBL researchers were the first to identify the structure of the oestrogen receptor, the protein that responds to oestrogen. This breakthrough opened up a host of new avenues for researchers developing treatments for conditions such as breast...
Faster diagnoses thanks to new scanning technology

A new ‘hyperpolarisation’ technology has been developed which could dramatically increase the scope of medical imaging and analytical chemistry

Scientists at York have developed a new process which detects clear signals very quickly from a range of materials. Their new approach manipulates the nuclear spin of atoms to bring materials into a hyperpolarised state. These materials have a far stronger signal than normal in magnetic resonance imaging (MRI) scanners and nuclear magnetic resonance (NMR) instruments, allowing them to be detected at much lower levels and for their signals to be recorded more quickly. MRI scanners are used extensively in hospitals for diagnosis, while NMR instruments are ubiquitous in chemical research.

Developed by Professors Simon Duckett (Chemistry) and Gary Green (Psychology), the new technology will make analysis in hospitals and laboratories much easier and quicker. The University has signed an agreement with international analytical instruments company Bruker Biospin of Germany to develop this patented technology further. The developments have also been reported in the leading scientific journal, *Science*.

“...the outcome of this combined effort will enable a breakthrough in localised diagnostics by opening exciting new possibilities in analytical imaging,” said Head of Psychology, Professor Susan Gathercole. “This technique shows that the gain in sensitivity is so great that data can be acquired in seconds rather than weeks.”

---

**Biology and Chemistry both undertake some of the very best science research in the UK university system.**

---

The results of tests of an anti-cancer agent on cells grown in YSBL’s incubator
The research activity of Departments such as Music and History of Art helps to foster social and cultural links in the community. The thousands of visitors who attend the national exhibitions curated by History of Art staff get direct access to the research undertaken by its academics, a process which also gives researchers the opportunity to consider how art is interpreted and viewed by the public.

The Department of Music is well known for its emphasis on performance, and every year hosts an extensive programme of concerts by international musicians and its own staff and students, which were last year attended by around 15,000 people from the city of York and beyond. It is also home to the Music Education Group, a student-run organisation that conducts music workshops in schools and other community settings.

When Zhu Jie’s composition Zen Fragrance was premiered in November, it was performed by an orchestra conducted by his father, Zhu Buxi.

It was also dedicated to the memory of the benefactor whose foundation supports his research: Zhu Jie is one of seven Sir Jack Lyons Scholars currently studying in the Department of Music.

Jie’s studies had already encompassed time at the Shanghai Conservatory of Music and the Royal Scottish Academy of Music and Drama when he moved to York in 2006.

“I was drawn here by the opportunity to work with Professor Roger Marsh, who is an expert in Oriental music, because I had a strong interest in the work of composers such as Takemitsu.”

“The scholarship made that possible. It opened a new door for me,” he said. Jie’s PhD is in composition. Zen Fragrance was inspired by the art of Italian painter Lucio Fontana, and the influence of musical theatre is evident in its performance which involves the seating of two string quartets among the audience.

“I am interested in the psychology of audiences and I want my work to build bridges between the orchestra and the people watching and listening,” he said. The first performance of Zen Fragrance was at a concert in Jie’s home city of Wuhan in front of an audience of 1,000 people.

The variety of musical interests pursued by the scholars is emblematic of the breadth and quality of research in the Department of Music which was recognised as one of the best in the country in the Research Assessment Exercise.

The work of jazz musician Kenny Wheeler, the integration of systematic breath-control training with school music education, and psychoacoustic phenomena are just some of the areas currently being explored.

The scholars also contribute to the Department’s substantial international character, with students from Poland, India and China among their number.

Head of Department Dr Jonathan Wainwright said, “The generosity of the Sir Jack Lyons Charitable Trust helps support a great deal of fascinating work by postgraduate students in the Department.

“Their work is an important ingredient in the vast array of research activities which give the Department its strength.”

The Department of Music supports the work of around 100 postgraduate students and has superb facilities, including the Music Research Centre with its own auditorium, recording studios and research spaces.

The performance of a new work is an exciting moment for any composer but it carried special meaning for University of York PhD student Zhu Jie
The transformation of a collection of art works into a thought-provoking and illuminating exhibition requires the input of a skilful curator. From 18th century British art to the work of Dutch modernists, galleries across the globe are tapping into the research expertise of the University of York’s Department of History of Art to find that important ingredient.

Professor Mark Hallett, Head of Department, said, “The Department’s involvement in exhibitions around the world is a sign of the high esteem enjoyed by our academics in the wider art world. “Forging these links is also hugely important in terms of ensuring that our academic research feeds into, and benefits from, the work of major galleries and museums.”

Hogarth, the landmark Tate Britain exhibition of the work of William Hogarth, owed its success in large degree to the work of Professor Hallett, who was co-curator on the project. The show, which was five years in the planning, broke new ground in terms of bringing Hogarth to a wider audience. Before moving to London, the exhibition opened at the Louvre, making it the first major Hogarth exhibition ever to be held in France.

“It is unusual for the Louvre to showcase a British artist, but it turned out to be the most successful autumn exhibition they have ever had,” Professor Hallett said.

Professor Hallett’s attention has now turned to a major new piece of research on British art between 1660 and 1735 which will again inform exhibitions at Tate Britain – another example of the type of work which led to the Department’s excellent Research Assessment Exercise result. Meanwhile, the Yale Center for British Art, the largest and most comprehensive collection of British art outside the United Kingdom, is preparing to host a new exhibition tentatively titled ‘Victorian Sculptural Encounters’. Dr Jason Edwards has been awarded a £70,000 Philip Leverhulme research prize to co-curate the exhibition, which is due to open in Spring 2013.

Tate Modern is also employing Dr Michael White, an expert in Dutch modernism, as a consultant to an exhibition it is planning for next year, provisionally entitled “Theo van Doesburg and the International Avant-Garde”. The exhibition is due to open at the Stedelijk Museum de Lakenhal in Leiden, in the Netherlands, this autumn.

“Forging these links is hugely important in terms of ensuring that our academic research feeds into, and benefits from, the work of major galleries and museums”
Engineering learns from the complexity of nature

York is well known for the way in which researchers from different disciplines work together to solve global challenges. The strong showing of its science and engineering departments in the Research Assessment Exercise drew in part from this collaborative work. In one project, researchers apply the lessons of biology to self-healing electronic technology.

A small, wheeled robot drives around an enclosed space, bouncing off the obstacles in its path. Over the course of a few minutes it learns to navigate the barriers. This kind of experiment is a small but significant step towards creating new technology that can learn, adapt and repair itself.

‘Swarm robotic’ systems are being built that are capable of performing tasks together, even if some of them are destroyed.

Researchers at York are attempting to make technology more resilient to damage or breakdown. Immune systems, the ability of plants and animals to adapt to changing circumstances, and the swarming characteristics exhibited by some species could hold the key to developing technology which could operate independently for longer periods.

“Incoporating these traits in engineered systems could have a variety of applications in all manner of situations but would be particularly useful in areas such as space or deep sea exploration,” said Professor Jon Timmis, who works in both the Department of Computer Science and the Department of Electronics.

“An ant’s nest is an intricate complex system, but if half of it is demolished, it continues to function. These are ideas that robotics researchers are starting to use to build ‘swarm robotic’ systems that are capable of performing tasks together, even if some of them are destroyed.

“We can already mimic some of these traits but only on a small scale. The challenge is to find ways of doing this on a much larger scale and in a reliable way.”

Conducting this research is not simply a case of taking an established understanding of nature and applying it to technology. In many cases, the desire to incorporate natural properties into machinery stimulates new research into how those processes work in the natural world. That, in turn, means finding new ways of mapping and modelling highly complex systems.

Another example of Professor Timmis’s novel and interdisciplinary work is with the University’s Centre for Immunology and Infection on the modelling of human immune system responses to different types of infection.
Sociologists and linguists at the University of York are working together to identify the ingredients of successful communication using their world-leading expertise in conversation analysis.

This desire to bringing different perspectives to bear on the understanding of conversation is at the heart of an ongoing project with the government Department of Work and Pensions to analyse and improve the discussions that take place between Jobcentre Plus advisors and benefit claimants. The project involves academics from the Departments of Sociology and Language and Linguistics, ranked first and second respectively in the national Research Assessment Exercise.

JobCentre Plus advisors have very little leverage other than the power of conversation when it comes to encouraging some to consider seeking employment or training. York’s research has been looking at how the same advisor can engage successfully with one client who agrees to take a path leading to training or employment, yet fail to achieve a similarly positive result with another person in similar circumstances. The research examines how approaching conversations in different ways, often inadvertently, can affect the end result.

Previous research with the police has investigated the way telephone calls from the public were handled and how this affected their response and their effectiveness in ascertaining key pieces of information.

“At one level, analysing conversation sounds like a trivial exercise,” says sociologist Professor Paul Drew. “But conversation lies at the heart of everything we do. It is only by understanding not just the words people use, but how they say them and how their choice of language is influenced by what the other person is saying, that we can help improve communication.”

Professor Drew is Director of the Centre for Advanced Studies in Language and Communication which brings together the University’s expertise in this area from different departments. This involves researchers from the Social Policy Research Unit, as well as from Sociology and Linguistics.

“They will look at a conversation differently, in terms of syntax and phonology, the order, manner and volume in which words are spoken and how language construction influences the conversation. But we converge on the same set of interests, which is understanding what makes conversation work.”

It is a linguistic approach to conversation analysis which reveals how words spoken in different ways and at different points can take the same conversation in entirely different directions. Researchers working with the Department of Work and Pensions have found that asking the question, “What are you thinking you might do? Are you looking for work at the moment?” tends to produce a negative answer that shuts off further avenues of discussion. In contrast, asking, “Have you got plans to go back to work in the future?” is more likely to lead to a positive response that allows for further discussion of the options available.

Sociology at York ranked joint first among UK universities. Linguistics came second in their category, submitting a very high proportion of staff.
Creating equality in world-class research

Researchers need a supportive environment to achieve the highest standards, and the University of York is determined that promising opportunities should be available to every academic.

Evidence of this commitment can be seen in the high proportion of women pursuing successful careers in science at the University. York’s strong record here is underlined by the accolades it has received under the Athena SWAN charter, the Royal Society initiative to help drive the advancement of women in science, engineering and technology.

The University holds more Athena awards than any other university. The University as a whole holds a bronze award, the Departments of Psychology and Biology hold silver awards, and the Department of Chemistry is so far the only science department in the country to have achieved the Athena SWAN gold standard.

Professor Paul Walton, Head of the Department of Chemistry, said, “We have gained a great awareness of potential obstacles to career progress for women scientists, and we want everyone to know that their careers are taken seriously.

“Ensuring that our practices are as flexible and considerate as possible benefits everybody. It’s all about having good employment practices.”

1 Dr Irene D’Amico, in the Department of Physics, is an expert in the field of spintronics, a developing area of research which could make electronic devices smaller, faster and more efficient.

She said, “Our Head of Department sets up regular meetings with different staff groups, ‘young academics’ or ‘technical staff’, for example, to give us a chance to discuss the typical problems of each group. Besides meeting collectively, we are also able to discuss issues on a more personal level. This I think is very helpful.”

2 Dr Janet Clegg, in the Department of Electronics, began her research career in 1993 when she was a single parent of two children aged 11 and 13. Her current research is in the area of Cartesian Genetic Programming.

“I found I was treated exactly the same as any male researchers which was very refreshing. I also found the Department to be very supportive both with balancing my family life and furthering my career. In 2000, when my father became ill, I was allowed to work half-time for 18 months to run his business. When that was sold, I resumed my full-time research position.”

3 Professor Dale Sanders’ research group studies how plant cells respond to changes in their environment and how they store the nutrients they acquire. An understanding of the way plants transport nutrients and what stimulates them to respond to certain conditions is crucial in areas such as improving crop quality in agriculture. In 2001 he was elected a Fellow of the Royal Society.

As Head of the Department of Biology he has upheld the Department’s supportive environment for parents – which was essential to him when, mid-career, he found himself bringing up his young family alone.

“We encourage career development programmes for more junior scientists at graduate student and post-doctoral stages through mentoring and a flexible working environment. Academic staff can work part-time and job shares are encouraged. It is important that all sections of the Department feel engaged in decision-making, so a gender balance is ensured on all committees, and for many key committees it is the norm to include more junior academic staff. Many junior academic staff are at critical stages of their careers when they also have young children, so we try to schedule meetings at family-friendly times.”

4 Dr Lucy Carpenter’s research as an atmospheric chemist involves travelling – literally – to three corners of the globe to manage fieldwork while juggling family commitments at home.

She recently won a £510,000 research grant to study frost flowers in Hudson Bay, Canada and co-ordinated a team of international academics to launch a new atmospheric observatory in the Cape Verde islands.

“The Department has always been supportive of flexible working which has been of enormous help in my career. While I was on maternity leave, a post-doctoral research assistant helped keep up my research activities.”

Evidence of this commitment can be seen in the high proportion of women pursuing successful careers in science at the University. York’s strong record here is underlined by the Athena SWAN charter, the Royal Society initiative to help drive the advancement of women in science, engineering and technology.

The University holds more Athena awards than any other university. The University as a whole holds a bronze award, the Departments of Psychology and Biology hold silver awards, and the Department of Chemistry is so far the only science department in the country to have achieved the Athena SWAN gold standard.

Professor Paul Walton, Head of the Department of Chemistry, said, “We have gained a great awareness of potential obstacles to career progress for women scientists, and we want everyone to know that their careers are taken seriously.

“Ensuring that our practices are as flexible and considerate as possible benefits everybody. It’s all about having good employment practices.”

1 Dr Irene D’Amico, in the Department of Physics, is an expert in the field of spintronics, a developing area of research which could make electronic devices smaller, faster and more efficient.

She said, “Our Head of Department sets up regular meetings with different staff groups, ‘young academics’ or ‘technical staff’, for example, to give us a chance to discuss the typical problems of each group. Besides meeting collectively, we are also able to discuss issues on a more personal level. This I think is very helpful.”

2 Dr Janet Clegg, in the Department of Electronics, began her research career in 1993 when she was a single parent of two children aged 11 and 13. Her current research is in the area of Cartesian Genetic Programming.

“I found I was treated exactly the same as any male researchers which was very refreshing. I also found the Department to be very supportive both with balancing my family life and furthering my career. In 2000, when my father became ill, I was allowed to work half-time for 18 months to run his business. When that was sold, I resumed my full-time research position.”

3 Professor Dale Sanders’ research group studies how plant cells respond to changes in their environment and how they store the nutrients they acquire. An understanding of the way plants transport nutrients and what stimulates them to respond to certain conditions is crucial in areas such as improving crop quality in agriculture. In 2001 he was elected a Fellow of the Royal Society.

As Head of the Department of Biology he has upheld the Department’s supportive environment for parents – which was essential to him when, mid-career, he found himself bringing up his young family alone.

“We encourage career development programmes for more junior scientists at graduate student and post-doctoral stages through mentoring and a flexible working environment. Academic staff can work part-time and job shares are encouraged. It is important that all sections of the Department feel engaged in decision-making, so a gender balance is ensured on all committees, and for many key committees it is the norm to include more junior academic staff. Many junior academic staff are at critical stages of their careers when they also have young children, so we try to schedule meetings at family-friendly times.”

4 Dr Lucy Carpenter’s research as an atmospheric chemist involves travelling – literally – to three corners of the globe to manage fieldwork while juggling family commitments at home.

She recently won a £510,000 research grant to study frost flowers in Hudson Bay, Canada and co-ordinated a team of international academics to launch a new atmospheric observatory in the Cape Verde islands.

“The Department has always been supportive of flexible working which has been of enormous help in my career. While I was on maternity leave, a post-doctoral research assistant helped keep up my research activities.”
Dr Mark Mortimer brings strong experience of both the academic and commercial worlds to his role as Director of the Research and Enterprise Office at the University of York. His academic background is in Chemistry, completing a PhD in Organometallic Chemistry at the University of Bristol, followed by four years post-doctoral research in California at Stanford University and UCLA.

On returning to the UK, he entered the private sector, first working in product development and research management at English China Clays in Cornwall and subsequently moving on to Microtherm International as Research and Development Manager.

Dr Mortimer joined the University in 2006 as Business Development Manager for Physical Sciences. He was appointed to his current role in December 2008.

The university of york is one of the most research intensive universities in the country, as highlighted by the high proportion of income derived from research and the excellent 2008 Research and Assessment Exercise (RAE) result, together with a high percentage of staff submitted. The Research and Enterprise Office (REO) has a broad remit to support all areas of research activity from applying and managing research grants, encouraging excellence in research practices and conduct, maximising the impact of research and not forgetting the support to departments with their RAE submissions and future research assessment systems.

The RAE confirmed that academics at the University of York are conducting world-class research that is hugely significant in its own right. The primary aim of the REO is to support the University’s academic departments to pursue that research and to explore new areas of investigation, as well as identifying opportunities where research activity can have a broader impact.

Dr Mark Mortimer, Director of the REO, said, “Everything we do starts from our research, so we play an important role in supporting the expansion and improvement of the University’s research base but we do so with an eye firmly on opportunities for benefit to individual companies, the economy and society.

“The ultimate goal of our work is to ensure that York’s research has the biggest impact possible on the wider world, socially, culturally and economically.”

The REO works with academic staff to help them spot commercial potential in the research they are doing. It provides the university’s research capabilities to organisations in both the public and private sectors which could benefit from it, and identifies opportunities for knowledge transfer. It also supports the translation of new discoveries into intellectual property.

Successful spin-out companies such as Xceleron, Rapita Systems and Pro-Cure Therapeutics are the highly visible product of the integration of the University’s research activities and its engagement with the commercial sector.

The REO’s work extends across all the academic disciplines, promoting the University of York’s excellence in research over a broad range of fields.
Researchers in the Department of Archaeology are investigating the ancient shorelines of the Red Sea’s Farasan Islands which are now under water.