CHANGING AND CHALLENGING OUR FUTURES

THE UNIVERSITY OF YORK IN THE WORLD
Foreword

UK universities are operating in an increasingly competitive environment. Higher education is facing difficult challenges in the coming years and we must demonstrate clearly the important role that it plays in developing and enhancing our society. Higher education provides benefits well beyond the economic performance traditionally monitored by the Government. As well as the £59 billion income generated by the higher education sector in the UK, universities are responsible for a range of benefits that are less easy to measure but provide important contributions to making a better society.

This document aims to demonstrate the impact that the University of York makes on communities around the globe. We outline here the effect the University has in catalysing economic development, addressing global challenges through new technological and scientific developments, student and staff volunteering, contributing to culture, and science outreach with children.

The effect of our work is widespread and positive. Perhaps our greatest contribution to society is the quality of the graduates that we produce. York is proud of its role in educating students. We transform the lives of our students and inspire them to go out and make a difference in the world. In the 46 years since the University of York was established, 73,000 York graduates have made an incalculable contribution in countries all round the world.

Professor Brian Cantor
Vice-Chancellor
March 2010
“If you want a perfect example of the transformative effect of universities in a city, then look at York.”

Greg Dyke, former Director-General of the BBC, and Chancellor, University of York

York students work on numerous outreach projects with local schoolchildren
A technician analyses growth traits in artemisia seedlings in one of the University glasshouses.
Changing and challenging our futures

In January 2010 a paper in Science revealed how a new genetic map of the world’s most important medicinal plant – *Artemisia annua* – could meet escalating demand for effective malaria treatments. Malaria kills over a million people a year and there is an urgent need to find more effective therapeutics. *Artemisia* produces artemisinin, the active ingredient of ACT, which is used in the treatment of malaria. It is largely a wild plant, but the genetic map leads the way to domesticating it in order to produce high-yielding crops. The map, produced by plant biologists from the University of York in the UK, plots genes, traits and markers in the plant that are associated with high performance. It is being used to accelerate plant breeding of *artemisia* in order to rapidly develop it into a high-yielding crop, adaptable to different growing environments. The next step is to take the plants to developing countries for trial, with the release to farmers in Asia and Africa of effective and commercially viable crops from 2011 onwards. This project has received two substantial grants from the Bill & Melinda Gates Foundation.

This breakthrough illustrates the sort of impact that universities can have on the world. Life-saving discoveries and new technologies, the speeding up and greening of industrial processes, safety-critical developments for transport, inspiring contributions to culture and society – these are all the product of world-class researchers in the supportive environment that universities provide.

**Consistent commitment to quality**

When it was founded in 1963, the University of York became a beacon of opportunity for those who might not have expected to study at university. Its bold founding principles, centred on opportunity for all and rigorous academic quality, have been the tenets guiding the development and growth of the University of York ever since.

In less than 50 years, York has powered its way to a consistent place in the top ten universities in the UK – performing equally well on teaching and research quality measures – and is ranked in the top 100 universities in the world.

The University is built on the twin foundations of strong viable academic departments and a college system for residential and social life. It is an informal place, at ease with itself, with a strong history of success and an equally strong commitment to social justice.

This has coloured its interactions with the community, the professions, research collaborators around the world, government and non-governmental organisations, schools and cultural institutions.

York has played a key role in changing and challenging the future in each of these areas. This document can necessarily only describe some of these interactions, celebrating the University’s energetic and serious acceptance of its role as a force for good in the world.
Making York a magnet for investment

The combination of positive local business partnership, one of Europe’s most beautiful cities, and a world-class university has positioned York as an international destination in which to work, study and live. The University of York has been a key catalyst in developing and accelerating York’s international profile.

In the last 20 years, the University has acted as a magnet for inward investment to the city and region. Instrumental in setting up England’s first Science City, the University has used its expertise and entrepreneurial spirit to establish York as a positive, flexible and successful environment for business. Science City York is a pioneering model for science cities. Businesses which have focused on biotechnology, IT and creative technologies in particular have flourished.

Inward investment, relocations, start-ups and University spin-outs have all benefited from the productive partnership of the University with the City of York Council, Yorkshire Forward, and York Science Park. The University’s global reputation for high quality research has been critical to that success.

Now the University has the opportunity to double the capacity of its work by extending the campus on an adjacent site. This allows the University to fully realise its aspirations as it leads the way in promoting York’s knowledge economy. With developments like the Hub – a creative grouping of research, innovation and businesses – and the Catalyst – a home for cognate knowledge-rich enterprises – the University and the city are well-placed to realise their ambitions. The development of the knowledge economy is about more than spin-outs and business collaboration, however.

York has a history of instilling students with a spirit of enterprise – the Enterprise Club is one of the most active student societies, and the long history of interdisciplinary work means that unusual partnerships arise between very different academic endeavours. Music scholars, for example, are engaged in a range of collaborations with some of the world’s leading creative technology companies, working on the development of ambisonic sound and cutting-edge sound and vision installations.

“No council should underestimate the positive impact having a higher education provider in their area has on the prosperity of a place. In the case of York, the University of York is a world-class institution which puts our city on a global footing.”

Kersten England, Chief Executive of the City of York Council
The right environment for enterprise

The University, Science City York and the Food and Environment Research Agency (FERA) have secured £20 million for the development of Yorkshire’s hi-tech industries from the European Regional Development Fund (ERDF) in Yorkshire and the Humber.

Over the next five years this joint endeavour will create 700 new jobs and 100 new businesses, and increase productivity in this sector by almost £40 million.

It will put knowledge exchange and enterprise at the heart of the University’s £500 million expanded campus on Heslington East, interlinking research and industry, with extensive knowledge exchange and business incubation facilities.

The funds will also support cutting-edge demonstration facilities for converting biomass to useful products at the University, a nationally significant project to scale up laboratory research examining the potential for the production of chemicals and bio-fuels from waste materials.
The Hub – a creative grouping of research, innovation and business
Novel therapies for beating cancer

Pro-Cure Therapeutics Limited (Pro-Cure) is a University spin-out company, founded in 2001, which is developing novel therapies for prostate cancer.

The company was founded by Professor Norman Maitland, who holds a research chair funded by Yorkshire Cancer Research and manages a world-leading prostate cancer research group. The group has isolated prostate cancer stem cells and identified a unique set of genes which are specifically up-regulated in prostate cancer stem cells. This leading-edge research has created a powerful drug discovery ‘toolkit’ with a definitive catalogue of valuable new cancer stem cell drug targets.

Pro-Cure has now embarked on a programme to develop therapeutic candidates against its lead drug target and is developing a monoclonal antibody aimed at killing prostate stem cells. It is also pursuing the development of vaccine candidates.

The company is located in the Biocentre, one of three facilities on the Science Park designed to incubate new science businesses. Companies which spin out from research groups produce particularly close collaborative endeavours. They remain rooted to the research which gave rise to a commercial idea or patentable technology, and provide a bridge to the commercial world of licensing, joint ventures and international venture capital.

Pro-Cure has recently received funding of over £700,000 as a follow-on to the major investment package it secured in late 2008. The largest investors in this current funding round were Yorkshire Cancer Research and the Yorkshire and Humber Equity Fund, managed by YFM Group. The company appointed Dr Alastair Riddell, who is a main board member of the Bioindustry Association (BIA) of Great Britain, as its non-executive Chairman in October 2009 and two fund managers, David Livesley of YFM Group and Dr David Milroy of Maven Capital Partners, as non-executive directors. These three appointments significantly increase the life sciences experience at what is an exciting and challenging time in the company’s evolution.

Prostate cancer is the most common cancer in men, and about 9,000 men in the UK die from it each year. As well as developing therapies to treat prostate cancer, researchers have worked with Yorkshire Cancer Research to raise awareness of prostate cancer among older men, including a website ‘What every man should know about prostate cancer!’

“The University, and its Science Park, provided the ideal relocation for Smith and Nephew’s global biomedical research centre – the links with Biology, Chemistry and Health Economics being particularly valuable. Since then, the Science Park – and the strength in life sciences through Science City York – has built into a key contributor to the regional economy.”

Sir Christopher O’Donnell, former Chief Executive Smith and Nephew, and Chair of Council, University of York
Internationalising the University and the city

York first hit international headlines in AD306 when Constantine was declared Roman Emperor in the city. In Roman and Viking times, and throughout the Middle Ages, York was a place of political and religious significance. York’s famous heritage now attracts over four million visitors a year; furthermore the University is driving the city’s economic resurgence and attracting world-leading scholars and businesses.

The reputation of the University of York for research, and the transnational nature of much of its work, means that people come from all over the world to work on global research and innovation challenges. Over 20% of the University’s staff and 20% of its students come from outside the UK, from 132 different countries. Global partners include IBM, GlaxoSmithKline, AstraZeneca, Rolls Royce and Unilever. York is also a founding member of the world’s leading network of universities, the Worldwide Universities Network, comprising universities from the US, UK, China, Australia and South Africa.

The University’s global growth and success have internationalised the population and customs of the city and region since the University’s founding in 1963. The primary school nearest the campus has children of 27 nationalities, speaking 15 languages and celebrating five faiths. International students develop their own niche projects in community life – helping out with language teaching in local schools and hosting fiestas which celebrate cultures from around the world.
Spintronics has the potential to have as profound an impact on electronics as the development of the transistor had 50 years ago.

Spintronics uses electron spin as well as charge to manipulate information-processing circuits. Spintronic devices combine the advantages of magnetic materials and semi-conductors, and are stable, versatile, fast and capable of simultaneous data storage as well as being energy-efficient.

York has established an international centre of excellence to exchange ideas and establish close collaborations in this exciting technology. Capitalising on the strong links that membership of the Worldwide Universities Network brings, York has joined with fellow WUN member Nanjing University to establish the Nanjing–York Spintronics Centre. The hope potential that spintronics offers for the future will be realised through the collaboration between these two world leaders in the field. The Director is York academic Professor Yongbing Xu (pictured), who also leads the Worldwide University Network (WUN) Grand Challenge Project on spintronics with 30 partners from the UK, USA and China.

“The University of York has made major contributions to spintronics, and is playing a world leading role in this exciting area of nanotechnology. We have benefited greatly from our close collaborations, including the establishment of the Nanjing–York joint centre and the winning of a recent major grant.”

Professor Rong Zhang, Vice-President of Nanjing University, China
A snapshot of Afghanistan

In 2008 Professor Sultan Barakat, Director of the University’s Post-war Reconstruction and Development Unit, led a six-person team to conduct the most comprehensive strategic conflict assessment of Afghanistan to date.

It involved interviews with members of the Afghan security services, former Taliban members, high-ranking Afghan officials, foreign diplomats, NATO military commanders and many others in Kabul, Helmand, Kandahar and Herat provinces, as well as in Pakistan and Uzbekistan.

The researchers uncovered a tendency to attribute all violence to the Taliban, which made efforts to target military and humanitarian aid less effective.

In fact, the team concluded that as many as half of the violent incidents resulted from long-standing inter-community disputes, from inequitable access to government services and public positions, and from opposition to internationally funded poppy eradication efforts – rather than from pro-insurgent sentiments.

The study also provided an opportunity to dispel additional myths about conflict in Afghanistan – including the idea that Al-Qaeda is playing a direct and leading role, and that the insurgency could not continue without narcotics trafficking to finance it.

“It’s good to see our research having a tangible effect on British and international policymaking and to have received positive feedback from the British and Afghan governments,” said Professor Barakat.

PRDU grew out of the York Charter for the reconstruction of human settlements, developed by Professor Barakat in the 1990s, and his work on cultural heritage and reconstruction following conflict. Research and consultancy in many countries, including Iraq and Bosnia, has followed. Recognising the need for specific training for professionals, the PRDU launched a Masters in Post-war Recovery Studies in 1996, which welcomes students from all over the world.

Although the cultivation of poppies for the narcotics trade provides funding for arms traffickers, it is a lifeline for impoverished farmers, and efforts by international forces to eradicate it cause resentment, say the researchers.

“The contribution of the University of York to rebuilding societies torn by conflict or natural disaster has been immense. Work emanating from its Post-war Reconstruction and Development Unit has significantly impacted on both institutions and individuals around the world.”

Prince El Hassan Bin Talal of Jordan
Student exchange widens horizons

In April 2009, York student Laura Longworth travelled to Erfurt in Germany as part of the pan-European Erasmus exchange programme. She studied French and German at York, and spending a period of her time abroad was a compulsory part of the course.

Like many students, Laura found the prospect of living abroad and learning in a foreign language daunting. For one of her final assessments she had to give a presentation in German to a class of 25 native German students. The presentation lasted one and a half hours and the students and professor asked many questions on the topic. But having done it, she felt an amazing sense of achievement and a significant boost to her confidence.

“I made friends with people from all over the world, and of course this meant that we had many different festivals to celebrate,” says Laura. “From American Independence Day to the German traditional May Day party, we did the lot. An Erasmus experience goes beyond the boundaries of your host country. It’s a truly global experience – it gives you the opportunity to embrace many different cultures and customs – French cooking, Mexican dancing, Czech games. I now have friends across the world and feel at ease meeting new people, from any background, and I’m sure that knowing that ‘Égészségedre’ is Hungarian for ‘Cheers’ will be useful one day!

“The Erasmus programme has truly boosted my confidence, my ability to speak a foreign language and my understanding of other cultures. Having the opportunity to develop these skills is invaluable and sharing a learning experience with students from around the world is an opportunity not to be missed.”

“York students have an impact all over the world. Every two years 150 students graduate in Beijing. The University of York is a great place to study because it takes you out of your comfort zone and encourages you to immerse yourself within the English educational system. For me, it was challenging and confusing at times, but also so rewarding to experience a different way of studying the subjects I love.”

Jaclyn Johnson, visiting student from the USA
In 2003, the University of York won a Queen’s Golden Jubilee prize for its project ‘York Students in Schools’ (YSIS) in recognition of its outstanding contribution to the community. Described as a ‘splendid asset’ by local headteachers, the scheme provides over 500 volunteer students in primary and secondary schoolrooms across York. YSIS is a pioneering initiative, run at York since 1994. It has inspired similar school volunteering projects in universities throughout the UK. It illustrates one of York’s critical characteristics – a high level of engagement with society.

At York, over a thousand students a year volunteer in the community – one in ten of the student population. Added to this are staff volunteering programmes which see academics and administrators spending a lunch hour helping children with maths, landscaping the grounds of a local primary school or visiting the elderly.

York’s Community and Volunteering Unit matches volunteers to needs in existing projects and supports staff and students who have new ideas that can benefit local communities.
Student volunteers find themselves in all sorts of roles

Bringing an international flavour to York schools

Language students Sinead Faherty and Jen Chester returned from studying in France and Germany impressed by how confident the young children in those countries were in speaking foreign languages. They decided to do something to create a similar attitude in York.

Project Babylon is the result. Sinead and Jen have recruited 17 volunteer students to give weekly lessons in French, German and Spanish for young children. Working with the City of York Council they arranged for the lessons to be given after normal lessons at four primary schools and one nursery in the city.

The age of the children involved ranges from three to 11 years old. “Learning a language should be fun, so the lessons concentrate on playing games and on words that people really use rather than just reciting phrases, which is what you often do when you first start learning a language,” Sinead said. “If you’re a music student then you can easily transfer that skill into extra-curricular activities, such as playing in bands, but it’s not as obvious when you study languages.

“This is a good way of making use of our skills outside our studies as well as contributing to the local community and hopefully getting more children interested in foreign languages.”
A team of 24 York students transformed a bare courtyard into a sensory garden for the pupils of Applefields Special School. The students designed the garden, secured funding and donations of materials from local businesses, and worked with pupils to transform the area with custom-built seating, wheelchair-accessible raised beds and planters, an outdoor classroom area, kitchen garden, and an artwork and music area.

“The sensory garden is a fantastic addition to the school’s facilities,” said headteacher George Gilmore.
A project for young care leavers in York was highlighted by the Government as a blueprint for employers nationwide to follow. The transition to independent living and employment can be a hugely difficult one for young people in care who have had disrupted lives and education. Starting Blocks, established by the University of York through the charity York Cares, helps young people leaving care to develop their skills by providing work placements tailored to their needs. Care leavers who have taken part in Starting Blocks have secured jobs and pursued new qualifications as a result of their work placements. The scheme aims to offer 15 placements for care leavers every year. The scheme was commended by Ed Balls, Secretary of State for Children, Schools and Families, when he launched the new From Care2Work programme in 2009. The project had professional advice from Jo Dixon, a social policy researcher at the University.

Improving the prospects of care leavers

Care leavers who have taken part in Starting Blocks have secured jobs and pursued new qualifications as a result of their work placements. The scheme aims to offer 15 placements for care leavers every year. The scheme was commended by Ed Balls, Secretary of State for Children, Schools and Families, when he launched the new From Care2Work programme in 2009. The project had professional advice from Jo Dixon, a social policy researcher at the University.

Recognition for work with dementia sufferers

Hull York Medical School students wanted to supplement the services available to people suffering from dementia and their carers. They set up Minds in Motion, a range of activities including the Harmony Café, at a local church, and regular arts and crafts visits to three daycare units in the city. Minds in Motion won the citizenship and volunteering category in the Guardian Public Service Awards.

“The ethos of the University positively encourages students to be involved in the wider community, enriching both their own lives and the lives of those who may not be as fortunate as themselves.”

Lesley Wild, Chairman of Bettys and Taylors Group
Taking the laboratory into the community

Local schoolchildren have a rich scientific education, thanks to the numerous outreach activities based at the University. Many have the opportunity to discover the fascinating secret lives of insects and germs when scientists take microscopes into their classrooms. Annual science trails allow nearly 300 children to spend time in University labs talking to researchers and trying out experiments. These are the daily practical examples of encouraging children to realise that science is interesting and relevant – and within their intellectual grasp. It follows many years of York leading the way in science curriculum development with the Salters courses, which are operational in schools all over the world. It took the pioneering approach of showing how the science of the classroom and laboratory has direct relevance in real life.

The track record of York staff in developing these curricula was instrumental in the success of a collaborative bid from Yorkshire universities to locate the National Science Learning Centre on the University of York’s campus. Now teachers from all over the UK travel to York for professional development and to learn how to translate the latest scientific research into exciting projects for their students.
Every year since 2004 the Science Trail at the University of York has engaged young people with science at the University. The day is targeted at Y10 students from disadvantaged schools, where progression to STEM subjects at university is low. Schools are drawn from across the Yorkshire and Humber region, and each attends with between 15 to 30 selected students. In recent years, every science department at the University has been involved, and other departments, such as Philosophy, are beginning to join in. The Science Trail in March 2010, and the previous two in 2008 and 2009, have been funded by the Excellence Hub.

As well as inspiring the teenage participants, the Science Trails have also had a positive effect on their teachers and on the academics who lead the trails. In 2006, staff collated before and after snapshots of pupils’ attitudes, which demonstrated a marked increase in their interest in science after the event.

In an integrated approach, science teachers who arrive with the pupils attend a day’s professional development at the National Science Learning Centre, which has its headquarters on the University of York campus. Since teachers are key influencers on young people’s educational choices, it is critical that they are briefed on innovative ways of engaging young people in science and fully understand the progression routes available to them.
“The biology session was good and I didn’t know you could do so many different things with science. All of the jobs you can do and the courses make it seem more exciting and I hope I can do this someday.”

Pupil

“I was made to feel very welcome. The opportunity to see the resources and the chance to try out lots of new, practical ideas was great. This day will make me think more about our curriculum model and how to implement new ideas and plans.”

Teacher

“I was really surprised. I didn’t know you could do these things at university and it makes choosing science subjects in Year 12 seem more worthwhile.”

Pupil

“It’s always good to get up to date with the latest admissions policies and routes into science careers so I can pass this information to our pupils, who often don’t think these kinds of opportunities are for them.”

Teacher

“Thanks for a great day – it was amazing. I think science is everywhere and it’s a really important thing to look into and study at school.”

Pupil

“Watching the pupils in action in the academic sessions and attending the CPD sessions has really inspired me. I’ve taken a lot from today, and hopefully we can make sure the pupils’ experiences will impact on their work back in school for a long while to come.”

Teacher

**Engaging the young through science**

Exciting primary school pupils about the importance of science is something that York academics take very seriously. A good example of this is a group of York schoolchildren having the opportunity to learn about plants from the University’s world-leading biologists.

Researchers from the University’s Centre for Novel Agricultural Products (CNAP) visited St Aelred’s RC Primary School and subsequently welcomed pupils back to their laboratories.

The Plant Explorers project, funded by the Royal Society, gave the Year 6 pupils the opportunity to dissect plants, extract DNA, and design their own experiments.

Visiting the laboratories on the University campus provided children with a unique opportunity to see research scientists using plants to tackle pollution from explosives and the development of better biofuels.

The aim of the project was to help children understand how society benefits from scientific discovery and help develop a long-term interest in science.
To boldly go...

The galaxy came a step nearer to children in 2010 when the Department of Physics hosted an astronomy day. Pupils had a three-dimensional space show, listened to talks about stars and visited the University’s observatory. The transformational effects of such outings is expressed by some of the visitors:

"We learnt stories about stars, their constellations and the myths that surrounded them. We also built a spectrometer which, when you looked at a light through it, you could see the spectrum of colours – then we looked at different chemical lights and noticed changes and gaps in the spectrum. We watched a 3D show that took us on a journey through the universe. It was brilliant."

Frazer

"The lectures and seminars were not dry (like you would expect!) but were prepared by University students. It was relaxing and informative."

Kieran

"It was fantastic! I’ve never found space so incredibly interesting! A once-in-a-lifetime experience. The star dome blew my mind as we whirled through space, venturing through the stars. The best day of my life!"

Esther

"I really enjoyed the final lecture on space – the images of distant stars and galaxies seemed so unreal. The visit encouraged me to apply myself more to physics lessons and encourage me to look into taking it to A level or even further."

Abbie

"The trip was great. I really enjoyed it. It gave me an idea of how things happen at a university. The most fun part was learning about, and making, a spectrometer. The most interesting part was learning about the planets and the lecture at the end by Dr Marek Kükula was great because it gave me an insight into what things astronomers study and how they study them."

Reece
Reflecting and changing culture

At York, the impact of arts and humanities research on society is rich and varied. Art historians curate internationally renowned exhibitions, including the recent Hogarth retrospective held at Tate Britain and the Louvre, and conservationists influence the management of our cultural heritage.

When the Borthwick Institute for Archives opened in purpose-built premises in 2005, it was a flagship development in a series of important investments in the arts and humanities to benefit national and international culture. The Borthwick’s collection of historical documents – one of the most significant in Europe – includes treasures such as Charlotte Brontë’s will and William Wordsworth’s marriage bonds, now housed in climate-controlled strongrooms. The public can access the collection without an appointment, providing a superb resource for local historians and genealogists.

The new home of the Department of Theatre, Film and Television features a suite of state-of-the-art facilities to ensure that our students are trained to be at the forefront of new media and creative development in the years to come. These include two theatres, a cinema, an interactive media laboratory to support film and television post-production, audio suites, television studios and video-mastering suites. Many of these facilities will be available for industry use and open to the public, as well as forming a platform for Science City York’s Creative Technology Cluster.
The Department of History of Art has built on its excellent reputation for teaching and research by forging an innovative partnership with Tate Britain. It will see a curator from the gallery teaching a full MA module at the University every Spring Term while an art historian from York spends time working on research and exhibition projects in London.

Professor Mark Hallett, Head of the Department of History of Art, says, “This is a wonderful opportunity for collaboration and exchange. It offers our MA students the chance to work with internationally renowned curators, and gives our staff the chance to pursue research in the world’s leading collection of British art.”

Karen Hearn, Curator of 16th and 17th Century British Art at Tate Britain, is the first visiting curator to come to York on this scheme. Meanwhile, Dr Jason Edwards is working closely with Tate colleagues on research relating to Victorian sculpture in an international context.

The Department has also developed strong partnerships with the National Gallery and latterly with the Victoria and Albert Museum.

Collaborations in art

“As a former York student, I am especially pleased to welcome the new staff exchange. It is an exciting opportunity to introduce works from the Tate Collection to new generations of art history students. In turn, the visiting York scholars will bring valuable skills and insights to the Tate.”

Judith Nesbitt, Chief Curator at Tate Britain
Music-goers experienced a unique event in York Minster with I Hear Too: Live, organised by Audiolab researchers in the Department of Electronics, which showcased the links between heritage, sound-art and music.

Among the contributions was Minster Voices, by Jon Calver and Professor Helen Weinstein of the Institute of Public Understanding of the Past (IPUP), a 30-minute audio piece comprising interviews with many of the people who work in York Minster. Other pieces included audio and video of the Minster and its surroundings projected onto a large screen entitled A Ripple on the World’s Pool, by John Was and Aaron Watson and Dusk Songs, a choral work performed by the Ebor Singers.

“Our interest lies in the role of participatory history in a multicultural society, and York is a perfect location to ground this research, with its long history of migration and settlement stretching right back to the Romans,” said IPUP Director, Professor Helen Weinstein.

IPUP was created to promote academic partnership projects across museums, galleries, heritage and the media.

Another IPUP project concerned the sensitivities surrounding the 200th anniversary of the abolition of slavery in 1807; it posed a particular challenge to museums which had a responsibility to present it to a diverse audience with very different perspectives. York academics examined exhibitions, spoke to curators and interviewed museum visitors to understand and gauge the reaction they provoked.

Their work has also led to the production of four toolkits for museum curators preparing exhibitions on sensitive subjects.
Every year, the University attracts thousands of people to the campus for its well-established concerts programme covering all kinds of musical genres.
York has become known throughout the world for its influence on public policy, particularly in the field of health. Health economics as a discipline had its origins here, and evidence-based health treatments and policy decisions have become a hallmark of York’s work.

Research into chemotherapies used to treat advanced prostate cancer produced savings of over £1 million a year with no reduction in health benefits, research into the efficacy of flu jabs led to new national policies for the over-60s, saving thousands of lives, and findings on interventions for treating alcohol dependence have informed guidance to NHS clinicians and were incorporated into policy reviews by the World Health Organisation.

These findings represent over 30 years’ worth of public policy research that has made a real difference to the quality of millions of people’s lives.

Scientific breakthroughs have been equally transforming. Early work on protein structures, including pioneering work with x-ray crystallography, has led to breakthroughs in the treatments of cancer, blood disorders and cardiovascular problems. A recent patented technology – hyperpolarisation – will dramatically increase the speed of diagnosis from imaging in hospitals and doctors’ surgeries. Plant biologists have developed highly innovative techniques to clear mine-infested areas using plant products, and have developed plants as ‘factories’ to produce high-yielding anti-freeze and adhesive products, helping farmers and consumers around the world.
In the modern world, a large proportion of our environment is supported by computer-based systems. From the braking control system in cars to online banking systems, our dependence on safe and secure computers and software will continue to grow.

Professor John McDermid, Head of the Department of Computer Science at York, leads the world’s largest academic research group studying the safety and security of computer-based systems. The group has worked extensively with industry and government and their work in translating technologies into industry was recognised by a Queen’s Anniversary Prize.

Techniques developed by Professor McDermid’s team were critical to the success of a recent Highways Agency project that allowed hard-shoulder running on the M42. This improved traffic flow, travel times and safety, with reports suggesting that lives have already been saved by the scheme. Road congestion is estimated to cost the UK £20 billion per year, and roll-out of this scheme across England’s motorways could give a multi-million pound benefit. More immediately, the M42 scheme has saved about £400 million in comparison with road-widening.

Saving money and improving safety with safety-critical systems

In the modern world, a large proportion of our environment is supported by computer-based systems. From the braking control system in cars to online banking systems, our dependence on safe and secure computers and software will continue to grow.

Professor John McDermid, Head of the Department of Computer Science at York, leads the world’s largest academic research group studying the safety and security of computer-based systems. The group has worked extensively with industry and government and their work in translating technologies into industry was recognised by a Queen’s Anniversary Prize.

Techniques developed by Professor McDermid’s team were critical to the success of a recent Highways Agency project that allowed hard-shoulder running on the M42. This improved traffic flow, travel times and safety, with reports suggesting that lives have already been saved by the scheme. Road congestion is estimated to cost the UK £20 billion per year, and roll-out of this scheme across England’s motorways could give a multi-million pound benefit. More immediately, the M42 scheme has saved about £400 million in comparison with road-widening.

Saving money and improving safety with safety-critical systems

In the modern world, a large proportion of our environment is supported by computer-based systems. From the braking control system in cars to online banking systems, our dependence on safe and secure computers and software will continue to grow.

Professor John McDermid, Head of the Department of Computer Science at York, leads the world’s largest academic research group studying the safety and security of computer-based systems. The group has worked extensively with industry and government and their work in translating technologies into industry was recognised by a Queen’s Anniversary Prize.

Techniques developed by Professor McDermid’s team were critical to the success of a recent Highways Agency project that allowed hard-shoulder running on the M42. This improved traffic flow, travel times and safety, with reports suggesting that lives have already been saved by the scheme. Road congestion is estimated to cost the UK £20 billion per year, and roll-out of this scheme across England’s motorways could give a multi-million pound benefit. More immediately, the M42 scheme has saved about £400 million in comparison with road-widening.
York scientists have developed a new technology which dramatically improves the sensitivity of magnetic resonance techniques.

Magnetic resonance is widely used as a diagnostic tool in hospital imaging scanners as well as being the most popular method for obtaining analytical and structural information in chemistry.

The new technique, known as ‘hyperpolarisation’, substantially enhances the magnetic signals of certain molecules and so could have a profound effect on the way magnetic resonance is used, in particular opening up new avenues for the diagnosis and treatment of a range of medical conditions.

It could be possible, for example, to use this technique to closely analyse how a drug is metabolised in the body and, as a result, be able to develop ‘personalised’ dosages that are unique to a particular patient.

In chemistry, hyperpolarisation makes it possible to make measurements in a single second that previously would have taken three months, as well as providing more detailed information about the purity of a material.

The research, led by Professor Simon Duckett in the Department of Chemistry and Professor Gary Green from the York Neuroimaging Centre, was published in Science in 2009.

The research has attracted strong interest from several large pharmaceutical companies such as GlaxoSmithKline and AstraZeneca, as well as from instrument manufacturers. Bruker Biospin, market leader in NMR, has already developed a prototype polariser with York. The University is now forming a consortium of academic and industrial partners to accelerate further development.

Magnetic resonance development speeds up diagnosis

The concept of hyperpolarisation is that certain molecules can be made more visible to subsequent NMR or MRI measurement. Work is on-going in the York Centre for Magnetic Resonance where the scientific discovery was made that enables molecules to be examined in a fraction of the time previously taken. This application will greatly improve treatment of diseases such as cancer.
Schistosomiasis is a debilitating disease affecting up to 200 million people in parts of Asia, Africa and South America, largely in areas without running water or sanitation. It is estimated to kill more than 200,000 people in sub-Saharan Africa every year.

There is currently only one drug used to combat the disease, with the consequent high risk that the parasite will build up resistance to it.

Scientists in the Department of Biology were part of an international team who successfully sequenced the genome of *Schistosoma mansoni*, a water-borne parasitic worm whose eggs spread the deadly disease.

The research, which was published in *Nature* in 2009, is a significant step towards identifying novel drug targets and establishing a vaccine.

Lake Malawi in sub-Saharan Africa is heavily contaminated with schistosomiasis, also known as bilharzia, and the disease is endemic in most coastal communities.
Universities are people-based organisations. Developing our students and staff and providing them with new opportunities is critically important to our own success. But this approach also benefits society. Well-rounded students with a range of skills become excellent employees and useful members of society. Well-trained and motivated staff can use skills acquired at work in their roles outside work as school governors, sports coaches, local councillors, or environmental campaigners.

We believe strongly in the value of education, but it is a belief that goes beyond the acquisition of knowledge and the ability to analyse complex ideas. Alongside academic work and learning the skills to do a job, students and staff have the opportunity at York to learn languages, develop entrepreneurial skills and experience, and have targeted training in leadership.
Tickets to ride

The University of York’s Student Internship Bureau links students and recent graduates with employers on short-term projects. Employers access the diverse range of talents and skills of the University’s students and the students gain valuable experience.

First-year students Gordon Harrison and Jordan Abbott put together a presentation to increase off-peak rail travel by students which they pitched to Northern Rail. They both secured six-week internships, organised by the University’s Student Internship Bureau, to create and implement their marketing campaign.

Focusing on the theme of ‘Northern Nights’, they designated Monday night as a ‘Northern Student’ night, and established contacts in clubs in Leeds and York with the aim of instigating deals between the clubs and Northern Rail. The interns agreed a deal with Oceana nightclub in Leeds to admit students free on Monday nights if they show a valid train ticket and NUS card on the door.

The interns then devised a marketing strategy, targeting relevant universities to advertise and promote Northern Nights.

Working with a Northern Rail designer, the students planned and executed a promotional campaign during Freshers Fairs at their target universities. This included designing a stand, fliers, and web advertising. The interns also personally fronted the Northern Nights campaigns at Freshers Fairs.

Ian Hall, Head of Marketing at Northern Rail said, “Gordon and Jordan provided a much needed resource over the summer period. They utilised their understanding of their target market to create a well-targeted product and implement it with commitment and enthusiasm.”

"Spending three years at York in my mid-20s changed my life. I learned how to think, analyse and question.”

Greg Dyke, former Director-General of the BBC, and Chancellor, University of York
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 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.

“Creating equality in world-class research”

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,” she said.

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.”
In 2008 the University began two new leadership programmes for staff. Leadership in Action was delivered internally and aimed at middle managers, while the Strategic Leadership Programme was for Heads of Department and delivered in partnership with The Work Foundation. The programmes were designed to bring long-lasting benefits to individuals. Both programmes brought academic and support staff together in an environment in which what they had in common far outweighed what they did not. The programmes encouraged a view of leadership that was about building an adaptive sustainable community in which collective leadership, rather than heroic or controlling individual leadership, was more likely to address the external complexity facing universities.

The approach to the programmes was emergent, using the actual leadership challenges and experiences of participants as source learning material. They also involved contributions from outstanding leaders from industry and public life, who shared their experience of leadership with participants and provided insights of leadership in a range of other organisations. The Leadership project also provided a variety of other activities for the wider staff community, such as ‘bite-size sessions’, an online resource and optional modules. It was thus extremely inclusive and accessible.

One participant commented: "What I learned about motivating and empowering people has helped in projects outside work. My new skills are of benefit to my local community too.”

This initiative won the Times Higher Education Outstanding Contribution to Leadership Development award in 2009.

“York’s programme demonstrates an exemplary case of intensive, inclusive leadership and management development. Examples like yours are an important benchmark to the rest of the HE community that we serve.”

Ewart Wooldridge CBE, Chief Executive, Leadership Foundation for Higher Education

The first cohort of the Strategic Leadership Programme
Towards a sustainable economy and an equal society

As part of the global challenge to adapt to climate change, develop renewable fuels, work towards a fairer society and ensure that there is opportunity for all, York engages in a myriad of projects. Many of them involve partners – the new Centre for Low Carbon Futures is a collaboration with other research universities in Yorkshire, while ‘Adapting to Climate Change’ is a major WUN project.

With ‘Sustainability’ as one of the four themes of its future development, the University of York is committed to benefiting society through work and behaviour that interprets the topic in a wide sense. Financial sustainability and having a fair and inclusive admissions policy for students sit alongside environmental concerns.
Equality research

York’s researchers set out to do no less than reshape British society, improving the quality of life for all of us. Professor Kate Pickett has published a raft of new evidence demonstrating that more equal societies – that is, societies with a smaller gap between rich and poor – perform better on a whole range of health and social indicators, including physical and mental health, education, levels of violent crime, drug abuse, teenage pregnancy, childhood well-being, and social mobility.

Drawing on many years of combined research experience, Professor Pickett has co-authored the book *The Spirit Level: Why equality is better for everyone* with Professor Richard Wilkinson. The book’s detailed comparisons of more and less equal societies reveal a consistent correlation between inequality and other societal problems. Professors Pickett and Wilkinson compared societies with the most inequality – Portugal, U.S. and the U.K. – to those where the gap between rich and poor is smallest – Japan and Sweden. They also compared the more and less equal American states and found exactly the same pattern.

Startlingly, the impact of inequality is not only on the poorest people in society, but affects the better-off as well. For instance, even wealthier people in unequal societies are more likely to suffer from mental illnesses, work long hours, get into debt, and die younger than their counterparts elsewhere. Their conclusion is that to tackle all these problems, governments should focus first on economic inequality.

The impact of Professor Pickett’s work is being felt across the social sciences and beyond. She has been instrumental in launching the Equality Trust, a new organisation, funded by the Joseph Rowntree Charitable Trust, dedicated to campaigning for greater social equality.

Backed by the strength of research evidence gathered at York, the Trust’s ambitious goals are to educate people about inequality, change public opinion and harness political will to bring about a more equal society.

Professor Pickett’s work was shortlisted for Research Project of the Year in the 2009 Times Higher Education awards.

“A big idea, big enough to change political thinking”

*Sunday Times*
Analysis of the atmosphere

Professor Alastair Lewis leads a team researching the chemistry of the atmosphere at sites across the world. They look at the distribution of pollutants and their contribution to climate change. This involves studying trace chemicals which may only have a fleeting existence, and looking at atmospheric compositions containing tens of thousands of separate materials. Their instruments are at the absolute cutting-edge of separation and sensitivity.

Such instruments are large, heavy, power-hungry and require expertise to carry out experiments and interpret the results. Professor Lewis is developing a way to miniaturise his laboratories, containers and aeroplanes full of equipment into a simple, handheld device. This device runs itself, uses no more power than can be provided by rechargeable batteries or a small solar panel, and is able to pick out particular atmospheric components that are crucial to understanding the interactions leading to greenhouse warming.

Integrating this capability into such a small device requires a fundamentally different approach to separation science and data handling, and some engineering inspiration. Working with computer scientists from the National Centre for Atmospheric Science at York, nano-fabricators sponsored by the Technology Strategy Board, and the National Physical Laboratory, the team has just achieved the first results from a device core and are developing a working prototype.

Professor Lewis believes that the same technology could be used beyond atmospheric chemistry. Support for this work is provided by the National Environment Research Council, the Ministry of Defence and the technology transfer team at York.

The potential applications are exciting. Sampling the air from trucks or shipping containers may reveal drugs, explosives, or smuggled illegal immigrants. An accurate profile of the vapours given off from a malt whisky or a fine wine could identify the genuine article from a fake. The presence of a trace impurity in a petrochemical plant might indicate a chemical process running inefficiently.
A long-term influence on social policy

The Social Policy Research Unit (SPRU) at the University of York has helped to develop a huge range of policies to support vulnerable people in society. Over more than 35 years, it has led change in the delivery of services to people experiencing poverty, ageing, disability, chronic illness, family crisis, abuse or neglect.

SPRU carried out research into the financial impact on families of the death of a child with a life-threatening or life-limiting condition. The study revealed that families could face a drop in income of up to 72 per cent when the child died. As a direct result, the Government extended Child Benefit for up to eight weeks after the death of a child.

The Unit has also carried out ground-breaking work on vulnerable groups of children and young people at risk, which has resulted in new knowledge about young runaways and missing young people. This work resulted in the establishment of the first refuge for children in Glasgow, a National Service Framework for runaways and new national guidance from the Department of Health.

SPRU was awarded a 2009 Queen’s Anniversary Prize for Higher and Further Education in recognition of the impact of its work in the social care field.

Since SPRU was established in 1973, its research teams have had a major influence on policy and practice development for disabled or chronically ill children and adults, informal caregivers, income and employment support systems, looked-after children and young runaways.

The Unit has led the way in developing methods that enable disabled and older people and children to participate actively in research. It has achieved a national and international reputation for applied research. SPRU has provided a model for similar research groups in other countries and trained policymakers, practitioners and researchers from the UK and abroad.
New treatments and technologies

Public policy debates revolve around how limited resources can be mobilised to achieve the best outcomes, delivering effective and equitable services. Bridging the gap between the latest research in these areas and policy is a major theme of health and social policy work at York. Work in the Centre for Health Economics (CHE), for example, 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, whilst also helping the NHS to avoid spending money on interventions that are not worthwhile. CHE research into chemotherapies used to treat advanced prostate cancer produced savings of over £1 million 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.

Professor Maria Goddard, CHE’s 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.”
“Giving the Cantor Nanoscience Lecture at the University of York was an immense pleasure. The visionary leadership, high quality science and perceptive audience, not to mention the warm hospitality and the beauty of the city, all added to a unique experience.”

Professor Ahmed Zewail, Nobel Laureate
The University of York makes an enormous impact on the lives of millions of people across the world, through its emphasis on equality and justice, scientific discovery, societal and cultural innovation and an entrepreneurial attitude. We are proud that we have never veered from our founding principles of providing high quality research and teaching across a wide range of academic disciplines.

Most of all, we aim to continue to challenge and change our future by providing an environment in which our staff and students are inspired to question, collaborate and discover.
York alumni live and work all over the world. There are 62,000 alumni in the UK and 12,000 overseas.

Facts and figures – global and local

Total income 2008/09: £226m
3rd highest research income per academic in England (HEFCE)
8th highest for research quality in UK (Guardian)
Total staff 2008/09: 3,243 (20% international)
Total students 2008/09: 13,009 (20% international)
More than half of departments in the top 10 for student satisfaction (NSS 2009)
70th in the THE-QS World University Rankings
2008/09

Events for members of the public

<table>
<thead>
<tr>
<th>Event</th>
<th>Attendance/Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public lectures</td>
<td>6,200</td>
</tr>
<tr>
<td>Concert audience</td>
<td>16,145</td>
</tr>
<tr>
<td>Exhibition visitors</td>
<td>1,200</td>
</tr>
<tr>
<td>Science festivals and school events – pupils and teachers</td>
<td>35,500</td>
</tr>
</tbody>
</table>

Community impact

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student volunteers</td>
<td>1,000</td>
</tr>
<tr>
<td>Individuals on continuing education courses</td>
<td>2,002</td>
</tr>
<tr>
<td>Community partner organisations</td>
<td>31</td>
</tr>
<tr>
<td>Active student volunteering projects</td>
<td>15</td>
</tr>
<tr>
<td>Active student volunteering projects</td>
<td>15</td>
</tr>
<tr>
<td>(the number of volunteers in each project ranges from 3 to 600)</td>
<td></td>
</tr>
</tbody>
</table>

Business services

<table>
<thead>
<tr>
<th>Service</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consultancy contracts with businesses</td>
<td>88</td>
</tr>
<tr>
<td>Consultancy contracts with non-commercial organisations</td>
<td>99</td>
</tr>
<tr>
<td>Number of businesses supplied with facilities and equipment</td>
<td>315</td>
</tr>
<tr>
<td>Number of other organisations supplied with facilities and equipment</td>
<td>48</td>
</tr>
<tr>
<td>People on continuing professional development for businesses</td>
<td>166</td>
</tr>
<tr>
<td>People on continuing professional development for other organisations</td>
<td>2,028</td>
</tr>
</tbody>
</table>

Awards for volunteering

<table>
<thead>
<tr>
<th>Award</th>
<th>Winner/Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guardian Public Service Award 2008 (University of York)</td>
<td>Finalist</td>
</tr>
<tr>
<td>The Press Community Pride Award 2009 (Minds in Motion)</td>
<td>Winner</td>
</tr>
<tr>
<td>Applefields School Sensory Garden Project</td>
<td>Finalist</td>
</tr>
</tbody>
</table>
The University of York

York, Y010 5DD, United Kingdom
www.york.ac.uk

The University of York is a Fairtrade university