Expertise and Application:

Biomedical and Health Research at York
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Introduction

Biomedical and health research at the University of York spans the fundamental to the applied, focusing on a wide range of factors that affect human health and wellbeing. Here, we describe our expertise in this area, and the skills and methods that inform our research, providing advanced capability for working with others. We highlight a number of case studies to give a flavour of our influential research.

At York, our research is not restricted by single disease categories or by traditional disciplinary boundaries. We address real world problems, including multiple morbidities, chronic disease and the complex causes of health conditions. To do this, we draw on a wide range of academic skills and disciplines, working together to discover, refine and apply new treatments and interventions to improve health.

Our success builds on a long tradition of flexible and interdisciplinary working, within and across departments and faculties. Academics working in the Hull York Medical School, for example, are embedded in departments best suited to their disciplinary backgrounds and clinical expertise: Creativity, Culture and Communication, Environmental Sustainability and Resilience, Health and Wellbeing, Justice and Equality, Risk, Evidence and Decision Making, Technologies for the Future.

York’s research environment empowers all researchers to seek advice from any colleague, allowing novel collaborations to flourish. Our research strategy builds on this tradition, with seven cross-cutting Research Themes, all of which can include biomedical and health activity.

Our future research will continue to span the health research pathway, from discovery to application, accelerating novel ways of working that intrinsically link fundamental science with its real world application at every stage.
Acknowledging Our Funders

The breadth of our research is reflected in a rich and diverse set of external partners and funders, including substantial funding from the UK Research Councils, as well as the National Institute for Health Research, government departments and the Wellcome Trust.
Molecular and Cellular Medicine

York's molecular and cellular medical research provides opportunities for the prevention, diagnosis and treatment of disease by revealing underpinning molecular mechanisms.

Researchers use model systems such as human cells, fruit flies, amphibians, rodents and human pathogens to understand the molecular and cellular mechanisms regulating nerve, muscle, skeletal, immune and epithelial tissue function.

York's expertise ranges across cell signalling, membrane trafficking, glycobiology, tissue engineering, cell cycle and differentiation as well as regulation of DNA replication and transcription.

Molecular and cellular medicine focuses on five broad areas of health and disease: cancer, inflammatory and infectious disease, degenerative diseases, hereditary diseases and tissue engineering & regeneration.

CASE STUDY
Developing a treatment for blood cancer

The myeloproliferative neoplasms are a group of blood cancers, characterised by the over-production of red blood cells and/or platelets. Although there are some treatments for these conditions, their use in the clinic is limited by severe side-effects. Research by Dr Ian Hitchcock's group in the Centre for Immunology and Infection has identified a new target which significantly reduces the development of these cancers without any adverse side effects. Novel therapies for these conditions are now being developed in collaboration with colleagues in the USA and Canada.

Reference
Microbiology

York’s research in microbiology encompasses investigation into bacteria, viruses and eukaryotic pathogens and addresses our understanding of DNA replication, metabolism, glycobiology, virulence factors, signalling, membrane trafficking, phage-bacterial and host-pathogen interactions. This fundamental, mechanistic research and applied disease-related activity is complemented by work in environmental microbiology, microbial evolution, industrial biotechnology and synthetic biology. Sophisticated mathematical and physical techniques are also deployed to describe, visualise and understand microbial processes.

In particular, these strengths are being harnessed, in collaboration with colleagues from across a broad range of disciplines, to counter the threat of antimicrobial resistance; recognised as one of today’s global grand challenges. As a result of York’s research, new drug targets, novel anti-microbials and therapies, and new diagnostic tools are under development.

CASE STUDY
Using experimental evolution to understand disease

A long-term observational study by Professor Mike Brockhurst (Biology) on a cohort of cystic fibrosis (CF) patients chronically infected by an epidemic strain of Pseudomonas aeruginosa shows the rapid evolution of genetic diversity within infections, including clinically-relevant traits like drug resistance. These findings have influenced diagnostic procedures in the UK via CF Trust guidance for clinicians.

Using experimental evolution in clinically-relevant infection models, it is now possible to determine the causal links between the drivers of selection and the pathogen’s evolutionary responses. This information will enable strategies to prevent the emergence of antibiotic resistance and improve evolution-informed therapies.

Reference
Biotechnology and Synthetic Biology

Research at York uses microbes and plants as ‘factories’ for the production of high value chemicals, exploiting methods in natural product identification, novel molecular entity design and synthetic biology to generate pharmaceuticals such as bioactive diterpenoids for multidrug resistance and cancer treatment. Activity is focused in the Centre for Novel Agricultural Products (CNAP), within the Department of Biology, with links to the Department of Chemistry for analysis and synthesis of novel products.

While microbes and plants produce a rich array of bioactive natural chemicals that are exploitable for drug and agrichemical development, these compounds are often produced uneconomically and at extremely low abundance. Linking synthetic chemical and biological-based approaches will be essential to progress our discoveries in natural chemicals, materials and processes towards application and impact. York’s primary focus is on the engineering of yeast, microbial and plant-based platforms for synthesis of natural chemicals and biomaterials, coupled with elucidation of the biosynthetic pathways involved.

CASE STUDY
Improving yields of anti-malarials

Malaria still kills around three quarters of a million people every year. The medicinal plant Artemisia annua produces artemisinin, the vital ingredient for anti-malaria drugs called Artemisinin Combination Therapies (ACTs); the mainstay of current global health efforts to tackle malaria.

The CNAP Artemisia Research Project led by Professor Ian Graham produced higher yielding varieties of Artemisia annua to impact on the increasing demand for affordable malaria medicines. Sales into Africa of CNAP F1 hybrid seed have been sufficient to deliver up to 240 million artemisinin combination therapy treatments for malaria sufferers over the last 3 years.

Reference

York’s biochemical research, including structural and chemical biology, has its epicentre in the York Structural Biology Laboratory (YSBL).

Structural biology involves determination of the structures of proteins and their complexes with other proteins, nucleic acids, carbohydrates and ligands. There is great expertise in York in protein chemistry, crystallisation, X-ray diffraction, NMR spectroscopy and software and methods development for tackling challenging structures, such as multi-molecular complexes or membrane proteins. When integrated with exploration of the cell and molecular biology of the targets, this structural work is providing major insights into the molecular mechanisms underlying biological function of key proteins associated with disease and health conditions such as malaria, cancer, inflammation and neurodegeneration.

Chemical biology focuses on the fundamental chemical basis for biological and biochemical processes, the use of small molecules to probe cellular biology and on the exploitation of enzymes in biocatalysis.

CASE STUDY
Increasing the effectiveness of insulin for treating diabetes

Diabetes costs account for 10% of the NHS budget for England and Wales. YSBL research in collaboration with Novo-Nordisk, the Danish multinational pharmaceutical company, led to the development of long-acting insulin. This has been used to treat millions of diabetics worldwide since 1999, who now require only one daily intravenous injection. Novo-Nordisk’s combined sales of the insulin drugs exceeded over $6 billion in 2012. Recent YSBL work, led by Professor Andrzej Brzozowski, has shed long-awaited light on the molecular basis of insulin action, opening avenues for novel, more effective insulin analogues.

Reference
Glycobiology

Carbohydrates play diverse roles in health and disease, mediating egg fertilization in human reproduction, cell invasion by the influenza and human immunodeficiency viruses, compression resistance in joints and the 'glue' in bacterial biofilms on medical devices. Understanding of the nature, function and exploitation of sugar molecules in biomedicine is now a major research focus in York, including: elucidation and exploitation of carbohydrate function in the etiology of disease states such as Alzheimer’s; diagnostic methods for detecting congenital glycosylation disorders; bacterial pathogenesis and heparin-relevant therapeutics. Funding for the first UK-based automated oligosaccharide synthesiser will transform our glycoscience research by breaking down boundaries between traditional synthetic glycochemistry and glycobiology.

Glycobiology

Professor Gideon Davies’ team has revealed the 3-D structure of human heparanase, a sugar-degrading enzyme which has significant potential in anti-cancer treatments. Heparanase is produced in excessive quantities in a cancer situation. The sugar-degrading activity of excess heparanase leads to exaggerated degradation of the sugars in the molecules surrounding cells making it easier for cancer cells to proliferate.

Understanding the structure and function of heparanase will aid the design of new and improved anti-heparanase compounds, which may be of use as anti-cancer therapeutics.

Reference

Since its foundation, the Centre for Immunology and Infection has brought together internationally-recognised scientists to build a leading facility in the fields of immunology, pathogen biology and experimental medicine. The Centre integrates the study of basic and clinical immunology, microbiology and parasitology to develop a greater understanding of the processes underlying infection and the development of disease, and thus to develop new approaches to prevention and treatment.

York’s research in immunology, which underpins our disease-specific interests, is focused on the biology of three critical components of immunity: phagocytes, lymphocytes and stromal cells. Pathogen research includes studies on Gram-negative Enterobacteriaceae, specifically E. coli, Salmonella, and on the single-celled kinetoplastid parasites. York’s research uses genetic, cellular and molecular biology approaches to understand the mechanisms of disease and identify new drug targets. The third research focus, ‘From bench to bedside (and back)’, is centred largely on clinical trials, with phase 1 trials of mucosal vaccines and microbicides against HIV-1 providing a focus for finding safe, effective and easily accessible interventions for women in developing countries. Other genital tract infections investigated in human volunteers include those caused by Chlamydia and Human papilloma virus.

Immunology

CASE STUDY
Developing treatments for leishmaniases

The leishmaniases are parasitic diseases responsible for significant morbidity and mortality, with up to 1.6 million new cases each year across 98 countries. Few drugs are available and vaccines for human use are sorely needed.

An international team led by Professor Paul Kaye has combined discovery research with a pragmatic approach to product development that has allowed progression of a novel adenovirus-based therapeutic vaccine from initial design to Phase I clinical trial in just five years. Funded by the Wellcome Trust, this vaccine will begin evaluation in Sudanese patients with post kala azar dermal leishmaniasis in mid-2016.

Reference
York has a long tradition of research in diverse areas of computation and modelling that impact on medical research, for example, in development of the experimental and computational methods used worldwide by crystallographers. York researchers are investigating complex immune processes through the development, implementation and interpretation of computer simulations, combining the insight of immunologists, engineers, computer scientists, physicists and mathematicians.

This interdisciplinary research employs state-of-the-art wet-lab and imaging techniques in conjunction with computational, mathematical and statistical methods to inform the design of future biological experimentation and to enhance understanding of disease mechanisms while driving the reduction of animal use for research.

Similar integration of lab observations with mathematical modelling is also elucidating our fundamental understanding of biological phenomena such as bacterial biofilm formation, sperm swimming behaviour and viral packaging.

CASE STUDY
Modelling proteins to develop disease treatments

Scientists at the Universities of York and Torino have used advanced mathematical calculations to create a complete picture of the surface morphology of protein nanoparticles.

Professor Reidun Twarock adapted a mathematical tool called ‘tiling theory’ to model protein nanoparticles with a mixture of local five- and three-fold symmetry axes. This understanding allows scientists to select particles with the most advantageous structures for the design of new vaccines. Clinical tests on a malaria vaccine designed in this way are ongoing.

Reference
Diagnostics and Biosensors

York has diverse experience in novel clinical diagnostic technologies that integrate expertise from our physical sciences (Electronics, Physics and Computer Science in particular) with biomedical and clinical applications. The development of learning algorithms to integrate and analyse data from off-the-shelf sensors underpins novel diagnostic and patient-rehabilitation support tools. Another focus is the creation of rapid, label-free and multiplexed biosensor arrays for clinical diagnostics. York researchers develop novel technologies that integrate chemical and biological functionality with semiconductor devices to detect target ligands (antibodies, proteins, nucleic acids and therapeutics) in serum and cell lysates in a highly sensitive and selective manner. Other microscale technologies include Raman spectroscopy which, when enhanced with novel computational protocols, has applications in cancer, regenerative medicine and infectious disease diagnostics. York also has expertise in wireless communications - an underpinning technology for point-of-care diagnostics, while the identification and validation of novel biomarkers for improved cancer diagnosis and prognosis is a particular focus for our biologists.

CASE STUDY

Wireless monitoring of Parkinson’s treatment

Parkinson’s disease affects approximately 120,000 people in the UK alone. The current treatment is the drug levodopa which can cause disabling involuntary movements called dyskinesia when used in the long term.

Electronic engineers at the University of York led by Dr Stephen Smith, have developed novel technology using wireless sensors to accurately monitor patients’ movements over 24 hours. The system is simple, reliable and safe and will save money as measurements can be undertaken in the patient’s home. This and related technologies are being trialled at Leeds General Infirmary and medical centres in Australia, Singapore and the USA.

Reference

Pollution and Health

Strengths in structural, atmospheric and biological chemistry are supported by analytical facilities and expertise within the Centre of Excellence in Mass Spectrometry and the Centre for Magnetic Resonance. The Wolfson Atmospheric Chemistry Laboratories (WACL) has a world-leading reputation for developing and deploying novel analytical techniques for atmospheric detection in the UK and around the globe, with an increasing focus on health related impacts of airborne pollutants.

The Environment Department and Stockholm Environment Institute-York model and monitor the impacts of chemical pollutants (metals, pesticides and emerging contaminants) on soil and water quality at high spatial and temporal resolutions. The Department is working to characterise human exposure to pollutants in the environment and to assess the indirect effects of pollution, e.g. by affecting ecosystem service provisioning or selection of antimicrobial resistant microbes, on human health.

CASE STUDY
Third hand smoke

Dr Jacqui Hamilton and colleagues from WACL have shown that toxic tobacco-specific nitrosamines can be brought into non-smoking households on clothing and in airborne particles from outside the house - so-called third hand smoke. This particularly exposes children to a harmful group of chemicals at concentrations that exceed recommended cancer limits. Hamilton’s team found carcinogenic exposure above guidelines for children aged one to six in three quarters of smokers’ homes – and two thirds of non-smokers’ homes.

Reference
Imaging

Specialist imaging facilities at York are primarily focused on biomedical applications. The York Neuroimaging Centre (YNiC) and the Centre for Hyperpolarisation in Magnetic Resonance (CHyM) provide advanced tools to enable understanding of the biological processes that underpin common diseases and disorders such as cancer or heart disease. Notably, hyperpolarisation in NMR/MRI is a novel technique that was developed at the University of York and whose applications, in providing hugely enhanced sensitivity and resolution, underpin the York-Leeds National Centre for Medical Imaging.

Other facilities include the York-JEOL Nanocentre, where researchers examine magnetic nanoparticles for healthcare applications such as cancer treatment, and the Imaging and Cytometry Laboratories of the Bioscience Technology Facility. At a more fundamental level, biological physics is a key strength with exquisitely sensitive tools under development for investigation of sub-cellular mechanisms involved in DNA replication, membrane transport and the immune system.

CASE STUDY
Using MRI to improve stroke aphasia interventions

Professor Beth Jefferies (Department of Psychology) is using multiple neuroscientific methods, including functional magnetic resonance imaging and brain stimulation, to understand how the brain represents and retrieves the meanings of words, objects and people. Her research focuses on how people can flexibly retrieve aspects of knowledge to suit their circumstances and uses these insights to improve our understanding of the difficulties encountered by patients with stroke aphasia, who frequently have poor comprehension of words and pictures. This may improve the design of suitable interventions in the future.

Reference
Researchers in the Department of Psychology use the latest methods to study the processes that govern some of our fundamental brain functions: vision, hearing and language.

In visual research, diverse methods from behaviour (psychophysical) experiments through to brain imaging and stimulation are used to understand the neural computations that allow us to see. This area of research has profound implications for the treatment of diseases such as macular degeneration.

The audition group investigates the interaction between the hearing system and our perceptual and cognitive experience of the world, informing analyses such as the benefits of cochlear implants. The group sheds light on typical development as well as developmental disorders, by studying the origins of complex skills such as language, mathematical and social interactions.

Researchers also study language and communication, which is central to our understanding of how humans successfully navigate and survive in a broad range of complex social and physical environments, and how we attend to, learn and remember information. This area of research has long-term implications for treatment of disorders such as stroke and dementia.

In addition, novel technologies and data processing methods under development will advance research in non-invasive monitoring of brain processes and quantum mechanics approaches to imaging.

CASE STUDY
Mapping the brain to develop retinal treatments

Professor Tony Morland is using Magnetic Resonance Imaging (MRI) to show the specific roles that different visual areas play in our perception of movement, orientation and shape. Work on patients with eye disease has shown that the visual brain can reorganize when sight loss is present at birth but the capacity to reorganize is likely to be absent when sight is lost in adulthood. These findings are important in the development of new treatments to restore function to the retina.

Reference
Health Data Analysis

At York we develop, refine and apply sophisticated methods of data analysis to inform policy and practice, using a variety of new and existing data sources from a broad range of topics.

Researchers in the Centre for Health Economics and the Department of Health Sciences analyse observational datasets containing detailed information about patients, staff and organisations within and beyond the NHS. These data are used to examine topics including: NHS productivity; the effects of integrating funding across health and social care and the effects and costs of numerous clinical practice and policy interventions. Researchers in the York Trials Unit are experts in efficient trial design and using trials within cohorts to maximise value. This knowledge provides a basis for substantial applied research.

York also hosts two major clinical registers: the Haematological Malignancy Research Network (see case study) and the National Audit of Cardiac Rehabilitation. These collect detailed data on patients’ diagnoses, treatment and outcomes, and their analysis informs and improves clinical practice.

CASE STUDY
Real world data on haematological cancers

Working with NHS colleagues, Professor Eve Roman’s team established the Haematological Malignancy Research Network (www.hmrn.org) to produce real-world, real-time, population-based information on cancer occurrence, treatment and outcomes, informing national and international clinical practice, research and policy decisions such as NICE guidance.

Reference

Evidence Synthesis

The Centre for Reviews and Dissemination (CRD) specialises in evidence synthesis, assembling and analysing data from multiple research studies to generate policy relevant research. CRD has, over the last 20 years, developed underpinning methods and undertaken over 160 high quality, systematic reviews and associated economic evaluations. In addition, the Centre promotes and facilitates the use of research evidence in decision-making, providing research-based information about the effects of health and social care interventions via its databases and finding effective ways to disseminate research findings widely to influence UK and international health care policy and practice.

CASE STUDY
Preventing infections in children with cancer

Good evidence for interventions and diagnostic tests in children is often sparse, and this makes good synthesis of evidence crucial. Researchers in CRD have particular research interests in child health, where increasing the accuracy of diagnosis and preventing and treating complications more effectively are key to improving survival and quality of life. Dr Bob Philips and his team are involved in a series of studies examining the prevention and management of potential life-threatening infections in children with cancer, including the Predicting Infectious Complications of Neutropenic sepsis In Children with Cancer (PICNICC) collaborative. This project synthesises existing research by using individual participant data (IPD) from primary studies, and is developing and testing a new risk prediction model.

Reference
Randomised Trials

Researchers at York apply rigorous and often novel methods to find out ‘what works’, at all levels of health care. The York Trials Unit (YTU) works across disciplines to design and conduct scientifically rigorous, randomised controlled trials (RCTs) of the effectiveness and efficiency of existing or potential health care interventions, and interventions that affect health more broadly. In health care, York researchers have expertise in multidisciplinary methods and their application to different clinical areas, including surgery, orthopaedics and musculoskeletal problems, mental health and health promotion.

Reflecting a strong belief that RCTs are not limited to health care, and that there is immense potential in using these methods across public policy, YTU supports trials in many non-health fields, particularly in education.

CASE STUDY

Should we use surgery to treat shoulder fractures?

There is considerable uncertainty about how best to treat fractures of the proximal humerus. To find out whether or not they should be treated with surgery, a research team at YTU, led by Professor David Torgerson, conducted the Proximal Fracture of the Humerus Evaluation by Randomisation (PROFHER) trial. The study found no significant difference between outcomes of patients who had surgery and who did not, so more conservative treatment options may be appropriate.

Reference

Economic Evaluation

The Centre for Health Economics (CHE) produces clinically and policy relevant research and innovative methods that advance the use of health economics to improve population health. CHE was one of the first university departments of its type and is a leading influence on UK health care, helping to shape the way policy makers, clinicians and the public think about health and health care. Research carried out in CHE is central to decisions concerning where and how increasingly limited healthcare budgets are spent, in the UK and around the world.

York researchers have defined and refined methods of economic evaluation of health technologies, developing many of the methods that underpin the activity of the National Institute for Health and Clinical Excellence (NICE) and similar organisations internationally. Application of these methods includes numerous NICE Technology Assessment Reviews each year by researchers from CHE and the Centre for Reviews and Dissemination (CRD). These processes involve review and synthesis of evidence, and development of decision analytic models to inform NICE decisions about whether the NHS should recommend (and reimburse) new technologies.

CASE STUDY
How much should we pay for new health technologies?

CHE’s economic evaluation team, led by Professor Mark Sculpher, has conducted recent work assessing expected health gains from new technology and the opportunity cost as other NHS activities are displaced. This research has stimulated and informed debate about the ‘right’ cost-per-quality-adjusted life-year (QALY) threshold. Research findings suggested that the NICE threshold may be too high, meaning that introducing new technologies can in some cases do more harm than good.

Reference

Health and Social Care Policy

At the level of national and international policy making, research teams in the Centre for Health Economics (CHE), Centre for Reviews and Dissemination (CRD), Department of Health Sciences and Social Policy Research Unit (SPRU) undertake influential analyses of key issues, and evaluate interventions affecting the organisation, financing, delivery and regulation of health and social care.

CHE’s policy research covers the behaviour and performance of organisations and individuals within the health care system, for example developing and refining methods to measure health care productivity and evaluating the effects of market structures and regulation to help policy makers deliver better performing health care systems. Research in SPRU is developing the evidence base for social care practice and informing policy at local, regional, national and international levels. In CRD and Health Sciences, researchers provide rapid response reviews and analysis to inform and support policy development.

Research at York often spans the boundaries of health and social care, including CHE’s participation in the Economics of Social and Health Care Research Unit, focusing on integration of health and social care funding.

CASE STUDY
Informing and evaluating personal budgets in social care

Individual and personal budgets lie at the heart of government policy for improving choice and control for people needing social care support. Researchers in the Social Policy Research Unit’s Adult Health and Social Care team, now led by Professor Yvonne Birks, conducted a major, multi-method and multi-centre research programme evaluating Individual Budget pilot projects in England, and their impact on family carers. This influential project has informed Department of Health and Department for Work and Pensions policy, and has helped shape the agenda for national and local organisations striving to successfully implement personal budgets, particularly for older people.

Reference
Most factors that affect our health are not determined by health services but arise more broadly. The society and environment that we live in, as well as the lifestyle decisions that we make, affect our individual health and the health of the whole population.

The Public Health and Society group of the Department of Health Sciences investigates the social patterning of health, by socioeconomic position, ethnicity and gender as well as age, focusing on the social and health care factors that affect inequalities in health.

York has expertise in international health, particularly in public health, health inequalities and health economics. Researchers in the Department of Health Sciences are working on interventions to reduce tobacco use in South Asia, and studying adolescent health behaviours in South Africa. York’s global health economics research includes studying the economic consequences of illness, the economic evaluation of public health interventions, and the impact of policy change.

People with severe mental illness frequently have long-term physical health problems, and have much reduced life expectancy compared with other sections of the population. Researchers at York’s Mental Health and Addiction Research Group are developing interventions to address this major health inequality, targeting problems including unhealthy behaviours and also problems in accessing good health care and managing long-term physical health problems.

Public Health

CASE STUDY

Improving children’s health and well-being

Working with the Bradford Institute for Health Research, Professor Kate Pickett and other York researchers are part of the ‘Born in Bradford’ research team. This cohort study of children born between 2007 and 2010 tracks the health and well-being of 13,500 children, from pregnancy, through childhood and into adult life. Research is conducted on parenting, maternal depression, obesity, asthma and allergy, environment and physical activity. Born in Bradford is changing health care in the city, and strengthening links with schools, children’s services and the community.

Reference

The University of York is a respected leader in social science research that recognises and integrates social, cultural, legal and political contexts to understand and address the health challenges of the future.

Social Science researchers from across the University engage in diverse health-related projects such as the impact of global health governance in developing countries, and working with police services to improve their practice and culture in interactions with people with mental health problems. Research in Social Policy explores ageing and cognitive decline at population levels, and work in the Management School focuses on the design and development of health innovation, as well as modelling the NHS as a complex system in order to develop better information and organisational processes. Research in Politics on the role of the state and non-state actors in low-income economies examines how health issues are represented and prioritized.

The Department of Sociology has a long-standing international reputation for research in the field of Science, Technology and Health, with particular expertise in the sociology of health, illness and healthcare. It carries out pioneering sociological and interdisciplinary work on language and communication in healthcare, end of life care, brain injury, gender and health, reproductive health and reproductive justice, transplantation and pharmaceutical innovation, and in the health professions. Research by the Science and Technology Studies Unit (SATSU) on regenerative medicine has shown how and why the clinical adoption of stem cell therapies varies considerably across the healthcare system, work which has informed NHS England, the Department of Health and the All Party Parliamentary Group for Health at Westminster.

CASE STUDY
Integrating health care and building design

Professor Sarah Nettleton and a team of Sociologists from the Universities of York, Kent and Queen's, Belfast are exploring the work of architects in order to understand the challenges associated with designing and developing health and social care buildings and settings.

Using ethnographic case studies of architectural practices and interviews with architects, commissioners, operators, planners and service users, researchers will probe how knowledge about health and social care is engineered into buildings design and to understand the challenges associated with design in the health and social care sector.

Reference
Medical Humanities

Policy makers are increasingly recognising that humanities have a vital role to play in developing successful responses to global health challenges and in understanding the socially and culturally embedded nature of disease. York’s world-leading Faculty of Humanities is advancing our understanding of human health.

In Archaeology, pioneering laboratory-based analyses are not only advancing our understanding of the interaction of disease, diet and environmental change in diverse historical contexts, but are also enabling us to supplement written records by reconstructing the microbial landscapes of the past. York’s literary scholars are analysing the cultural representations of disability and the role of narrative in framing and structuring the experience of impairment and ill health. Philosophers are helping to develop bioethics and the ethics of public health interventions. York’s medical historians examine sickness, healing and the cultures of health in a remarkable range of chronological and geographical contexts, ranging from medieval Europe, to seventeenth-century South East Asia to modern global health policy. Together they document how health and medicine are entwined with their particular social, political, economic and environmental contexts, and offer a wealth of insights into contemporary health problems.

CASE STUDY
Applying global research at a local level

Professor Sanjoy Bhattacharya, Director of the Centre for Global Health Histories, analyses the national implementation of international development projects by drawing on archival resources around the world on the history of smallpox eradication, and the links between this programme and broader health projects in South Asia and wider afield.

This research has collected long term data on the social, political, economic and economic determinants of health and shown their direct relevance for the current provision of immunisation and universal health coverage services. For ‘global’ programmes to work locally, researchers need to be aware of a host of local circumstances, social attitudes and complex administrative structures. Highlighting these intricacies helps to make health research and projects more responsive to conditions on the ground.

Reference

University of York Facilities and Services

The Bioscience Technology Facility

The BioScience Technology Facility in the Department of Biology comprises six state of the art bioscience labs (Imaging and Cytometry, Genomics, Proteomics, Bioinformatics, Protein Production, Molecular Interactions) with nearly £10M invested in modern and constantly updated equipment. The facility is available for external use and supported by a dedicated team of technical staff. The BioScience Technology Facility also includes office, hot-desk and meeting space with video conferencing capability for the use of visiting scientists. Clients include a broad spectrum of bioscience companies incorporating medical research, agriculture and food sectors.

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The Centre of Excellence in Mass Spectrometry

The Centre of Excellence in Mass Spectrometry (CoEMS) is a state-of-the-art facility with the latest in mass spectrometry analytical capability suitable for use by the chemical, food and bioscience industries. The CoEMS is an open access research facility with charging structures and flexible arrangements for use by businesses and other external clients. Fee-for-service access is provided through the Bioscience Technology Facility.

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Histotech

Histotech provides a complete histotechnology service including consultation, experimental planning, sample processing, routine and specialist stains, immunohistochemistry, as well as imaging and reporting. Histotech’s engagement throughout a project will mitigate risk in costly animal or in vitro trials and maximize the results as well as reducing the risk of failure or artefact. Histotech specialises in small scale troubleshooting and optimisation work and can deliver protocols to GLP standards, where scale-up is required.

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The York Health Economics Consortium

The University of York is world-leading in the field of Health Economics and Health Technology Assessment. The York Health Economics Consortium is a wholly owned subsidiary of the University providing consultancy to private and public sector providers of healthcare, including many leading pharmaceutical and medical device companies.

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York Science Park

York Science Park is an exciting environment to create, innovate and grow; offering high specification, fully serviced office and laboratory space with facilities and business support to all types and size of business primarily in the Creative, Digital Media, IT Technology and Bioscience sectors.

Key Contact:
Darrell Hooper, Business Development Manager
01904 435100
darrell.hooper@york.ac.uk
www.yorksciencepark.co.uk

Patient Case Management Information System

PCMIS is an evidence-based Patient Case Management Information System ‘designed by Clinicians for Clinicians’ for the management of high volume mental health caseloads through stepped and collaborative care models for common mental health and related problems. Integrated with patient portal, app and online eReferrals, PCMIS has powerful clinical tools that can identify and alert for clients at risk and not on track in their treatment regime, this integrated technology allows services to improve quality and care. PCMIS is used by over 10,000 health care professionals, including NHS adult services, children’s services, military veterans, student services, research trials, charities and commercial health organisations both in the UK and Australia.

Key Contact:
Byron George
01904 321322
enquiries@pcmis.com
# Working with the University

## Research Partnerships
Stay ahead of the competition by working with University staff and facilities to develop and apply cutting edge research expertise, with the potential to secure joint funding through applications to UK and international bodies.

*business@york.ac.uk*

## Consultancy
The University delivers a wide range of consultancy projects to support organisational development and growth.

*business@york.ac.uk*

## Knowledge Transfer Partnerships
Employ a University graduate and get a grant subsidy to improve your competitiveness, productivity and performance by directly accessing the skills and expertise within the University.

*ktp@york.ac.uk*

## PhD Studentships
Enhance your innovation capability and competitive advantage by funding a PhD student and gain access to the world-class expertise and facilities available at the University.

*pg-admissions@york.ac.uk*

## Short Courses and Professional Development
Professional training courses, including part-time Masters degrees, certificates, diplomas, accredited and non-accredited short courses.

*cpd@york.ac.uk*

## Philanthropy and Sponsorship
High profile opportunities to support world leading teaching and research.

*daro@york.ac.uk*

## Internships and Work Placements
Engage York students throughout the year via a range of flexible undergraduate and postgraduate work placements, internships and projects.

*info@yorkinternships.co.uk*

## Business Innovation Reviews
Allows organisations to critically review new technologies and products under development in University departments.

*business@york.ac.uk*

## Graduate Recruitment
Get the first pick of top quality graduates by participating in regular careers events.

*careers@york.ac.uk*

## York Cares
Work with employers throughout the City to promote employee volunteering.

*careers@york.ac.uk*

## York Award
Help students develop the skills your organisation will need in the future.

*careers@york.ac.uk*

## Student Enterprise and Innovation
Support York student entrepreneurial activities through ‘Apprentice’ and ‘Dragon’s Den’ style activities.

*careers@york.ac.uk*
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Contact us

**Professor Deborah Smith**  
Pro-Vice Chancellor for Research  
Deborah has responsibility for research strategy and policy at the University of York. A biochemist by training, her research background is in infection and immunity.

**Professor Karen Bloor**  
Research Champion for Health and Wellbeing  
Karen leads one of the University of York’s seven research themes, working to drive new opportunities for interdisciplinary collaborative research across the institution.  
Her research background in health economics and health policy, complements York's biomedical strengths.

**Dr Rachel Curwen**  
Research Development Manager  
Rachel works across all departments to nurture capability in health related research, helping academics build collaborations, find new external partners and win funding.  
Rachel is the primary contact for medical research enquiries.

**Dr James Walsh**  
Business Development Manager, Biomedicine  
Jim focuses on exploitation opportunities derived from the University of York's discoveries and know-how, especially in medical and life-sciences research.  
As well as striving to create links with potential development partners and licencees for University-owned IP and materials, he deals with incoming industry requests.

[Contact details for each individual are listed here.]

[University of York logo]  
[Research Development website link]