University of Reading

Health-related Sciences at the University of Reading

The University of Reading (www.reading.ac.uk) has a long history of involvement in health-related research and teaching, including many links with healthcare services and industry.

Chronic diseases are a major and growing societal and financial concern. Moreover, an increasingly ageing population means that there is a greater prevalence of these diseases. Interdisciplinary research programmes at the University investigate many aspects of health including how these conditions such as heart disease, Type 2 diabetes, gastroenteritis and cancers can be prevented by changes in lifestyle, food production and diet.

The University's main research centres relating to Health include:

- The Institute for Cardiovascular and Metabolic Research (ICMR);
- Centre for Integrative Neuroscience and Neurodynamics (CINN);
- Hugh Sinclair Human Nutrition Group.

Health-related research at the University encompasses many disciplines, from neuroscience and psychological disorders to cybernetics, and from biomedical sciences to informatics. These varied research projects are making significant contributions to a wide range of health-related problems.

The University's main Schools for degree programmes related to Health include:

- Chemistry, Food and Nutritional Sciences, and Pharmacy;
- Biological Sciences;
- Psychology and Clinical Language Sciences.

A wide range of undergraduate, postgraduate and CPD programmes provide education and training for both future and current healthcare professionals. A wide range of PhD research study programmes are available in health-related topics across the University on a part-time as well as a full-time basis, working at the University of Reading or "working away".

A summary is given below of the key areas of health-related research and teaching that the University is involved in.

Cardiovascular and Metabolic Health

Research

Cardiovascular and metabolic diseases represent a major public health challenge in the 21st Century. The University of Reading has an international reputation for research in these areas, and has contributed to major advances in these fields over recent years. To build on this, and to increase the scope and impact of the research, a cross-disciplinary approach is taken to tackle these issues, in particular researching the processes of thrombosis, heart failure, heart attacks and strokes.

Institute for Cardiovascular and Metabolic Research (ICMR)

The ICMR is a multidisciplinary centre that brings together scientists from a wide range of research fields to work to understand the development of cardiovascular diseases, and the underlying obesity-related metabolic diseases from which they develop. This is done using a distinctive combination of research approaches and expertise that allows the developing 21st century healthcare crisis to be tackled from a number of innovative directions. In the past, improved treatment of cardiovascular and metabolic disorders has been a key focus of research in this area, with less attention paid to the prevention of disease development. The centre now brings together these approaches, studying both healthy human and disease processes, to be able to combine the prevention of cardiovascular and metabolic disease development with more effective and safer therapies.
For more information: www.reading.ac.uk/icmr
Contact: Professor Jon Gibbins (j.m.gibbins@reading.ac.uk

Teaching

Certificate in Obesity Management

The University of Reading, in conjunction with local clinicians, is in its fourth year of running an inter-professional course to support the challenge of tacking obesity. The course attracts doctors, dietitians, nurses, pharmacists and physical trainers and supports them in understanding all aspects of managing obesity from behavioural change to bariatric surgery. This is a five-day practical course for primary health care professionals in association with the Centre for Inter-Professional Postgraduate Education and Training (CIPPET).

The programme has been developed by local clinicians and is being delivered by local and national experts in the field of obesity management. Development of the course was supported by the Government Office of the South East (GOSE) and the South Central Strategic Health Authority (SCSHA).
For more information: www.reading.ac.uk/icmr/certobesity.aspx
Contact: Dr Angela Alexander (a.m.alexander@reading.ac.uk)

Psychology and Neuroscience

Research

Psychology at Reading has a long-standing reputation for excellence in experimental psychology, perception, learning, memory and skilled performance. In more recent years, research has strengthened in the field of developmental psychology, neuroscience, ageing, virtual reality and multimedia interactions. Clinical Language Sciences at Reading focuses on research and teaching in the area of typical and atypical speech and language acquisition and in acquired speech and language disorders. The emphasis on clinical research is enhanced by links with local NHS facilities and professionals. Enhanced facilities within the School of Psychology and Clinical Language Sciences include new speech and language therapy clinics.
For more information: http://www.reading.ac.uk/pcls/research/pcls-research.aspx
Contact: Dr Laurie Butler (l.t.butler@reading.ac.uk)

Child Development

The Child Development Group studies the development of cognition, perception, and emotion from infancy to adolescence. Much of the work carried out by the group concerns typical development. The research is funded by UK and EU Research Councils, the Department of Health, and charities.

Current research areas include: cognitive development and delay in premature children; early visual development - particularly the ability to co-ordinate the use of both eyes together; language development - especially how first words are learned and how such learning can be supported; word learning in Down Syndrome and Autistic Spectrum Conditions; how to measure intellectual development in young children - and how parents can do this themselves; the development of attachment in early life; bilingualism; specific language impairment; the influence of age on categorisation ability; attitudes to children with Autistic Spectrum Conditions; healthy eating habits in children; the influence of nutrition on cognition in development; and grammar learning. The group holds several National Institute of Health Research grants and works in close collaboration with several local hospitals, most notably the Royal Berkshire Hospital.
For more information: www.reading.ac.uk/pcls/research/child-development.aspx
Contact: Dr Graham Schafer (g.w.schafer@reading.ac.uk)

Winnicott Research Unit

The research of the Unit is focussed on the interplay between environmental and biological factors in the course of child development. The Unit has made particular use of prospective longitudinal research, notably in relation to the development of offspring of mothers with postnatal depression and with anxiety disorders, as well as of those living in conditions of extreme socio-economic adversity. The Unit has also studied the development of children with cleft lip/palate. For each of these populations the Unit has undertaken the development and evaluation of psycho-social interventions, both as a means of elucidating causal processes, and to establish evidence-based interventions for improving child developmental outcome. Much of the Unit's current work takes place within a clinical facility it runs in collaboration with the local NHS Trust, and the Berkshire Child and Adolescent Anxiety and Depression Research Unit (see below). The Unit is supported by many funders, including MRC, ESRC, Wellcome Trust, and the NIHR.
For more information: www.reading.ac.uk/pcls/research/winnicott-unit.aspx
Contact: Professor Peter Cooper (p.j.cooper@reading.ac.uk)

The Berkshire Child and Adolescent Anxiety and Depression Research Unit

The clinical research unit is integrated with Berkshire CAMHS Anxiety and Depression Pathway to offer a county-wide specialist service for the assessment and treatment of childhood problems associated with anxiety and depression among children 0-18 years of age. The joint clinical research facility provides a unique resource for research to improve understanding of, and outcomes for, these common but potentially debilitating conditions of childhood.
For more information: http://www.reading.ac.uk/bcac/bcac-home.aspx
Contact: Dr Cathy Creswell (c.creswell@reading.ac.uk)

Infant Vision Laboratory

Funded by the NIHR and MRC since 1997, the Laboratory is a world leader in research into visual focusing in infants and children. Developmental studies and research into clinical conditions such as squint and refractive error (long & short sight) are helping clinicians both better understand the fundamental causes of common vision problems, as well as leading to changes in how these conditions are treated. Joint NHS - University research and close links with the Orthoptic Department at the Royal Berkshire Hospital and with national and international paediatric ophthalmology communities ensure that the research improves patient care.
For more information visit http://www.reading.ac.uk/pcls/people/a-m-horwood.aspx
Contact: Dr Anna Horwood (a.m.horwood@reading.ac.uk)

Nutrition and Health Research Group

This group aims to inform public policy by addressing questions that are linked to a central theme of improving quality of life and lengthening the healthy lifespan. One theme is whether supplementation of the diet with specific phytochemical rich foods can improve the health and function of the brain and the eyes, indexed by cognitive performance, brain imaging, mood measures, and visual function. This important question is addressed by performing randomised control trials in school age children, young adults, and older adults, as well as animal behaviour studies. A related research theme explores the best ways to persuade toddlers to enjoy eating fruit and vegetables. The third theme represented in the group is disorders of swallowing in adults and the elderly. The research is supported by BBSRC, ESRC, MRC, Knowledge Transfer Programmes and several industrial sponsors.
For more information: http://www.readinsg.ac.uk/pcls/research/nutrition-health.aspx
Contact: Dr David Field (d.t.field@reading.ac.uk)

Berkshire Autism Research Network

The Berkshire Autism Research Network (BARN) constitutes a diverse group of researchers, clinicians, and special educators from within and outside the University of Reading, who are involved in studying and supporting children and adults with Autism Spectrum Conditions.
For more information: www.reading.ac.uk/pcls/research/BARN.aspx
Contact: Dr Bhismadev Chakrabarti (b.chakrabarti@reading.ac.uk)

European Huntington's Disease Network

Two of the European Huntington's Disease Network's working groups are led from the University of Reading. These groups focus on Quality of Life and also Functional Ability in this genetic neurodegenerative condition. Work across this increasingly global network involves clinicians, researchers, patients and their families. Research centres on developing and refining outcome measures for capturing the impact of this disease on everyday function and quality of life in both prodromal and symptomatic patients, as well as working towards behavioural interventions to improve patient care and management.
For more information: http://www.euro-hd.net/html/network/groups/qual, http://www.euro-hd.net/html/network/groups/functional
Contact: Dr Aileen Ho (a.k.ho@reading.ac.uk)

NHS Speech and Language Therapy Clinic

Embedded within the School of Psychology and Clinical Language Sciences, the NHS Speech and Language Therapy Clinic at the University of Reading delivers a full range of assessment and therapy services for developmental and acquired language disorders. The clinic also provides a platform for training and research for undergraduate and post-graduate students. Academic and clinical staff are engaged in a wide range of research aimed at understanding language production and comprehension deficits in children and adults and in translating research results into clinical practice. Topics include Specific Language Impairment, language disorders in William's Syndrome, Down Syndrome and Autistic Spectrum disorders, Alzheimer's and other degenerative brain diseases, Stuttering, Cluttering, Cleft Lip and Palate and disorders of Resonance, Dysphagia, Multilingualism, sentence and word processing and artificial grammar learning.

Clinic staff work closely with other research groups at the University (CINN, Child Development, Autism Network, Centre for Literacy and Multilingualism) and with health care and education providers, hospitals and health authorities in the South. The Clinic also provides placement educator training as a service to clinical placement providers in the area.
For more information: http://www.reading.ac.uk/pcls/cls-about.aspx
Contact: Professor Theo Marinis (t.marinis@reading.ac.uk)

Centre for Integrative Neuroscience and Neurodynamics (CINN)

The Centre for Integrative Neuroscience and Neurodynamics (CINN) occupies a dedicated wing in the Harry Pitt building at the University of Reading and houses a 3T Siemens Trio research-dedicated MRI scanner and high-density EEG laboratory. These facilities are complemented by high resolution stimulus display systems with integrated high-speed eye tracking, MRI compatible EEG, TMS and NIRS systems.

Research at CINN builds upon existing interdisciplinary research into the physiological and psychological mechanisms underpinning complex cognitive behaviours, targeting typical and atypical development and decline in individuals. CINN research involves scientists in Psychology, Pharmacy, Mathematics, Chemistry, Biology, Cybernetics and Clinical Language Sciences. The educational aspect of CINN is underpinned by interdisciplinary MSc and PhD programmes as well as involvement in European student exchange networks. On-site access to a variety of cutting-edge neuroscience technologies, local expertise and links with the FMRIB neuroimaging group in Oxford provide trainees with unprecedented hands-on training in neuroscience research methodology.

In addition to dedicated CINN facilities, contributing departments house state-of-the-art research laboratories, supporting research in developmental, social and clinical psychology, neurophysiology, psychophysiology, speech and language perception and production, visual and auditory perception and motor systems, genomics, post-genomics, structural and computational biology, computational modelling, cellular and molecular neuroscience, and pharmacology. Researchers at CINN also collaborate extensively with NHS clinical units based at the University of Reading that specialise in a range of mental health problems experienced by people over the lifespan, from infancy to older age.
For more information: www.reading.ac.uk/cinn
Contact: Dr Kelly Sloan (k.d.sloan@reading.ac.uk)

Charlie Waller Institute

The Charlie Waller Institute (CWI) is a collaborative initiative established in 2008 between the Charlie Waller Memorial Trust, the University of Reading, and Berkshire Healthcare NHS Foundation Trust. The Institute develops and disseminates evidence-based psychological treatments.

Staff working within the CWI are involved in a range of large randomised controlled trials (RCTs) to evaluate psychological treatments for Obsessive Compulsive Disorder, depression in young people aged 11 to 17 years, and psychosis. Research focuses on mental health difficulties which have a significant impact on well-being and which constitute a significant burden on the health service. Work is carried out with clinical academics and NHS clinics across the country to recruit to the larger trials. Recently in the IMPACT trial, recruitment of over 458 young people with depression was finished. The aim of this trial is to compare the effectiveness of two psychological therapies - cognitive behaviour therapy and short-term psychodynamic psychotherapy - in preventing relapse. Research is also being carried out with young people to try to understand more about how depression develops during adolescence and to develop new and more effective treatments.

Another important research strand is the evaluation of the training programmes offered (see below), with the aim of identifying which forms of training are most effective. The focus is on changes in staff behaviours, improvements in their skills and knowledge and improvements in the quality of health services for patients.
For more information: http://www.reading.ac.uk/charliewaller/cwi-research.aspx
Contact: Professor Shirley Reynolds (s.a.reynolds@reading.ac.uk)

Teaching

Psychology and Clinical Language Sciences
The School offers a range of programmes at undergraduate and postgraduate level, including MSc programmes in Cognitive Neuroscience; Development and Psychopathology; Clinical Aspects of Psychology; Research Methods in Psychology; Speech and Language Therapy; and Language Science.
For more information: www.reading.ac.uk/pcls/
Contact: Dr Laurie Butler (l.t.butler@reading.ac.uk)

Charlie Waller Institute
Research and clinical training is provided for postgraduate and undergraduate students (PhD, MSc, Post Graduate Certificates and Diplomas, MSci and BSc). Where relevant, all training programmes are accredited by the appropriate professional associations.

The CWI has been identified by regional health authorities to provide training for the Department of Health's IAPT (Improving Access to Psychological Therapies) programmes. It is also one of three first wave training providers for the new Children and Young People's strand of IAPT. This includes training for therapists in Cognitive Behaviour Therapy or Parent Training, for clinical supervisors, and for managers and leaders in Child and Adolescent Mental Health services.

In addition, the Institute provides a range of high quality workshops and short flexible courses which are delivered by nationally and internationally recognised clinical academics who are leaders in their field.
For more information: http://www.reading.ac.uk/charliewaller/cwi-home.aspx
Contact: Professor Shirley Reynolds (s.a.reynolds@reading.ac.uk)

Human Nutrition and Food Microbial Sciences

Research

Food Chain and Health
Pharmaceuticals had an enormous impact on the treatment and prevention of disease during the 20th century. However, increasingly, there is recognition that the 21st century health model will comprise both preventative life style and therapeutic entities, with diet playing a central role. Food chain and health research focuses on identifying particular food ingredients that may exert beneficial properties whilst the underpinning research investigates mechanisms of effect.

An effective approach requires the co-ordination of expertise across agriculture, animal and plant sciences, economics, food policy, bioscience, food science and nutrition and consumer choice. The University of Reading's multi-disciplinary science programme has a long-term vision that also aims to generate short- to medium-term benefits.

Hugh Sinclair Nutrition Unit
The Hugh Sinclair Human Nutrition Group has an international reputation for its research into the relationship between diet and the risk of chronic disease such as cardiovascular disease, diabetes, neurodegenerative disease and cancer. The group collaborates with centres of excellence throughout the world and has strong links with food companies.

The HSNG has access to extensive pilot plant facilities which allow the development of foods or functional ingredients, the efficacy of which may be subsequently established through clinical trials in the Clinical Facility (the Human Intervention Study Unit – a fully equipped human intervention suite) and associated mechanistic studies.

The activities of the group may be broadly divided into the following research themes:

- Dietary fat composition and lipoprotein metabolism;
- Macronutrient intake and insulin sensitivity;
- Vascular function and reactivity;
- Dietary flavonoids, cell signalling and cognitive function;
- Nutrigenetics and nutrigenomics;
- Phytochemical composition and oxidative status;
- Nutrition and immune function;
- Nutrition status, cognition and food choice;
- Plant bioactives and cancer;
- Food production and processing, and enhanced food composition;
- Probiotics, prebiotics and health;
- Nutrition support for the critically ill.

For more information: www.reading.ac.uk/nutrition/ntr-home.aspx
Contact: Professor Ian Rowland (i.rowland@reading.ac.uk)

Gut Microbiology Group

There is increasing evidence that the large population of micro-organisms that inhabits the human gastrointestinal tract plays a critical role in metabolism and human health. This is the major focus of gut microbiology research at the University of Reading, with studies into the role of the gut microbiota in acute and chronic gut disease, autism, obesity, and metabolic syndrome using state of the art molecular methods and metabonomic approaches.

A particular focus of the group is dietary manipulation of the microbiota, predominantly with probiotics and novel prebiotics (developed here). The rationale is that certain components of the microbiota are beneficial to health of the host and their fortification then reduces pathogenic traits. Examples of completed research programmes include gut inflammation in the elderly, performance in athletes, and clinical gastroenterology (irritable bowel syndrome, ulcerative colitis, traveller's diarrhoea, peptic ulcers). The fundamental approach and principles used have much broader relevance for nutritional sciences and the research interfaces with the generation and testing of bioactive molecules (e.g. antioxidants, polyunsaturated fatty acids) that have effects systemic to the gut.
Contact: Professor Glenn Gibson (g.r.gibson@reading.ac.uk)

Biomedical Science and Microbiology

Research

Biomedical science is presently at an extremely exciting stage, driven by technological advances that allow experiments to be conducted that would have been unthinkable only a few years ago.

Mammalian Physiology, Health and Disease

Research interests in this area range from protein structure to cell biology and to whole mammal physiology. They include developmental and reproductive biology, endocrinology and bioinformatics and systems biology. This research covers diseases such as cancer, muscle disease, cardiovascular disease and infectious diseases.

Microbiology
Research interests within this theme include the structure and function of viruses and viral proteins and many aspects of bacterial biology including host-pathogen interactions, iron homeostasis and protein secretion. Research covers a wide range of pathogens including bacteria such as *E. coli, Staphylococcus, Streptococcus, Pseudomanas* and *Yersinia pestis* as well as viruses such as retroviruses, hepaciviruses, coronaviruses and tick-borne flaviviruses.

Molecular and Cellular Medicine
This research group brings together biomedical science researchers whose primary aim is to understand the molecular and cellular causes of disease in order to facilitate the development of new therapies. In particular, there is a focus on cardiovascular disease (blood clotting, atheroschlerosis, cardiomyocyte function), skeletal muscle development and muscular dystrophies, ovarian function and fertility, endocrine disruptors, the endocrinology of the 'stress response' and cancer. Group members also engage in bioinformatics, structural biology and systems biology research.
For more information: www.reading.ac.uk/biologicalsciences/research/biosci-biomedicalresearch.aspx
Contact: Professor Simon Andrews (s.c.andrews@reading.ac.uk)

Teaching

Biological Sciences
The School of Biological Sciences offers three BSc programmes specifically in health-related sciences (Biomedical Sciences, Biochemistry, and Microbiology) together with a more general Biological Sciences degree where students can choose to specialise in health related topics. BSc Biomedical Sciences is accredited with the Institute of Biomedical Science (IBMS).

In October 2013 the School will launch a one-year MRes in Biomedical Research designed specifically for individuals who plan to pursue a career in biomedical research.
For more information: www.reading.ac.uk/biologicalsciences/
Contact: Michelle Steers (sbsadmissions@reading.ac.uk)

Pharmaceutical and Chemical Sciences

Research

Pharmacy
The unique capabilities of Pharmacy at Reading allow active pharmaceutical compounds to be synthesised, evaluated for pharmacological activity and then developed into functional dosage forms with specific consideration of patient use and safety. Major research themes with critical mass include regenerative medicine and neurodegenerative disorders with substantial support attracted from Research Councils, major charities, and very strong, funded links with the pharmaceutical industry, including significant funding to commercialise research findings.

Pharmacy has an established track record of translating preclinical research to human clinical trials. Research is carried out in the main areas of Pharmacology, Medicinal Chemistry, Pharmaceutics and Pharmacy Practice, and includes key advances with non-psychoactive cannabis components for the treatment of epilepsy, the development of intelligent biocompatible materials in regenerative medicine, innovative clinical diagnostic devices, medicines safety and polymer therapeutics.

For more information: http://www.reading.ac.uk/pharmacy/research/pharm-research.aspx
Contact: Dr Ben Whalley (b.j.whalley@reading.ac.uk)

Smart Materials and Regenerative Therapies (SMART)

Regenerative medicine is an emerging discipline that holds the promise of revolutionising patient care in the 21st century. The application of polymeric materials to regenerative medicine is critical to its success at many levels. University of Reading scientists are at the forefront of this rapidly evolving field and are well positioned to translate this knowledge to achieve clinical and economic impact specifically in the area of advanced polymer therapeutics.

The University has a strong, active polymer based bio-materials programme, which has recently been brought together under the Smart Materials and Regenerative Therapies (SMART) group. Its overarching goal is to produce scaffolds and transform them from passive mechanical supports to active components of regenerative medicine manufacturing processes and therapies. The intelligent materials will be capable of changing their chemical and material properties under predictable conditions (via endogenous or non-invasive exogenous stimuli), which will both direct cell behaviour (within the body), and monitor the success of implanted structures or modified tissues in a quantitative manner without the need for additional surgery. This approach is currently applied via EPSRC/BBSRC/MRC funding to drug and cell delivery strategies resulting in key publications and patents pertinent to the emerging cell therapy industry.

Current examples of research in this area include:

- Spatiotemporal positioning of stem cells using functionalised peptide amphiphiles;
- Modulation of tissue stiffness to control stem cell differentiation following engraftment;
- Predicting therapeutic cell release from hydrogel encapsulation;
- Smart materials in directing extracellular matrix repair.

Contact: Dr Che Connon (c.j.connon@reading.ac.uk)

Teaching

Pharmacy

The University of Reading provides a 4-year MPharm programme and also provides postgraduate professional training for registered Pharmacists and other healthcare workers in the University's Centre for Inter-Professional Postgraduate Education and Training (CIPPET). One of its objectives is to support the Department of Health in training pharmacists, equipped to perform current and future tasks within rapidly changing pharmaceutical services in the community and in hospitals. To achieve that aim, CIPPET provides a postgraduate certificate and diploma in General Practice Pharmacy as part of the Joint Programmes Board (JPB) initiative, a collaboration between the NHS and other Universities in the South East. CIPPET also provides training for new roles for nurses and pharmacists such as Independent prescribing and runs Continuing Professional Development (CPD) workshops for local health care professionals.
For more information: http://www.reading.ac.uk/pharmacy/
Contact: Professor Helen Osborn (h.m.i.osborn@reading.ac.uk)

Cybernetics

Research

Rehabilitation Engineering

Robotics can be used to help people who are recovering from a stroke or brain injury. Collaborative projects with therapists at the Royal Berkshire Hospital demonstrate how the use

of a robotic arm and virtual reality games can offer entirely new approaches to neurorehabilitation.

Rehabilitation engineering allows people to restore movement with Functional Electrical Simulation (FES). The human body is a complex system that is very difficult to control; new strategies have been developed to integrate and/or to take into account those particular complexities. The direction of research involves patients with severe Spinal Cord Injury who have difficulties in transferring between poses (e.g. moving from a bed to a chair), and likewise for carers of patients with Spinal Cord Injuries who must avoid possible back pain due to incorrect lifting. Research at the University into this investigates the dynamics involved in transferring, along with FES methods to activate muscle groups at the appropriate phase of a sit-to-stand transfer.

Research has also investigated applying FES to the trunk extensor as a new tool to decrease the risk of pressure sores, which at the present time requires substantial NHS resources due to the length of the necessary therapies, often involving hospitalisation. Funded by the Nuffield Foundation and the University of Reading, the research has involved to different degrees collaborators from Brunel University, Oxford Brookes University, the Aspire National Training Centre and the Royal National Orthopaedic Hospital.
For more information:
http://www.reading.ac.uk/research/researchshowcase/neurorehabilitation/res-neurorehabilitation.aspx
Contact: Dr William Holderbaum (w.holderbaum@reading.ac.uk)

Human Machine Interaction

Understanding the human is key to understanding human machine interaction and research is on-going on designing human-machine interaction environments that are intuitive, adaptable and natural. The aim is to develop technologies to support older adults and people with disabilities, and interdisciplinary projects are on-going assessing nutrition and frailty in older adults, and on technologies to support speech and cognitive therapy after brain injury. Technologies are being developed to provide help and support for people in tackling drug and/or alcohol misuse, and the University is a key partner on a UK research initiative on disability and ageing. Interface research also includes haptic interface research where contact can be emulated with virtual environments. One practical consequence of this research is a new method of teaching skills to dental students so they can get a much higher intensity of training than afforded by current teaching methods.
For more information: http://www.reading.ac.uk/sse/research/sse-cybernetics.aspx
Contact: Professor William Harwin (w.s.harwin@reading.ac.uk)

Brain Embodiments Lab

The Brain Embodiments Lab (BEL) promotes a cross level systems approach to investigate brain function. Thus for example, BEL fosters investigations of the role of closed loop in neural information processing at the systems neuroscience level using animat platforms (robotic devices controlled in a closed loop by cultures of neurons grown on multielectrode arrays) and at the whole brain level via EEG-based Brain Computer Interfaces research.

BEL has enabled research in advance neurorehabilitation robotics where we are pursuing how best to deliver tailored robotic rehabilitation to individuals following a stroke, in which therapy can be modulated in a closed loop based on the patient's brain activity. This work complements studies into the mechanisms of inducing plasticity in neural tissues affected by the disease, with the aim of promoting functional recovery. BEL also allows for an integrated approach to

industrially funded research projects investigating, at both levels, the role of novel pharmacological factors.
For more information: http://bel.reading.ac.uk/
Contact: Professor Slawomir Nasuto (s.j.nasuto@reading.ac.uk)

Healthcare support: Infrastructure, Design, Law and Informatics

Research

Healthcare Infrastructure

Healthcare infrastructure research tackles the key challenges that face today's health and care systems. The University helps delivery agencies meet expanding demand while also controlling costs, improving quality and raising productivity.

The Health and Care Infrastructure Research and Innovation Centre

The EPSRC-funded Health and Care Infrastructure Research and Innovation Centre (HaCIRIC) is a four-way collaboration between Imperial College London and the universities of Loughborough, Reading and Salford. It delivers world class research to support better healthcare through better infrastructure. The Centre has a strong interdisciplinary research team with a good track record in influencing practice in the UK and disseminating knowledge internationally. The four issues covered at Reading are:

- Home not hospital: how to embed new systems of remote care (telecare) - across the NHS and social care, to achieve high quality, personalised, cost effective services;
- Safer patients: seeking answers to reducing healthcare associated infection – a project with GOSH and UCLH to design out hospital acquired infection by considering correlation of people movement through ward spaces with time series micro-biological sampling of key contact points (door handles, bed rails, sinks);
- Smarter purchasing: helping to redesign buying methods to embed innovative healthcare, sifting the best from PPPs, PFIs and other models from around the world;
- Better decision-making: developing fresh approaches to complicated decision making - planning buildings and services to get the best from technology, people and infrastructure.

Other healthcare research priorities within the built environment domain in the School of Construction Management and Engineering include ageing research as it relates to the built environment and the introduction of intelligent digital technologies into the domestic setting.
For more information: http://www.reading.ac.uk/CME/research/cme-healthcareinfrastructure.aspx
Contact: Chris Harty (c.f.harty@reading.ac.uk)

Medical Law

Research in medical law focuses on the rights and duties arising within the NHS. The School of Law includes a member of the Department of Health's Medicines Commission, the South Central Priorities Committee (which advises local NHS commissioners) and the Royal Berkshire NHS Foundation Trust hospital Clinical Ethics Committee, an Honorary Consultant to Berkshire West PCT, an advisor to the BMA Working Party on NHS Rationing and the NHS National Prescribing Committee. 'Good practice' guidance on NHS priority setting has been provided for the National Prescribing Centre and the NHS Confederation.
Contact: Professor Christopher Newdick (c.newdick@reading.ac.uk)

Centre for Information Design Research

The Centre for Information Design Research, Department of Typography & Graphic Communication, brings together research and practical expertise in writing, graphic design, interaction design and psychology. Collaborating with domain experts, such as doctors and public health specialists, educationists, lawyers, and meteorologists, the Centre contributes to a growing understanding of the theory of information design and practical solutions that bring benefit to care settings and in public health.

Health-related projects include:

- Collaboration with psychiatrists, geriatricians and pain specialist nurses at Berkshire Healthcare NHS Foundation Trust (BHFT) and Royal Berkshire NHS Foundation Trust (RBFT) to develop a pain scale/questionnaire for use by carers of people with dementia in order to improve communication with hospital staff on hospital admission, and reduce use of anti-psychotics;
- Current work with BHFT and RBFT on tools to support assessment of capacity to make an informed decision in older patients;
- Collaboration with BHFT and Berkshire Primary Care Trust to develop 'Information Prescriptions' for carers and people with dementia on diagnosis of dementia, to support planning for the illness and reduce critical admissions;
- Research with Berkshire West Primary Healthcare Trust on the development of information about their Text-to-Nurse pilot for school children (designated an example of best practice by DoH);
- Collaboration with a consultancy designing drug delivery devices to improve (public) user understanding of the devices (and hence their effectiveness).

For more information: www.reading.ac.uk/cidr/Currentprojects/sim-projects.aspx
Contact: Professor Alison Black (a.black@reading.ac.uk)

Informatics Research Centre

The Informatics Research Centre, Henley Business School, researches business informatics, social informatics, organisational semiotics, business intelligence, business processes and systems and knowledge management. Health informatics combines information systems, computer science and health care. Information provision is critical to understanding how to maximise resources, devices and methods in order to provide outstanding care and at low cost.

Research within this area includes:

- Rushey Green Primary Care Trust Knowledge Transfer Partnerships - integrating healthcare systems, procedures and information;
- Royal Berkshire NHS Foundation Trust Florey Sexual Health Unit - system for integrating laboratory results and diagnostic processes including data mining;
- Digital Hospital - development of integration of information systems towards unified solutions and real-time interactive workstations for improvement in hospital management capabilities;
- Mobile healthcare solutions for pervasive healthcare using cloud computing and mobile devices for elderly and chronic patients – research and development in partnership with Sinldo based in China. Solutions have been adopted by more than 60 major Chinese hospitals.

For more information: www.henley.reading.ac.uk/bisa/Aboutus/irc-about.aspx
Contact: Professor Kecheng Liu (k.liu@henley.ac.uk)

The Informatics Research Centre and Royal Berkshire NHS Foundation Trust have developed a joint research programme and health informatics forum.

Joint Projects include:

- Information architecture for pervasive healthcare - development of the pervasive architecture will be based on information retrieval and sharing and electronic patient records;
- Human factors and patient safety - a range of projects focusing on modelling human factors to improve patient safety;
- Drug error and patient safety - researching process and information optimisation;
- Pain monitoring - examining process and information optimisation and vertical process-systems integration;
- Clinical process optimisation - to improve patient safety;
- Attention mapping and health clinician training - improving patient safety by attention mapping;
- Home telecare - adoption of social preferences to improve telecare acceptance;
- ICU data mining;
- Service Science applications in healthcare;
- Health data visualisation for personalised chronic disease management;
- Personalised management of chronic diseases and continuing care;
- Hospital systems integration for seamless care processes.

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27 March 2013