

LIVERPOOL MARSHALL SCHOLARSHIPS

Further Information Provided by the University of Liverpool

Infection and Host defence

Study of Infectious Disease is a major cross-cutting theme of the University of Liverpool, involving researchers from the Faculty of Health and Life Sciences, including the affiliated Liverpool School of Tropical Medicine (LSTM). Liverpool is the UK Department of Health national Biomedical Research Centre in Microbial Disease, a partnership between the Royal Liverpool University Hospital Trust, the University of Liverpool and the LSTM. The University is the lead organisation of the National Zoonosis Research Centre, located at the University Veterinary Field Station at Leahurst. The University is in partnership with the Centers for Disease Control, Atlanta for both research and exploitation of intellectual property and is the only UK site with such a collaborative arrangement. The University has expertise in the molecular biology, population dynamics and epidemiology of a large array of bacterial (including Shigatoxigenic *E. coli* and their bacteriophages, *Staphylococcus aureus* (MRSA) and *Mycobacterium tuberculosis*), protozoal and viral (including HIV, Japanese Encephalitis Virus) pathogens. A major research focus of the University is to understand how pathogenic organisms evolve and affect human and animal medicine. Current projects include work on host-pathogen dynamics, food-borne pathogens and antibiotic resistance, rodent-borne viral zoonoses, life history trade offs in parasites, gastro-intestinal infections, latent and persistent viral infections, infections in intensive care, perinatal infections, genital tract infection, antibiotic resistance and meningococcal disease. In the 2008 RAE Liverpool was ranked joint fourth in the UK for 4* research for Infection and Immunology and 65% of its research was judged as 4* and 3*. The University has a strong research base in infectious disease and has established a £20 million Biomedical Research Centre in Microbial Diseases in collaboration with the Royal Liverpool University Hospital and the Liverpool School of Tropical Medicine.

Materials and Nanoscience

The University has significant research activity in materials discovery and functional materials utilising expertise in the Departments of Chemistry and Engineering. This is largely at the experimental or practical level, but includes world-leading theoretical studies on molecular behaviour at surfaces. The University Chemistry Department was ranked joint seventh in the UK for 4* research in Chemistry in RAE 2008 and has benefited from a £17 million investment, to become the leading centre within the UK for novel materials discovery aiming to develop new complex materials for use in communications, medicine, energy storage and nanotechnology. The £8.2 M Centre for Materials Discovery (CMD) also in Chemistry is championing the use of novel High Throughput technologies across multiple industrial sectors to discover innovative materials for high-value applications in the Chemical, Electronics, Automotive, Food, Aerospace, Health and Personal Care industries. In Engineering there is leading research activity in impact response and structural integrity of materials and structures, novel metal foams for use in lightweight construction, smart materials and structures, blast and impact response of composite and metal structures, together with biocompatibility of alloys for medical implants.

Climate Change

Investigations on the affects of global climate change constitute a major area of interdisciplinary research in the University, spanning all three faculties. These range from analysis of global scale physical processes, investigation of climate change in ancient sedimentary basins through geological history, the effects of soil erosion, biological affects such as the spread of infectious diseases and on aquatic and terrestrial ecology, through to studies of socio-political and geographical effects. Much of our work on climate change is performed in collaboration with the Proudman Oceanographic Laboratory (POL) run by the UK Natural Environment Research Council which lies on the Liverpool campus and is affiliated with the University. There are numerous collaborations between University departments such as Earth and Ocean Sciences, Mathematics and Engineering with POL on research into global scale events as they affect the oceans, including changes in mean sea level, often involving joint supervision of research students. Work by POL on ocean and tidal changes provides major contributions to the work of the Intergovernmental Panel on Climate Change (IPCC). Earth and Ocean Sciences was ranked joint ninth for 4* research in the 2008 RAE, with 75% of its research ranked 4* and 3*.

18th Century World

The University has great expertise in various aspects of the 18th century, particularly where it impinges on, migration, trade, slavery, colonialism and the development of Atlanticism. Central to this research activity is

the 18th Century World Centre. The Centre is an interdisciplinary initiative involving some three dozen scholars (from the University departments of English, Geography, History, Modern Languages, Music, Philosophy and the School of Archaeology) and the National Museums Liverpool Curators including staff from the Lady Lever Gallery and the Walker Art Gallery.

Its objective is to promote study and research in the political, social, economic, intellectual, and cultural life of the global eighteenth century across disciplines and departments at the University of Liverpool. The Centre was formally launched on 1 May 2007 with Prof John Brewer (CalTech) giving the inaugurating lecture. Amongst its activities, the Centre will run an interdisciplinary MA in C18th-Studies and develop international partnerships. The extensive archives and libraries, museums and galleries, and the built environment of Liverpool support a very wide range of research in the global 'long' eighteenth century. This work has gained a high profile following Liverpool's year as European Capital of Culture in 2008. The University was ranked joint fourth in the UK for 4* research in History in RAE 2008.

Accelerator Science

The University is a leading centre for both Experimental and Theoretical Particle Physics and is engaged in major international collaborations, notably with the Stanford Linear Accelerator, Fermilab and Berkeley in the USA, CERN in Geneva, Switzerland and DESY in Hamburg, Germany. Our Particle Physics group is integral to many of the most exciting large science projects in the World such as the Large Hadron Collider (LHC), BaBar and the 4th Generation Light Source (4GLS). The University leads the Cockcroft Institute which is the flagship centre for Accelerator Science in the UK and is located in the nearby Daresbury Laboratories. The inaugural Director, Professor Swapan Chattopadhyay has recently joined the Cockcroft Institute and the University of Liverpool from the Thomas Jefferson National Accelerator Facility in Virginia.

Personalised Medicines/Pharmacogenomics

The University hosts the UK Department of Health Chair in Pharmacogenomics, using studies of variation in the human genome to understand the mechanisms leading to adverse drug reactions in a minority of patients. Pharmacologists in the School of Biomedical Sciences are leading in understanding and defining the mechanisms underlying adverse drug reactions in order to predict and manage patients likely to develop a serious reaction. They are at the forefront of developing the science of drug safety management (pharmacovigilance) which aims to promote the safe use of medicines. The University of Liverpool with the Royal Liverpool Children's NHS Trust (Alder Hey) also leads a £20 million UK Department of Health programme to develop medicines specifically for safe use in children.