

## 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 Faculties of Medicine (including the affiliated Liverpool School of Tropical Medicine (LSTM)), Science and Veterinary Science. 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.

#### 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 is 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 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 the Faculties of Science, Veterinary Science, Medicine, Engineering and Social and Environmental Sciences. These range from analysis of global scale physical processes, 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).

#### 18<sup>th</sup> Century World

The University has great expertise in various aspects of the 18<sup>th</sup> century, particularly where it impinges on, migration, trade, slavery, colonialism and the development of Atlanticism. Central to this research activity is the 18<sup>th</sup> 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. Moreover, this work will have high profile following the adoption of Liverpool as European Capital of Culture in 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 4<sup>th</sup> 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.