**University of Southampton**

<http://www.southampton.ac.uk>

**Faculty of Natural and Environmental Sciences (FNES)**

**Biological Sciences**

[**http://www.southampton.ac.uk/biosci**](http://www.southampton.ac.uk/biosci)

**FURTHER PARTICULARS**

The University of Southampton is one of the UK’s leading Russell Group research-intensive universities and is consistently among the top 100 universities in the world. In the recent REF2014, which assessed the research output of UK universities, we were ranked 11th and for Biological Sciences over 80% of our submission was judged at a world leading or internationally excellent standard.

We also deliver an excellent educational experience, in addition to world-leading research, and we are known for successfully commercialising that research through enterprise. We aspire to enhance our reputation and standing even more. Our strategic priorities for the next five years are the transformation of our educational provision by broadening the curriculum, improved research performance, leadership in enterprise and innovation, and a positive social impact. As part of this ambition, we are looking for a new academic staff member who can develop the research and educational activities of Biological Sciences to establish its key role within the Faculty of Natural and Environmental Sciences, the Institute for Life Sciences and the University as a whole.

The University has strengthened Biosciences and Life Sciences research with the completion, in 2010, of a new £50m Life Sciences Building in the centre of the University’s Highfield campus (<http://www.southampton.ac.uk/estatedevelopment/projects/LSB.html>). A further £12m has been invested in the refurbishment of Biomedical Research Facilities and laboratories at the Southampton General Hospital (SGH) campus. This represents a major component of the **Institute for Life Sciences** (IfLS), which helps integrate cross-disciplinary Life Sciences research across the University. **Biological Sciences** is at the core of interdisciplinary initiatives in the Life Sciences and has a vital role in contributing to the achievement of Southampton’s ambitious plans for the future.

**Biological Sciences** (<http://www.southampton.ac.uk/biosci>) is within the Faculty of Natural and Environmental Sciences, together with Chemistry and Ocean & Earth Science. The School is responsible for the research and education programmes within Biological Sciences and comprises a core group of 65 academic staff. Within the Faculty, initiatives are being encouraged at the interface of Chemistry with Biological Sciences and research in aquatic organisms in concert with the National Oceanography Centre in Southampton. Most staff (about 85%) are based in Building 85 (Life Sciences Building) at the heart of the Highfield campus, which is the main University site. Most other staff are based at Southampton General Hospital. Finally, we have a small number of staff at the Waterfront campus, which is the home of Ocean and Earth Science and the National Oceanography Centre.

The primary responsibilities and person specification for this post are outlined in the Job Description (HR5) linked from the on-line advertisement (<https://www.jobs.soton.ac.uk/Vacancies.aspx>).

**Research Themes for Biological Sciences**

Our research has three major themes: **Molecular and Cellular Biosciences, Biomedical Sciences and** **Environmental Biosciences**. Each of these main themes contains at least two specialist areas, with many members of academic staff spanning different themes and being affiliated to more specialist research interest groups within Biological Sciences or across the University via inter-disciplinary University Strategic Research Groups (USRG’s). (See <http://www.southampton.ac.uk/interdisciplinary/usrgs/index.page>).

**Molecular and Cellular Biosciences**

Our research in this area seeks to understand the molecular and cellular mechanisms that underpin basic biological processes. We collaborate closely with researchers across the University and with investigators around the world. For example, we work with physical scientists and engineers to investigate biomolecules as substrates for the production of novel materials and our joint projects with staff in Medicine aim to understand the origins of disease.

### *Control of gene expression*

The appropriate control of gene expression is critical for normal cell function: defects in such control mechanisms lead to a range of human diseases such as cancer, cardiovascular disease or inflammation. Our particular interests include intracellular signalling pathways, especially those involved in the post-transcriptional control of gene expression and in the regulation of RNA translation and stability by RNA-binding proteins and by microRNAs. Complementary expertise in DNA/ligand interactions and nucleic acid modification further strengthens this area.

### *Molecular structure and function*

Southampton has a strong tradition and reputation for structural studies. We currently use a range of structural and molecular techniques to investigate the properties of proteins and nucleic acids. We are able to study macromolecular structure at atomic resolution, while biophysical and chemical studies probe functional properties. Current research ranges from structural proteins to enzymes and includes membrane proteins such as channels, receptors and transporters and those involved in cell-cell recognition. We are also interested in the sequence specific recognition of DNA by small molecules and oligonucleotides as potential anticancer and antiviral agents and as tools in molecular biology and diagnostics.

*Southampton Proteome Centre*

The study of protein interaction networks, using both proteomic and bioinformatic technologies, underpins key elements of our Molecular Bioscience research.

**Biomedical Sciences**

*Developmental Cell Biology*

The focus of our research is developmental biology and its influence on adult health and disease, using mammalian, and especially mouse or rat, model systems. The main areas of research are: early oocyte and embryo development, epithelial differentiation, mouse transgenics and embryonic stem cell biology, extracellular matrix, epigenetics, transcription factor activity, inter- and intra-cellular signalling, pattern formation, and processes associated with developmental programming. Much of our work associates basic mechanisms with applications in clinical medicine and the causes and consequences of various human diseases. Close research links are maintained with the Faculty of Medicine.

*Neuroscience*

Inter-disciplinary research in this rapidly expanding, vital and exciting area is coordinated through the Southampton Neuroscience Group (SoNG) that includes both basic and clinical scientists. The commonality of the molecular and cellular mechanisms of nervous system function across the phyla has become ever more evident, and neuroscience projects in Biological Sciences investigate the properties of excitable cells and tissues from nematodes, insects and mammals. Research on each of these organisms is directed towards understanding nervous system function in health and disease, and utilises information from the genome and proteome mapping of key species such as C.elegans, Drosophila and mouse and human. The central themes of neuroscience research in Biological Sciences are in the areas of neurodegeneration, neuroinflammation, synaptic function and plasticity and neuronal modelling from basic science to drug discovery. This work is helping to increase our understanding of chronic disease states such as Alzheimer’s disease, Huntington’s disease, multiple Sclerosis and macular degeneration as well as acute neurodegeneration due to ischemia and trauma linking into the Faculty of Medicine.

**Environmental Biosciences**

### *Plant and Microbial Sciences*

Plant Biology is a thriving area of research at Southampton with an overall emphasis on the use of genetic and molecular techniques to answer fundamental and applied questions relating to plant function and development, and the responses of plants to abiotic and biotic stress in the context of a changing environment. The approaches used involve functional genomics supported by biochemical, molecular, physiological and eco-physiological analysis of plant tissues. Our key areas of research are: membrane transport proteins involved in the acquisition and distribution of nutrients; light regulation of plant development; chloroplast biology; the functioning of plants in relation to the environment, in particular to changes in light, CO2, heavy metals and ozone; trees as sources of renewable, carbon neutral energy; plant cell wall biosynthesis.

Using microbial systems, our research is focused on how microbial pathogens adapt and survive in various environments and how this contributes to their transmission and disease potential. Main areas of research are: detection and inactivation of prion proteins associated with neurodegenerative disease, microbial growth on surfaces, particularly in high species diversity biofilms, the molecular characterisation of novel signal transduction systems.

*Ecology and Evolution*

We are investigating fundamental ecological processes within the general theme ‘Adaptation in a Changing Environment’. We address questions about the creation, persistence and management of biodiversity at the levels of genes, species, communities and ecosystems and how ecological and environmental processes interact with each other. In addition to developing general ecological principles, we apply our expertise to solving topical environmental issues that are concerns for our society. Our base in ecology and environmental biology gives us the capacity to address key applied issues currently identified by the Research Councils (for example, NERC: Farmland use and GMOs; BBSRC: farmland biodiversity) while at the same time ensuring that we have the conceptual framework to tackle the key issues of tomorrow. The group publishes fundamental and applied ecology and environmental biology in world-class journals.

Current research areas are: individual behaviour and eco-physiology; population growth and persistence; effects of metapopulation structure on genetic diversity and population persistence; ecology and evolution of immunity to parasitism and disease; species coexistence and local diversity; global patterns of species diversity; phylogenetic patterns of species diversification; plant-insect and tritrophic interactions; plant responses to climate change, the light environment and nutrient deficiencies.

### Undergraduate Teaching in Biological Sciences

<http://www.southampton.ac.uk/biosci/undergraduate/index.page>

Biological Sciences is responsible for delivering undergraduate education across a wide range of disciplines from biochemistry to the environment. We presently offer six successful single honours BSc degree programmes in Biochemistry, Biomedical Science, Pharmacology, Biology, Ecology, and Zoology with an annual intake of approximately 290 students. We also offer a range of integrated 4-year Masters Programmes, including a Neurosciences degree, an Advanced Biological Sciences MRes, and a separate MRes in Wildlife Conservation with Marwell Wildlife. Teaching methods cover a variety of formats including lectures, tutorials, e-learning, practical classes in the laboratory and field, and final-year research projects (both traditional laboratory and field projects, as well as projects focused on business, communication, and education). All academic staff are expected to participate fully in the delivery of undergraduate education at all levels.

### The Graduate School

<http://www.southampton.ac.uk/biosci/postgraduate/index.page>

The Centre has around 100 MPhil/PhD research students. A spectrum of topic-specific training is offered to our postgraduate students by the Graduate School. At the University level, there are 1900 research students who, through the Researcher Development and Graduate Centre, receive a programme of generic skills and development training.

## The Institute for Life Sciences

The establishment of the IfLS is based on the conviction that major discoveries in the biosciences will come from the interfaces of diverse scientific, engineering and medical disciplines. The Life Sciences building on the Highfield Campus provides a purpose-built hub for the IfLS and home for most staff in Biological Sciences. The remainder are located within the newly refurbished laboratories and Biomedical Research Facility at SGH. Collectively, these developments allow significant interaction for Biological Sciences staff across disciplines. The Life Sciences building (Building 85, Highfield Campus) brings together scientists, clinicians and engineers, who have a common interest in biological research and education whilst our location of biomedical staff at the Hospital campus enables strong collaboration with staff in Medicine and use of *in vivo* research models to tackle health and disease.

**Facilities**

The University has superb high-performance computing facilities.

Within Biological Sciences, we have a wealth of modern facilities. We are well- equipped for structural (X-ray Crystallography, including the EPSRC National Facility, and NMR, both jointly with the adjacent School of Chemistry) and biophysical studies of proteins and nucleic acids and have a superb Proteomics facility with a range of mass spectrometers. The Bioimaging Facility provides access to, and experimental support for, microscopy including confocal and multiphoton instruments and Fluorescence Correlation Spectroscopy techniques.

There is also a quarantine-level Insectary (for many licensed invertebrates), a suite of controlled environment rooms (some licensed for invasive organisms) and computer-controlled glasshouses. The latter were secured by members of Biological Sciences as part of a large philanthropic gift to the University to carry out research into food security. The ability to work on GM and licensed organisms in ultra-modern facilities allows many new research opportunities.

At our laboratories at Southampton General Hospital (SGH), we have mouse embryo laboratories, an embryonic stem cell laboratory and associated molecular, biochemical and cellular laboratories, plus facilities for epigenetics research. Within Biological Sciences on the Highfield Campus we also have an animal holding facility to allow for up to 5-day holding of mice. There are also excellent electron microscope, bio-imaging and histology facilities at SGH.

**Equal opportunities**

The University of Southampton is an equal opportunities employer and holds an Athena Swan Silver Award demonstrating its commitment to providing equality of opportunity and advancing the representation of women in STEM/M subjects: science, technology, engineering, mathematics and medicine. Biological Sciences holds a Silver Athena SWAN Award.

Benefits of joining the University include on-campus sports, arts and culture facilities, a full programme of events, flexible working policies, childcare vouchers, an Early Years Centre and a range of staff discounts and offers.

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