

Institute  
for Life Sciences

UNIVERSITY OF  
Southampton

Institute for Life Sciences  
Annual Report

# In this report



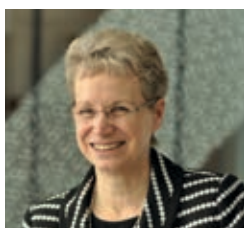
At three years old the Institute is now firmly embedded as a cornerstone of the University's interdisciplinary strategy. Through our members and the networks of connectivity we have engaged across all the faculties and together we bring a wealth of talent to topical life science

problems. This year has seen marvellous examples of this growing out of mathematical approaches to problem solving, device design for fluid analysis, and advances in non-conventional imaging. We are at the forefront of infectious disease research, global change and drive our perception of the world through web sciences and advanced analytics. Our community is delivering high-impact research that targets the toughest challenges of the world today and informs our world class education. Through our research networks, we are attracting world-leading academics to join our community, and be part of the University of Southampton's Life Sciences activity. The portfolio is a rich one, both in terms of problems addressed and the skill sets available to us through the University's centres of excellence.

Recognising the enthusiastic participation of our members we have restructured our priorities. We will now focus on research around **four grand challenges:** *New Pathways to Health, Life Technologies, Global Change: Systems and Cycles, and Human Nexus*. We will also be using these broad areas to inform our education and enterprise efforts.

## Professor Peter J.S. Smith

Director, Institute for Life Sciences

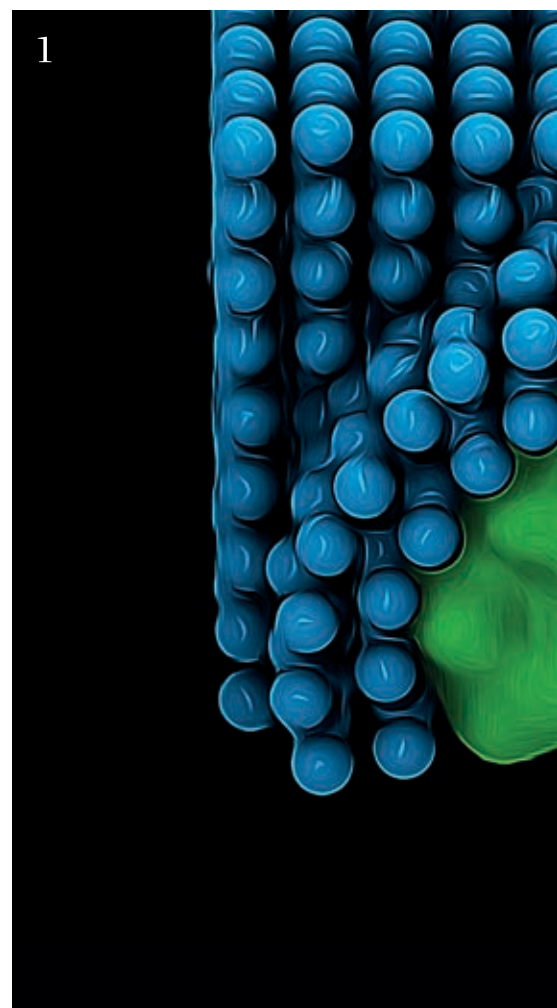
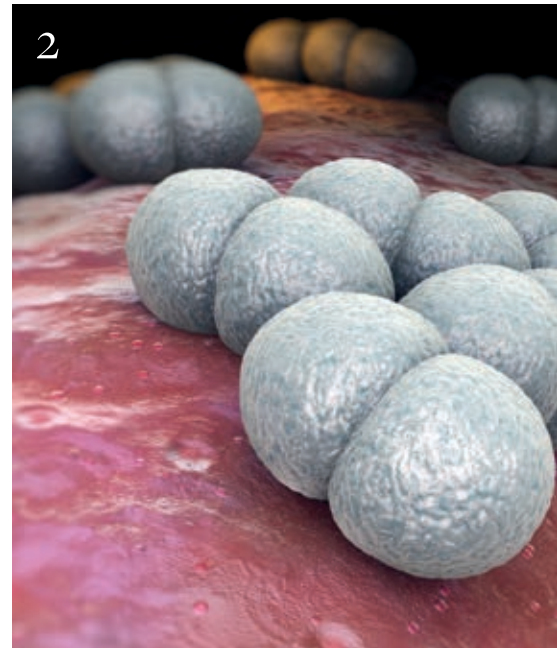


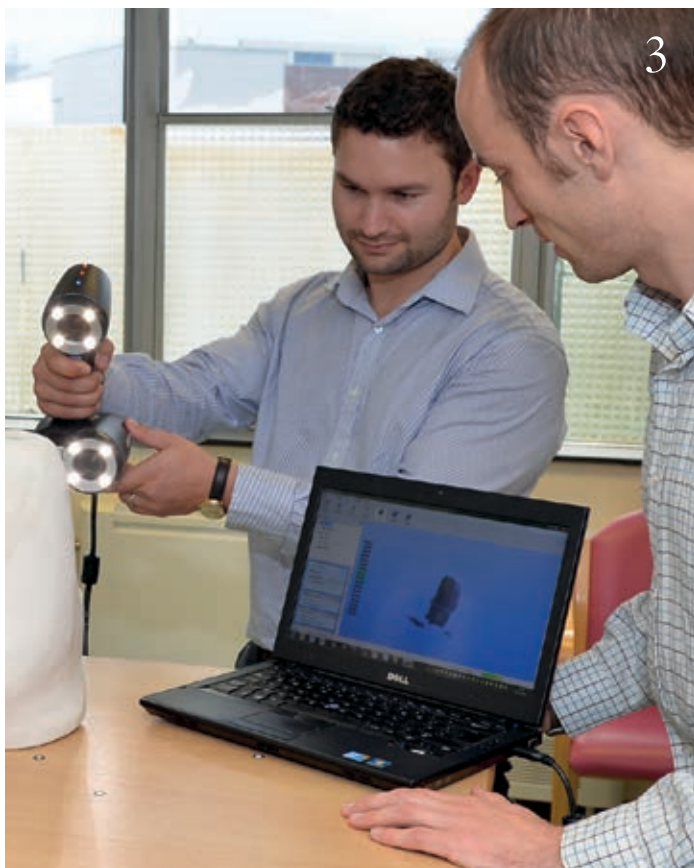
“The Institute for Life Sciences is playing a pivotal role in energising and capitalising upon the University's significant interdisciplinary strengths in the Life Sciences. As it has begun to mature, its impact in terms of the networks of researchers formed and in the research income

leveraged is impressive. I am sure that the Institute's continued attention to understanding, and capitalising upon, Southampton's distinctive strengths in the major grand challenge areas supported by the Life Sciences from cancer to the carbon flux and rehabilitation to quantitative biology will have significant impact.”

## Professor Judith Petts

Pro Vice-Chancellor (Research and Enterprise)





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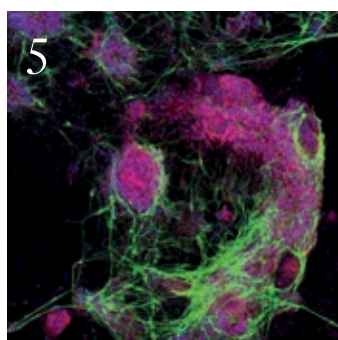
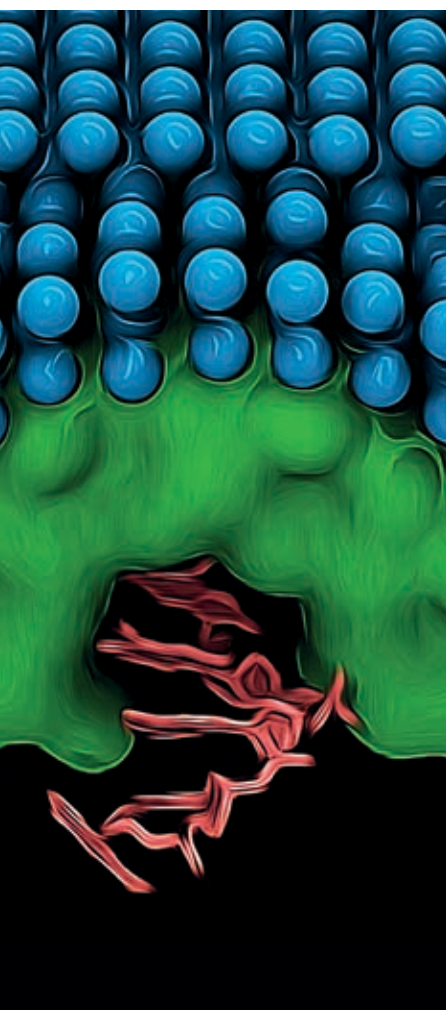
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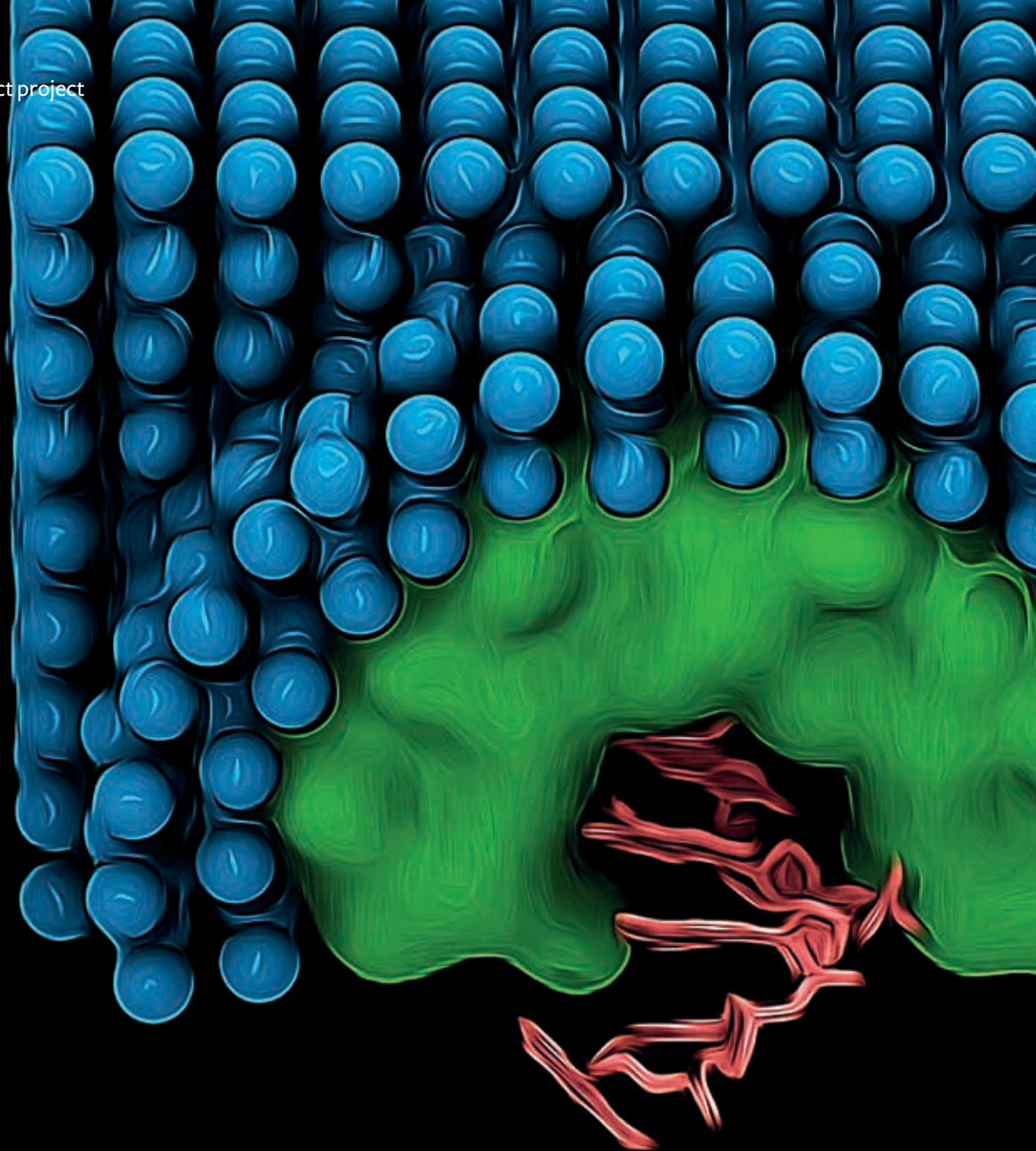
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## Focusing in on Nucleic Acids (FioNA)

Southampton is a world-leader in the research of nucleic acids, the molecules that lie at the heart of our living systems, define who we are, and impact our health and our futures.

From developing pioneering biosensors and biodevices to exploration into epigenetics and genomics, Southampton is leading the way in research both nationally and internationally.

Now Southampton's Institute for Life Sciences (IfLS) has created Focusing in on Nucleic Acids (FioNA). A community which has drawn together these areas of excellence and expertise

from across the University will generate a new network of academics who are working together to deliver high quality research.

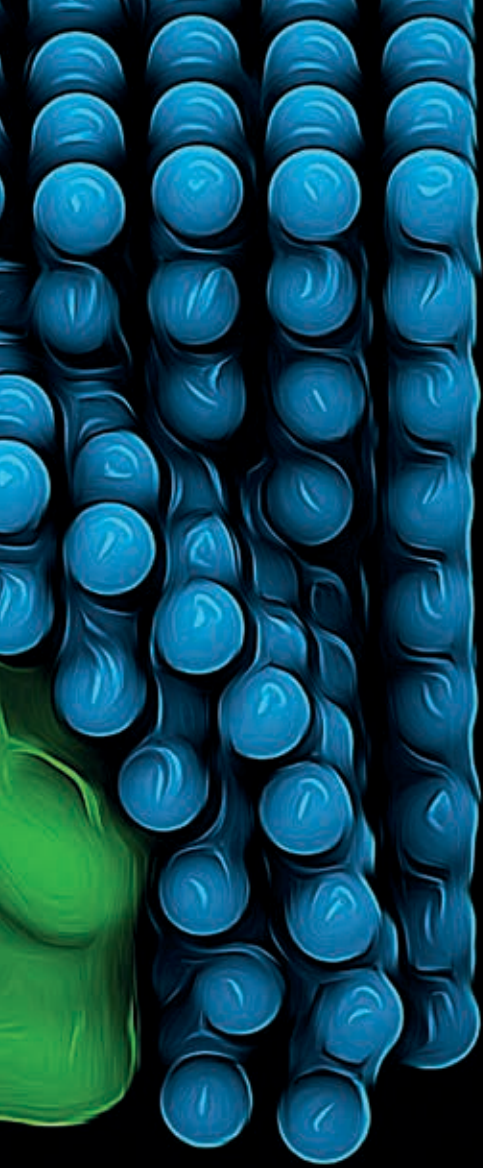
FioNA has been identified as a Biotechnology and Biological Sciences Research Council (BBSRC) funded focus that is part of the Excellence with Impact programme.

### **Aims and objectives**

FioNA's mission is to provide a framework to coordinate and enhance all aspects of nucleic acid research conducted at the University – a diversity spanning the individual molecule ensnared in devices for sequence reading

or manipulation, to probing the secrets of human development and soft evolution. Although seemingly disparate these areas closely relate in the molecular biology and underpinning chemistry of these essential molecules. Our lives, survival and developmental capacity depend on their flexibility, encoding and expression.

The simplistic view that sequences buried in the genome would answer so many of our questions about health and variation was laid to rest a long time ago. In an era where the blueprint is understood to be subject to such diverse transcriptional



“We aim to capture and enhance the excellence and expertise Southampton has in this field, as well as foster new collaborations across the University and within the wider community by focusing on key areas of policy, enterprise and outreach.”

Professor Peter J.S. Smith, Director IfLS

Snapshot from an MD simulation showing a single stranded DNA molecule (pink) embedded within a nanopore (green) in a membrane mimetic bilayer (blue).  
Guy et al, Biophys J, 2012

control, post-translational modifications and non-protein interactions it will be through interdisciplinary perspectives ranging from basic mechanisms to children’s health that we will continue to reveal the true wonder of what this apparently simple coding mechanism has achieved throughout evolutionary history.

The study of nucleic acids is important to our prosperity and growth and provides vast opportunities in research, education and enterprise. The FioNA project seeks to make its own contribution to this stellar challenge by aiming to:

- Coordinate University research activities in this area.
- Develop regional activity collaborations.
- Support the development of research driven education at University and regional level.
- Identify resources for shared use between academics and enterprise.
- Add the FioNA initiative to the IfLS agenda of providing leadership within our grand challenges.

Director of the IfLS Professor Peter J.S. Smith said: “We aim to capture and enhance the excellence and expertise Southampton has in this field, as well as foster new collaborations across the University and within the wider community by focusing on key areas of policy, enterprise and outreach.” ▶

“We feel it is imperative that we share our research with the wider community, both inside and outside the University. It is vital that we engage the community with the importance of nucleic acids research, as well as inspire the next generation of researchers to carry on the pioneering work that FioNA is doing.”

Sarah Ennis, Professor of Genomics

Image 1 & 2: A single strand of DNA is shown threaded through a nanopore (purple). The complex will be embedded in a membrane mimetic environment, which in turn is surrounded by water and ions before molecular dynamics simulations are performed. (Guy, Piggot & Khalid, *Biophys J*, 2012)

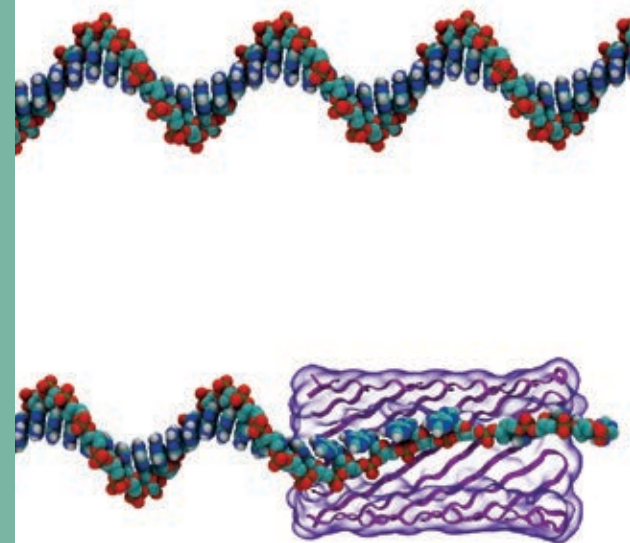
Image 3: A single stranded DNA used as input for molecular dynamics simulations of DNA translocation through nanopores. (Guy, Piggot & Khalid, *Biophys J*, 2012)

### Focusing in on Policy

The field of nucleic acids inevitably raises issues of policy and public interest. In many cases it is important that the research community is involved in ensuring policy-makers are informed and have as accurate a view as possible before they make their decision.

Peter said: “FioNA aims to identify and pursue opportunities to promote the policy implications of our research findings. At Southampton we feel we have two particular areas of expertise where we can usefully contribute to these debates – the use of nucleic acids in sensors and point of care devices, and the developmental origins of health and disease.”

The latter area, a clear example of Southampton’s strengths, will be the focus of an Epigenetics Conference in 2015. Here we will consider the basic mechanisms and environmental regulation of gene expression and development, but we will also consider these in the context of soft evolution and policy impact.



### Focusing in on Enterprise

A key outcome of the FioNA programme is to engage with small and medium enterprises and other industrial partners to develop collaborations and opportunities to work together.

Southampton already has a number of established mutually-beneficial links with companies involved in nucleic acids development and will look to strengthen these by organising enterprise networking.

By sharing expertise and ideas in an informal setting, new areas for collaboration between academic and industrial partners will be identified, as well as funding streams to support these activities. This will be especially valuable for early career researchers and those with recently patented technology looking for commercialisation partners.

The IfLS has a role to play in helping stimulate regional economic activity in areas of excellence like nucleic acids research, through licensing technology, collaborative research, consultancy, exchange of staff between organisations and creation of spin-out companies.

Dr Jonathan Watts, Lecturer in Chemical Biology, who is leading the initiative said: “We will expand on Southampton’s enterprise collaborations by sharing our capabilities and vision so that together we can maximise our progress in the field of nucleic acids.”

### Focusing in on Outreach

FioNA aims to disseminate Southampton’s nucleic acids research more widely across the University and into the regional community.

The FioNA programme has enriched existing outreach activities at local schools and colleges by providing:

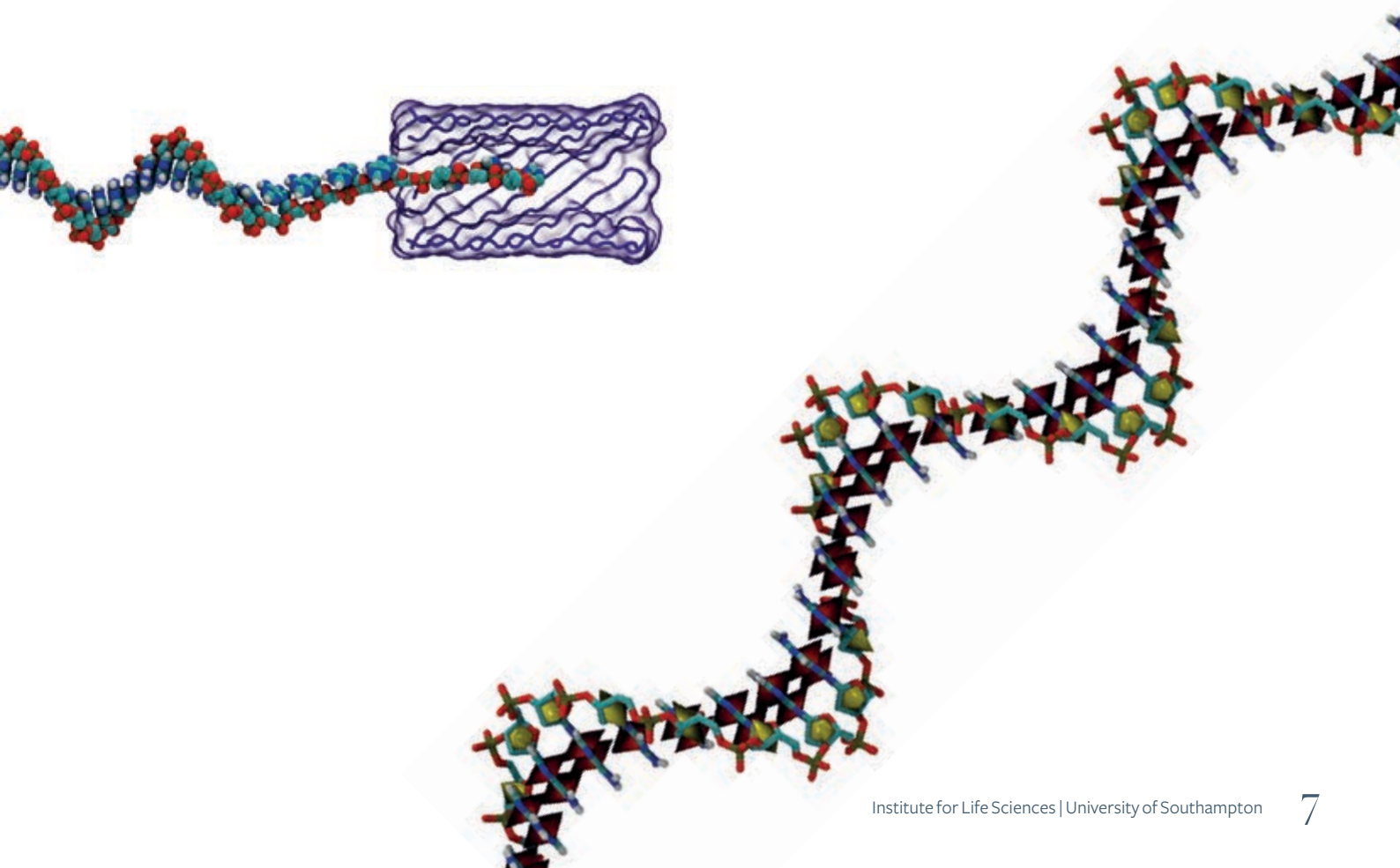
- on campus summer schools
- *Ask the Expert* lectures at local sixth form colleges
- talks at local secondary schools

The team has also been on the road as part of the University of Southampton’s Roadshow visiting events across the country including the Cheltenham and Winchester science fairs; the Big Bang Fair, in Birmingham; and Bestival, on the Isle of Wight. Hundreds of children have

been able to find out more about the impact of nucleic acids research through a range of hands-on activities and demonstrations.

As well as disseminating information to schools, colleges and the general public, FioNA has also been working with Artist-in-Residence Pauline Pratt, based in Medicine, to create an outreach tool designed to engage people in the FioNA project. The artwork is an adaption of the table football game but with a variation on the rules and the standard formation of the players. It highlights the programme’s networking connections. A series of seminars for the FioNA community in Southampton is also underway.

To find out more visit  
[www.southampton.ac.uk/ifls/fiona](http://www.southampton.ac.uk/ifls/fiona)



# Stopping the spread of meningitis

Bacterial meningitis is a severe and devastating condition that can cause serious medical complications and even death.

Pioneering research by a team of interdisciplinary investigators at the University of Southampton has discovered that two new vaccines can prevent the transmission of meningitis bacteria from person to person and could change the future of vaccine production.

## About bacterial meningitis

Bacterial meningitis is an infection of the meninges, the membrane that surrounds the brain and spinal cord. Meningococcal bacteria are common and carried harmlessly in the nose or throat by about one in 10 people. They are passed on through close contact.

Meningitis most commonly affects children under five years of age (particularly babies under one), and is also common among teenagers aged 15 to 19-years-old, particularly in areas of high residency such as universities.

Symptoms of the condition include high fever, unresponsiveness, stiff neck, aversion to bright lights and a red rash, and, while most people recover, if left untreated it can cause severe brain damage, hearing loss, learning disabilities, septicaemia and death.

## In the UK

Extensive work is being done in the UK to protect the population from bacterial meningitis. In 2011–12 there were around 2,350 cases of bacterial meningitis and septicaemia in the UK. This number has dropped due to the introduction of vaccines that protect against many of the bacteria that can cause meningitis.

## Research at Southampton

Investigations by the team in Southampton, led by Robert Read, Professor of Infectious Diseases, have heralded a breakthrough in the development of vaccines to protect against the spread of bacterial meningitis.

Working with colleagues in Medicine; the Wellcome Trust, at Southampton; and Southampton's National Institute for Health Research clinical research facility; the team discovered that two vaccines – 4CMenB and MenACWY-CRM – reduced the carriage of the meningitis bacteria in people's noses and throats.

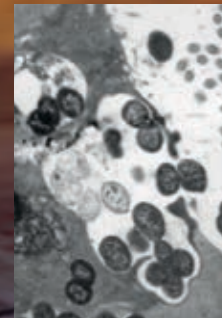
Robert said: "Standard practice is to vaccinate with the aim of inducing high levels of antibodies in the blood to protect against the disease, but we know that these antibodies can disappear over a few months. This study tells us that the vaccines also have an effect on carriage in the throat and is a significant piece of work in helping more and more people be protected from meningitis."

The study has recently been published in world's leading medical journal *The Lancet*. Please see pages 18–21 for journal publication.

## A catalyst for research

This breakthrough in meningitis vaccination is an excellent example of the role Southampton's Institute for Life Sciences (IfLS) plays in drawing together researchers, clinicians and public health to work together on translating ground-breaking research into key clinical developments.

To find out more visit:  
[www.southampton.ac.uk/ifls/newpathwaystohealth](http://www.southampton.ac.uk/ifls/newpathwaystohealth)



Co-infection of human nasopharyngeal mucosa with the pathogen *Neisseria meningitidis* reveals active bacterial uptake by human epithelial cells (above); *Neisseria meningitidis* bacteria (below)



Lydia had meningococcal septicaemia when she was two years old. Lydia lost several fingers and has extensive scarring, particularly on her legs and has also had to undergo surgery to correct bone growth problems. She is now 17 and studying for A levels. Photo credit: Meningitis Now.

Meningococcal diplococci adhering to a cell surface



“The IfLS acts as a significant catalyst in facilitating collaboration between science research, public health and clinical trials networking. Together we are investigating developments in the battle against infectious diseases and are working to try and understand how we can manipulate the carriage of pathogens by humans and how we can perhaps modify and improve prevention.”

Professor Robert Read, Professor of Infectious Diseases

# Developing more comfortable and durable prosthetic limbs

The quality of life of amputees could be significantly improved due to research being carried out by academics at the University of Southampton.

Thousands of amputees experience pain and discomfort while wearing replacement lower limbs. No two residual limbs are the same shape and they also substantially change shape over time, presenting a moving target for prosthesis fitting.

Research by Dr Alex Dickinson and Dr Peter Worsley, supported by the Institute for Life Sciences (IfLS), is developing clinical and engineering tools to help produce prosthetic limbs that will be more comfortable and durable.

## About the Fellowship

Early career academic Alex is a specialist in creating design and pre-clinical analysis tools for medical devices, and has recently been awarded a prestigious Research Fellowship by the Royal Academy of Engineering (RAEng) to apply his expertise to artificial limbs. He aims to enable prosthetists to produce more comfortable, better performing replacement limbs first time.

His Fellowship will allow him to develop a dedicated prosthetic biomechanics team and solve some fundamental clinical and technological problems with prosthesis and human interaction.

Alex, who is based in Engineering and Environment, is collaborating with colleagues

in Health Sciences and Medicine at the University; a specialist NHS rehabilitation physiotherapist; and the Fraunhofer Institute in Germany to ensure his research is clinically relevant and can be translated into the real world.

He said: "I am thrilled to launch this exciting and important programme that will explore how residual limbs adapt over many years. The target is to produce design tools to help develop prosthetics that are more comfortable for the wearer and last a lot longer."

## In the UK

Around 5,000 major amputations are carried out every year in the UK and, despite the development of advanced prosthetic limb technologies, the achievable level of mobility strongly depends on successful rehabilitation after surgery and maintaining an optimally fitting prosthetic limb.

Producing a comfortable and functional socket fit is also a challenge as the residual limb's size fluctuates during the day due to activity, temperature and hydration; and longer term can alter due to deterioration of the soft tissues.

## The history

Alex's RAEng Fellowship expands on an IfLS pilot project carried out with colleague, Dr Peter Worsley from Health Sciences, that aimed to improve residual limb measurement so that researchers can investigate what constitutes a good interface between a

residual limb and the socket of an artificial limb. The team developed a software tool that accurately performs a series of objective, repeatable measurements.

They analysed patients to see how their limb shape varies, and are now aiming to identify trends between shape and patient comfort.

## The future

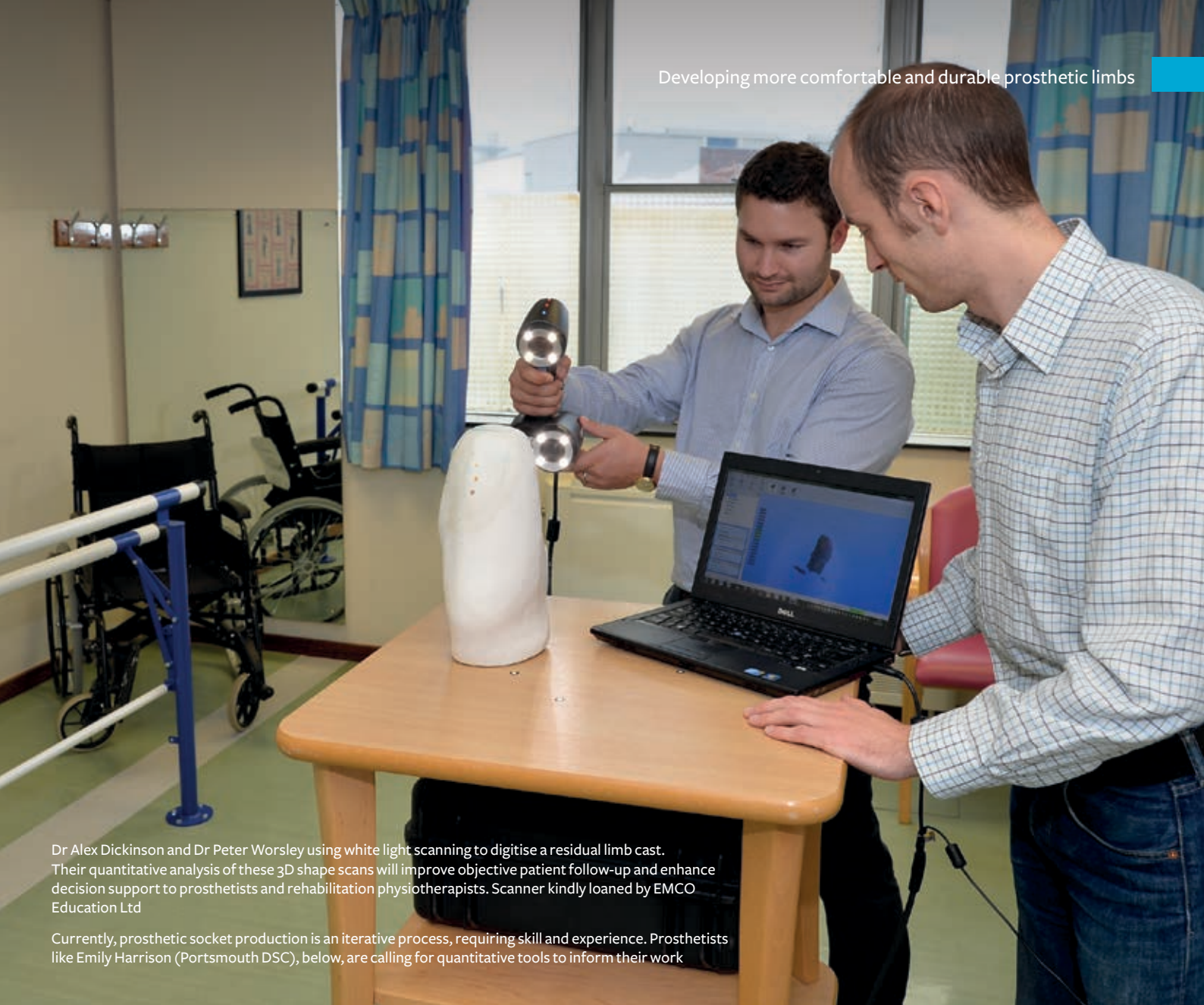
Currently prosthetists use either physical measuring or laser scanning to create a template for the artificial limb. However, taking into account the residual limb changes that can occur even over a short period of time makes this a challenge.

Alex said: "I am aiming to develop accurate models of the interaction between the residual limb and the prosthetic socket based on state-of-the-art imaging and gait analysis techniques. This data will allow me to create computational models that predict how the residual tissues deform and respond to the loads generated during daily living, and how they adapt over longer timescales. These first-of-kind models will enable us to develop surgical and prosthetic treatments that speed up and reduce the discomfort of rehabilitation."

To find out more visit [www.southampton.ac.uk/ifls/lifetechnologies](http://www.southampton.ac.uk/ifls/lifetechnologies)

**“Significant ‘untapped potential’ exists for Life Technologies particularly at the interface to New Pathways to Health. We hope to expand interdisciplinary collaboration between these grand challenges wherein clinicians and clinical and laboratory scientists work more closely with physical scientists and engineers. It is our aspiration to dissolve the boundaries that exist between technological solutions and clinical problems, facilitating translation to health practice and enterprise.”**

Professor Neil W. Bressloff, Professor of Biomedical Engineering & Design, Life Technologies, grand challenge lead

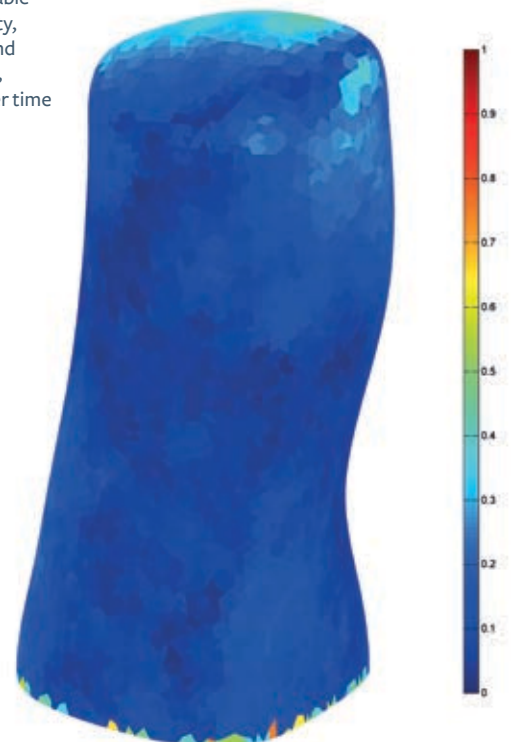


Dr Alex Dickinson and Dr Peter Worsley using white light scanning to digitise a residual limb cast. Their quantitative analysis of these 3D shape scans will improve objective patient follow-up and enhance decision support to prosthetists and rehabilitation physiotherapists. Scanner kindly loaned by EMCO Education Ltd

Currently, prosthetic socket production is an iterative process, requiring skill and experience. Prosthetists like Emily Harrison (Portsmouth DSC), below, are calling for quantitative tools to inform their work



The developed tool can capture the considerable inter-patient variability, in residual limb size and shape characteristics, and their changes over time



“Global change sharpens the reciprocal interactions between human societies, ecosystems and the abiotic environment. Advanced technology and interdisciplinary research will help us to provide the information required to understand these complex systems and cycles and to work towards a sustainable future.”

Professor Jörg Wiedenmann, Global Change, grand challenge lead

# Looking back to the future

Could climate change and global warming lead the Earth towards a major environmental catastrophe similar to the end-Triassic mass extinction more than two hundred million years ago? This event wiped out much of the planet's animal and plant life, led to the development of modern ecosystems on land and in the oceans, and paved the way for the dominance of the dinosaurs.

A new project will bring together life sciences researchers from across the university to collaborate on a wide range of carbon-related research projects including exploring the parallels between this ancient end-Triassic event and today's carbon use in a quest for lessons that inform our future.

The Carbon Flux project will see teams of researchers documenting the effect of carbon cycling on our past, present and future to help predict the effects humans will have on the living ecosystems that we are so tightly bound to.

The project is led by Dr Jessica Whiteside, from Ocean and Earth Science Southampton, who is exploring the potential causes of mass extinctions and catastrophic climatic events in our past.

Jessica said: "The flow of carbon through the environment is important to help us understand the ecology and evolution of all life on earth. If we can understand the behaviour

of carbon in the environment and relate it to the pollution of biospheres, the recovery of energy resources, the regulation of the Earth's past and present climate, and the evolution of life, this can help us predict what we might expect for present or future scenarios."

The Carbon Flux Project is truly interdisciplinary and involves researchers from across the University including Archaeology, Biological Sciences, Civil Engineering, Chemistry, Electronics and Computer Science, Geography, Medicine, Ocean and Earth Sciences, the Optoelectronics Research Centre, and the Southampton Marine and Maritime Institute.

Their research is tackling some of the biggest challenges facing us today such as terrestrial carbon cycling and bioenergy; the effect of using sub-seafloor high-voltage cables; developing novel biochemical sensors to monitor carbon in the environment; understanding modern and past variations in the ocean and atmosphere carbon cycles; quantifying the impact of land use change on carbon and water footprints and greenhouse gas mitigation; and the capture, storage and ultimate end of CO<sub>2</sub> emissions.

This world-changing interdisciplinary research work is set to be supported by the launch of a new Southampton Environmental

Carbon – Training, Observation and Research (SECTOR) Initiative. SECTOR will stimulate new research ties across different campuses into the behaviour of carbon in the environment, enabling new collaborative research focusing on natural systems; resources, energy and public health; and technology and enterprise.

Jessica said: "The IfLS enables us to forge stronger working partnerships across the University, acting as a catalyst to link different areas of research and allowing us to grow together. Nowadays most scientific research has evolved from being carried out by an individual researcher or lab to being pursued by multi-faceted teams. This concept of interdisciplinary working is really embodied by the IfLS as no one person has overall expertise in any particular area and we all need to work together to solve the really important questions we are facing today dealing with global warming and what it may hold for our future".

"Our aim is that by working in this interdisciplinary partnership we can help identify specific mechanisms of past global catastrophes and thus find clues to help mitigate future global change."

To find out more visit:  
[www.southampton.ac.uk/ifls/globalchange](http://www.southampton.ac.uk/ifls/globalchange)

**"The flow of carbon through the environment is important to help us understand the ecology and evolution of all life on earth."**

Dr Jessica Whiteside

# Stem cell research and Human Nexus

Interdisciplinary collaborations at the University of Southampton are advancing our understanding of stem cells thanks to Institute for Life Sciences' (IfLS) funding.

The IfLS award from the Engineering and Physical Sciences Research Council (EPSRC) Bridging the Gap fund provided the interdisciplinary team from Mathematics and Medicine with the opportunity to gather experimental data that allowed them to successfully bid for more than £600,000 from the Biotechnology and Biological Sciences Research Council (BBSRC) to develop their pioneering research into individual stem cells and how they interact as a group.

Lead researcher Dr Ben MacArthur, an IfLS member and Associate Professor in Mathematics and Medicine, said: "Without this initial funding from the IfLS we would have found it very difficult to generate the data we required to secure our funding application with the BBSRC."

## About stem cells

Stem cells are the body's master cells and have the amazing ability to renew themselves and regenerate tissue following disease or injury.

This gives them the potential to repair or replace damaged tissues and organs, offering new hope for treatments and cures for many common diseases. However, in adults stem cells are very rare.

Ben said: "if we can understand how stem cells behave in a model system then we may ultimately be able to translate that knowledge to improving medical treatment for a range of different degenerative diseases."

## BBSRC funding

The four-year £606,000 BBSRC award will allow Ben to engage the help of two postdoctoral researchers to further develop his stem cell research.

Ben said: "The BBSRC funding will allow us to better understand what makes stem cells so potent. We will be exploring individual cell identity in mouse embryonic stem cells, as well as looking at how individual cells interact with each other and behave collectively. These experiments generate large amounts of data and we will also be developing mathematical models to understand how individual stem cells work together and make collective decisions.

## The future

Before stem cells can be used effectively and safely in the treatment of common diseases, we need to know more about them and understand them better.

Ben said: "Our research aims to provide a more quantitative understanding of stem cell identity. The experiments produce lots of data, so we are working with mathematicians and computer scientists at Southampton to develop the computational models and methods needed to get the most out of this data. The interdisciplinary environment of the IfLS has been essential to establishing and maintaining this work."

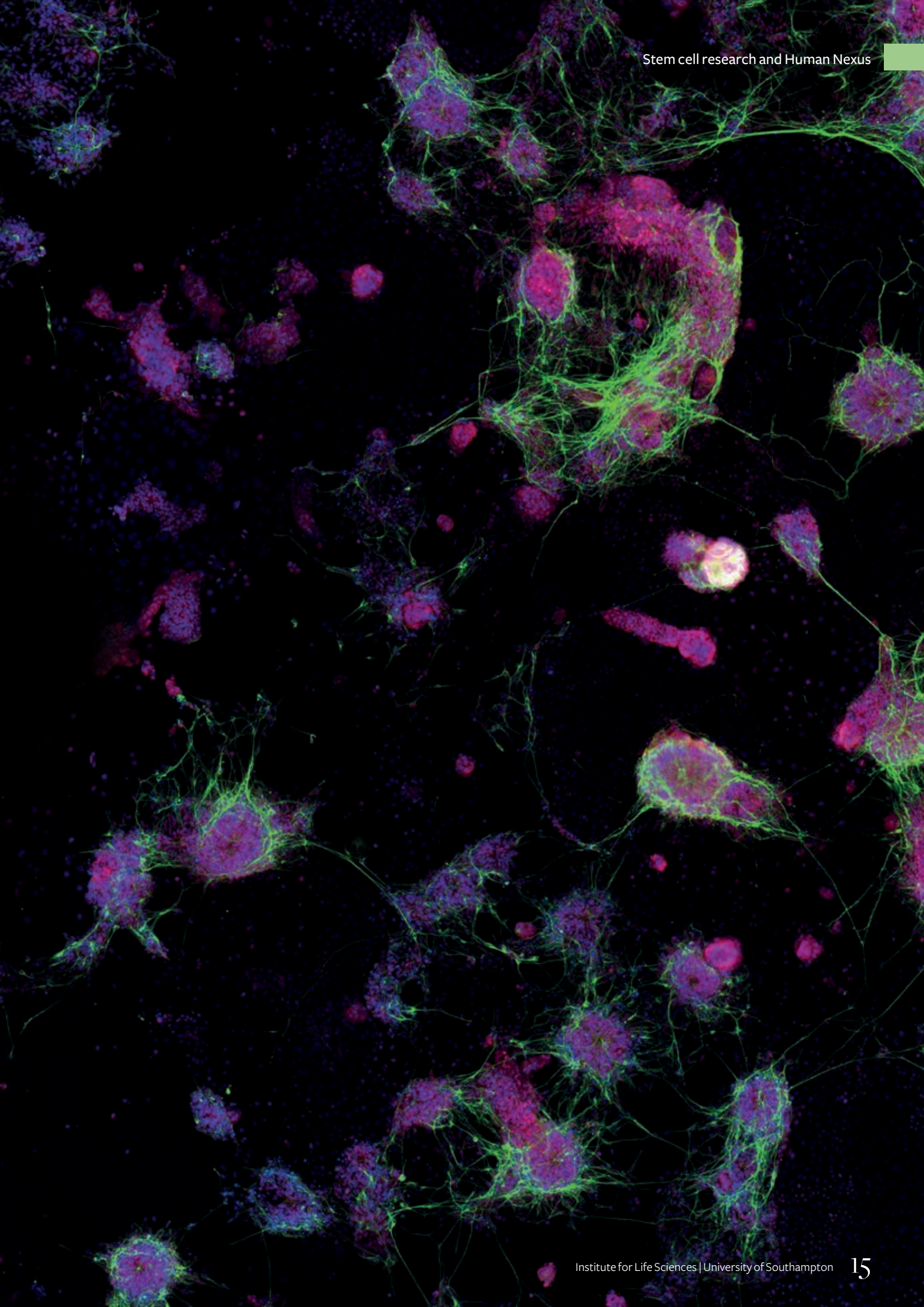
To find out more visit

[www.southampton.ac.uk/ifls/humannexus](http://www.southampton.ac.uk/ifls/humannexus)

"Human Nexus represents a unique Southampton opportunity to bring together areas of web science and maths, with disease and environmental data, to better understand human health and the environment from the perspective of the individual and in a societal context."

Professor Peter J.S. Smith, Director IfLS, Human Nexus, grand challenge lead

Neuronal progenitors and neurons derived in vitro from mouse embryonic stem cells. Image credit: P.S. Stumpf



## IfLS sponsored research takes student to the international stage

Institute for Life Sciences (IfLS) sponsored student Cara Vallance has just finished the first year of her PhD and already the results of her research have seen her attending an international conference to disseminate her findings.

Cara is exploring the integration of high-resolution Nuclear Magnetic Resonance (NMR) with microfluidic technologies for metabolomics analysis and is co-supervised by Professor Marcel Utz, from Chemistry, and Professor Hywel Morgan, from Electronics and Computer Science.

She said: “We have been focusing on chip-based cultures that allow us to expose cells to

variations in growth conditions and changes in the metabolome by introducing drugs, changes in temperature, changes in biological signals and various other stimuli”.

“This type of analysis is being considered more and more for the development of new drugs as an alternative to animal testing.”

The results of her recent research have seen Cara attending an international conference – the Euomar, in Switzerland – where she gave an oral and poster presentation about her work.

“Being an IfLS PhD student has offered me opportunities to enter into research covering

multiple disciplines. It has also given me the chance to obtain a range of skills, network with people and share information. I believe collaboration like this is the key for future career prospects and furthering research in many fields,” added Cara.

The IfLS is committed to expanding the opportunities it can offer to postgraduate programmes through interdisciplinary projects where students can be guided by supervisors from different subject areas. For details of the IfLS funded project opportunities visit [www.southampton.ac.uk/ifls/educationtraining](http://www.southampton.ac.uk/ifls/educationtraining)





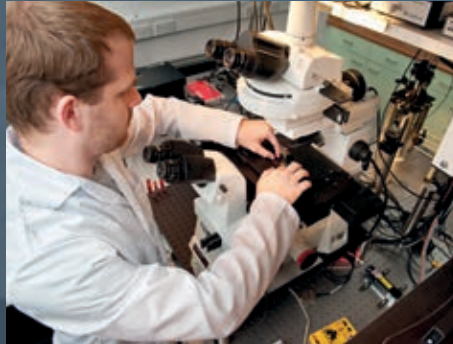
## New role aims to secure further IfLS growth

Research Fellow Dr Alexandra Mant has recently been appointed to the role of IfLS Collaboration Manager.

Alexandra has been a researcher in plant biology and biomedical sciences for more than 20 years and brings a wealth of experience to the new role that aims to develop research collaborations and interdisciplinary funding opportunities, as well as fostering links between the IfLS and external partners.

She said: "I am looking forward to contributing towards raising the strategic funding required to increase the number of IfLS sponsored interdisciplinary research projects and studentships."

"In just three years the IfLS network has expanded in size and complexity and its interdisciplinary collaborations are now yielding research papers and grant awards. However, to underpin further growth and to catalyse life sciences' growth within the Wessex region we need to actively secure more strategic funding."



## New IfLS appointment

Dr Edward Rogers, from Southampton's Optoelectronics Research Centre (ORC), has been appointed as an IfLS Research Fellow.

Edward has been working in the Nanophotonics and Metamaterials group and has developed a number of technologies with potential impact in the life sciences including a new super-resolution imaging technology based on super-oscillatory imaging. He is now working with colleagues in the IfLS to refine and use the imaging system on research-relevant biological systems.

He said: "My appointment to the IfLS will allow me to translate the potential of our discoveries in physics into real applications of benefit to the biological and biomedical communities. I will also act as a bridge between Physical Sciences and Engineering and the IfLS community to facilitate new collaborations, allowing easier and quicker exploitation of this ground-breaking research."

"The IfLS is excellent at fostering collaboration and translation between disciplines and, as an IfLS Research Fellow, I will aim to bring that excellence in interdisciplinarity to my areas of expertise."



## IfLS researcher goes international with prestigious fellowship

Institute for Life Sciences (IfLS) Early Career Researcher Dr Maria-Nefeli Tsaloglou was this year awarded the prestigious Marie Curie International Outgoing Fellowship to further her research in novel low-cost microfluidic systems for pathogen detection.

Nefeli is currently spending two years at Harvard University as part of the European Commission-funded three-year Fellowship that aims to reinforce the international dimension of the career of European experienced researchers by giving them the opportunity to be trained and acquire new knowledge in a third country high level research organisation.

Nefeli said: "It is a fantastic opportunity to be awarded this Fellowship. During my two years at Harvard I will be working in Chemistry and Chemical Biology developing three-dimensional microfluidic paper analytical devices for isothermal nucleic acid amplification, before returning to Europe to start my independent research."

"The IfLS and University of Southampton have always offered me the opportunity to hop across disciplines without any constraints. This unique research freedom nurtured my creativity and got me where I am today. I look forward to returning to Southampton and the opportunities that come with being a member of the IfLS to continue my research."

For more news about the IfLS please visit: [www.southampton.ac.uk/ifls/news](http://www.southampton.ac.uk/ifls/news)

# A sample of publications from our members: 2013–2014

The Institute is a catalyst for interdisciplinary research and training. Working across the University campuses, and the regional community, we aim to develop our collaborative models and address key societal issues and enterprise opportunities. We aim to train our scientists and policy makers to address their world from a cross-disciplinary perspective and in doing so support the life sciences activity of the University in addressing today's global grand challenges.

## New Pathways to Health

### Anastasia A et al (2013)

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Zooplankton captured during a trawl of Southampton Water by Dr Simon Boxall,  
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Image credit: David A Johnston, Biomedical Imaging Unit, University of Southampton



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