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We hope you enjoy reading this edition of the annual School of Biosciences annual newsletter, which reflects upon some remarkable achievements over the last year.

The end of 2014 saw the result of the Research Excellence Framework. This 6-year UK-wide assessment of research performance placed the School of Biosciences in the top 10 for our percentage of ‘world-leading’ and ‘internationally excellent’ research outputs, and also in the top 10 for ‘research intensity’, the quality of our research in relation to the proportion of staff submitted to the exercise. This is exciting news for staff and students, placing the School of Biosciences as one of the best centres of discovery in the UK.

Our performance in the National Student Survey also reached new heights in 2014, with all three of our degree programmes in the UK top 10 for overall student satisfaction, and Biochemistry ranked first. We have also extended our reputation for excellence in provision through professional accreditation. Our degree programmes have recently been scrutinised by professional bodies, and we have received re-accreditation of our Biomedical Science degrees from the Institute of Biomedical Science for a further 5 years, plus ‘advanced accreditation’ of our Sandwich Year degrees from the Society of Biology. Accreditation ensures that you will leave university with a defined set of knowledge, skills and abilities which is very attractive to employers looking for graduates with the potential to excel.

It has been an outstanding year for the School of Biosciences, while the University of Kent has consolidated its position as a leading UK university, ranked 20th in the Guardian University Guide for the second year running. We think the combination of research and teaching excellence, plus our supportive and inspiring culture of discovery, makes the School of Biosciences an excellent choice for you to consider.

Dr Richard Williamson
Undergraduate Admissions Officer

Ten reasons to choose Biosciences at Kent

Student satisfaction
In the 2014 National Student Survey, all of our degree programmes all were all ranked in the top 10 for “overall student satisfaction”, with Biochemistry ranked 1st in the UK.

World leading research
In the Research Excellence Framework (REF) 2014 exercise, the School of Biosciences was ranked in the top 10 for research intensity and for the proportion of research deemed “world leading” and “internationally excellent”.

Teaching excellence
We are one of only a handful of Biological Science department to have two National Teaching Fellows – the UK award for individual teaching excellence.

Professional accreditation
All of our Sandwich Year programmes have achieved Advanced Accreditation from the Society of Biology, while our Biomedical Science degrees are accredited by the Institute of Biomedical Science.

Modern facilities
Our refurbished teaching laboratories and a recent investment in high-specification laboratory equipment have underpinned advances in our extensive practical training.

Industrial and international links
Around 15% of our students spend a year in Industry or at a University in North America, Europe, or Asia.

Research experience
In the final year students carry out an 8-week research project with a member of academic staff. The Stacey Fund also supports 8-week summer studentships for undergraduate students.

Transferable skills
As part of your degree you will learn about science communication, problem solving, working in groups, time management and IT, all of which promote graduate employability.

Academic support
Each undergraduate is assigned to a member of academic staff and benefits from individual guidance and structured small group teaching.

Attractive campus and location
The University is situated on a 300 acre hillside campus overlooking the historic City of Canterbury.

Bioscience 2014 photography competition

The yearly competition is now in its 5th year and gaining in momentum, with enthusiastic support from staff and students in the School. More examples of this year’s shortlisted images are shown on the rear cover.

The winning image of 2014 entitled ‘Bottled Sky’ was taken by Julian Cook.
£3.5million for ‘world leading’ bioscientists

Bioscientists in the School of Biosciences have been awarded nearly £3.5 million to research the production of bacterial cells with enhanced internal organisation for industrial biotechnological processes.

Such cells are key to driving forward the UK’s knowledge-based bioeconomy through a combination of basic and strategic research aimed at improving cellular productivity and the synthesis of fine chemicals and biotherapeutics.

The research, led by Professor Martin Warren and his team at the University’s School of Biosciences, is one of five projects to be recognised by the BBSRC (Biotechnology and Biological Sciences Research Council) as part of its Strategic Longer and Larger Grants (sLoLaS) scheme. Professor Warren’s five-year research programme will engineer new ways of reorganising the internal metabolic machinery of cells.

The team hopes to build ‘micro-factories’ inside cells that will be able to produce useful and valuable molecules, such as pharmaceuticals, without intoxicating the cells. The overall aim of the project is to increase bacterial metabolic efficiency through the ergonomic design of specific intracellular compartments. This involves the use of cutting-edge technology in synthetic biology to tackle the redesign of the bacterial cytoplasm to accommodate the inclusion of bespoke self-contained mini-bioreactors.

This research will provide an important edge for UK biotechnology companies, existing and new, through the provision of greater productivity and new molecules, peptides and proteins for a number of purposes, including the development of fine chemical and protein-based drugs.

Professor Warren, who is receiving the largest grant (£3.484 million) among the five university beneficiaries, said that support for his research was ‘exciting’ and would help keep the University of Kent at the forefront of synthetic biology, resulting in strong interaction with industry.

Other beneficiaries of the total BBSRC £15.8 million funding include the universities of Oxford (£3.041 million), Manchester (£2.990 million) and Glasgow (£2.922 million). The BBSRC awards the grants to give ‘world-leading teams the time and resources to address major challenges’.

New Centre for Interdisciplinary Studies of Reproduction (CISoR)

The Centre for Interdisciplinary Studies of Reproduction (CISoR) comprises several like-minded academics dedicated to the study of reproduction in all its forms. Drawing on a range of academic disciplines, CISoR’s core philosophy is that the study of this fascinating field will advance further through a multidisciplinary approach. Impactful, excellent research forms the basis of CISoR’s activities including scientific advance, new products and processes, contribution to public policy, and public engagement.

Top 10 in the UK for internationally-recognised research excellence

The School of Biosciences has consolidated its position as one of the strongest Biological Science departments in the UK in the most recent Research Excellence Framework (REF 2014).

As measured by the proportion of the highest quality outputs – deemed 4* and 3* in the REF exercise – 88% of the School’s submitted research outputs were judged to be “world-leading” or “internationally excellent”. This has placed the School of Biosciences in the top 10 nationally. The School was also placed in the top 10 nationally for “research intensity” – the measure that also takes into account the proportion of eligible staff submitted to the assessment exercise.

In rankings based on grade point average (GPA) – the measure that is widely reported in league tables – the School was ranked 23rd in the UK. This places Kent equal with Queen Mary and King’s College London, and above prestigious institutions that include Bath, Warwick, Southampton, Durham, Nottingham and Essex.

The REF results cap an extraordinary year of success for the School of Biosciences. They follow our exceptional performance in the National Student Survey (see page 5), which also placed the School in the top 10 for overall student satisfaction for all three of our degree programmes. These external measures of academic excellence confirm the School as a leading centre of discovery within the biological sciences in the UK.
The 2014 Kent iGEM team was the second team from Kent to enter the iGEM competition. The team of students received the Bronze award at the Giant Jamboree in Boston. Dr Wei Feng-Xue, Senior Lecturer in Chemical Biology, describes this year’s project.

Project selection
The project selection took place in the first two weeks of the project. Students were instructed to research into past iGEM projects through reading the past iGEM wiki pages, the iGEM website, and scientific papers ahead of the brainstorming session at project start. A few possible projects that were based on the research expertise available were also suggested to the students. Following the first session, the students had decided on two projects with the advisors: “Engineering bacterial micro compartment (BMC) as a therapeutic cargo delivery system for anti-microbial peptides”, and “The Biosynthesis of Fragrant Terpenoids in \textit{E. coli}”. In a second session, after further independent research by the students, the team decided on “The Biosynthesis of Fragrant Terpenoids in \textit{E. coli}”. This project was seen as the best choice by the students due to the presence of a nearby site for Givaudan, a world leading Fragrance Company situated in Ashford, Kent. This project was subsequently entered into the Manufacturing track. The team managed to obtain additional sponsorship from Givaudan in the form of a range of essential oils to be used as standard samples.

The project
The Kent iGEM team was mainly located in the School of Biosciences teaching labs as well as the laboratory space in the research labs of the instructors. Throughout the duration of the summer, the students received day-to-day support from postgraduate advisors. Weekly supervisory meetings with the advisors, instructors and the iGEM students took place throughout the summer.

The aim of the laboratory part of the project was to construct and to characterise new biobrick parts that encode for terpene synthase enzymes. Two enzymes were selected.

The main outcomes
The team performed industrial scale-up modelling to assess the industrial and financial aspects. Finally, the team also engaged with policy and practice activities that included distributing questionnaires to engage with the general public, attending an interview with Givaudan representatives to engage with the industry, submitting a POST note on their project and on synthetic biology to engage with UK Parliament, and performing outreach activities as well as submitting an article to Young Scientist journal to engage with education.
Undergraduate news

First in the UK for overall student satisfaction

The 2014 National Student Survey has recognised the School of Biosciences as one of the very best places to study in the UK. The School was ranked first for Biochemistry, third for Biomedical Science, and ninth for Biology, with overall student satisfaction of 100%, 99% and 96% respectively. Our degrees also ranked first in individual categories of the survey, including teaching quality, academic support, personal development, and organisation and management.

Our students go on to become some of the country’s most employable graduates: we are placed in the top 20 for career prospects in the Guardian University Guide 2014. Coupled with outstanding research funding successes, the results in REF 2014, and the University of Kent’s status as a top-20 university, this makes the School an excellent place to study the biological sciences.

Record success for Class of 2014

The School of Biosciences is delighted to report the outstanding achievement of the graduating class who successfully processed at the graduation ceremony at the grand surroundings of Canterbury Cathedral in July 2014. The “Class of 2014” achieved a record level of achievement for the School of Biosciences, with three-quarters being awarded Upper Second Class Honours or above and a record number being awarded a First Class.

This is a real achievement for the school – a reflection of the high quality and commitment of our students, and the staff who have taught them and supported them over the previous 3-4 years. Congratulations to all our graduates and staff who worked so hard together with great success!

Largest number of students awarded sandwich placements

Students from the School of Biosciences have been successful in securing a record number of sandwich placements. Among the placement locations are key pharmaceutical companies in the UK (GlaxoSmithKline, Procter & Gamble), academic and industrial research institutes (MRC Technology, the Science and Technology Facilities Council) and prestigious research organisations overseas (National Center for Genetic Engineering and Biotechnology, Thailand, and the Noguchi Memorial Institute of Medical Research at the University of Ghana).

Our Sandwich Year programme provides the perfect opportunity to incorporate scientific work experience into a degree. The programme has recently been awarded Advanced Accreditation by the Society of Biology – an indication of the quality of provision on offer. A recent graduate, Chen Liang, said “My sandwich year was an amazing experience. It gave me insight into the pharmaceutical industry and I found a research topic I would like to continue as a career. I really enjoyed working with my team and the skills and techniques I gained will set me apart from other graduates. I cannot recommend it enough, so don’t let this opportunity pass you by.”

Kent around the world

Kent students talk about their Study Abroad year

Silvana Pinna – Hong Kong

“I spent this past semester studying in Hong Kong, and so far it has been an amazing experience. I have visited many places around here, although there is still very much to do: the city is amazing, very modern with a touch of Chinese tradition, and the people are so welcoming! Sharing a dorm room with a local girl has helped me so much with learning about their culture and a bit of Cantonese (although it’s so difficult!) and I am really happy I made a good friend. The university is nice and the classes were very interesting, I’m glad I got to choose subjects outside my degree as well.”

Hannah Bridgewater – UC Berkeley

“My first semester at Berkeley in one word has been AMAZING! I have been able to see and do many new and exciting things. I have explored all of San Francisco, been up north to see the famous Redwoods, had the traditional American thanksgiving and even took a quick plane journey to Nevada for a few days. The classes I have taken are enjoyable and challenging, particularly my Immunology class which was every interactive. I have gained a lot from this first semester, not just in an educational sense. I have learnt to be more independent and adventurous.”

Did you know?

In the past two years students have also attended at UTM Malaysia, Virginia Tech, University of Massachusetts Amherst, San Diego State University and the University of California at the Los Angeles, Santa Barbara and Berkeley campuses. UC Berkeley is widely acknowledged as one of the top 10 universities in the world.
The 22nd Annual School of Biosciences Postgraduate Symposium Plenary Lecture was given by Professor Chas Bountra, Nuffield Department of Medicine, University of Oxford on Thursday 10 July 2014.

Professor Bountra gave a highly interesting talk to an audience comprising postgraduate students and academics, entitled: “The future of research and drug discovery”

Winners were presented with cash prizes of £50 following the poster session and prior to the beginning of Professor Bountra’s lecture. Lonza Biologics very kindly supported the prizes once again with a cheque for the Lonza prize of £250 for the best PhD talk.

The generosity of a former member of staff, Professor Chris Knowles, provided the school with a further opportunity to present a prize for the student showing a biotechnology theme in their research.

The list of the prize winners this year were:
Best Master’s Poster – Deborah Kajewole
Best PhD Poster – Erin Balasubramaniam
Best PhD talk – David Beal
Lonza Prize – David Beal
Knowles Prize – Sarah Packwood

Doctor Doctor

Congratulations to the following students for successfully negotiating their vivas and being awarded their PhDs.

Lesley Chiverton
Alexandra Moores
Gary Harton
Matt Johnson
David Palmer
Claudia Rathje
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The MSc in Infectious Diseases is our new flagship postgraduate programme, adding to our excellent suite of Masters’ Taught Programmes for 2014. Dr Mark Shepherd, the Programme Director, said the programme had been designed for students who wish to gain an advanced education and training in the biological sciences, within the context of a range of human diseases that affect a significant proportion of the global population. The course provides training in the modern practical, academic and research skills that are used in academia and industry.

The programme culminates with a research project under the supervision of members of faculty that currently perform research on disease-causing microorganisms.

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New arrivals

**Professor Michelle Garrett**

Professor Michelle Garrett joined the School of Biosciences in 2014 as Professor of Cancer Therapeutics.

Michelle received her undergraduate degree from the University of Leeds and then joined The Institute of Cancer Research (ICR) London, to undertake her PhD research with Alan Hall on the RhoA small GTPase. After gaining her PhD in cancer cell signalling, Michelle won a Lucille Markey International Research Fellowship and in 1991 moved to the USA to undertake post-doctoral studies at Yale University School of Medicine on regulation of small GTPases in the yeast Saccharomyces cerevisiae, with Peter Novick.

In 1994 Michelle joined Onyx Pharmaceuticals, California, USA, where she went on to become a team leader before returning to the ICR in 1999 to take up a team leader position in the Cancer Research UK Cancer Therapeutics Unit. Her research specialised in the discovery and development of novel small molecule therapeutics for the treatment of cancer, two of which are currently in the clinic.

**Dr Jennifer Tullet**

Jennifer joined the School of Biosciences in September 2014 after conducting postdoctoral research with Professor David Gems (University College London) and Professor Keith Blackwell (Harvard). Prior to that, she obtained her PhD from Imperial College London under the supervision of Professor Malcolm Parker. Jennifer’s background covers ageing biology, transcriptional regulation and C. elegans genetics. Her research focuses on the molecules and processes that regulate lifespan and influence life-long health.

**Dr Neil Kad**

Neil Kad studies Biochemistry at Sheffield University before undertaking a PhD at the University of Bristol. After postdoctoral research fellowships at Leeds and Vermont he was appointed Lecturer at the University of Essex in 2007. He joined the School of Biosciences in August 2014. His lab uses single molecule techniques to understand the physical basis of how proteins interact. A number of diseases are linked to alterations in these physical parameters and the lab aim to find solutions to these problems.

**Dr Peter Ellis**

Dr Peter Ellis joined the school of Biosciences in September 2014. His first degree was in Medical Sciences at Cambridge University (1999). Subsequently he studied for a PhD with Professor Nabeel Affara in the Department of Pathology at Cambridge, where he was among the first people worldwide to apply microarray expression profiling to the study of reproductive functions in mouse and human models of infertility. As a post-doctoral researcher in the same group he led a team investigating genes on the mouse Y chromosome and their roles in spermatogenesis and in genome evolution.

**Dr Ben Goult**

Dr Ben Goult obtained his first degree in Biochemistry at the University of Sheffield before embarking on a PhD (University of Leicester/Manchester) developing NMR based approaches for detecting small molecule binding to target proteins, a first step in drug discovery. After postdoctoral work at University of Manchester and AstraZeneca Alderley Park, Ben returned to Leicester to work with Professor David Critchley on the proteins that regulate cell adhesion and migration. Ben joined the School of Biosciences in August 2014.

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**Wain Medal Lecture 2014**

Dr James Turner from MRC National Institute for Medical Research was the recipient of the 2014 Wain Medal, which is awarded annually in memory of Professor Louis Wain CBE, a former Honorary Professor of Chemistry at the University. The Wain Medal recognises the achievements of an outstanding young scientist working at the interface of biology and chemistry.

Dr Turner lectured to a packed audience of over 300 in Woolf Lecture Theatre on: “The battle of the Sexes: how sex chromosomes influence human health and disease”

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**Major grants awarded in 2014**

Professor Mark Smales, £654,400 awarded by BBSRC, Bioprocessing Network: BioProNET

Professor Mark Smales, €819,863 awarded by EU Commission

Professor Mick Tuite, Dr Tobias von der Haar, £564,111 awarded by BBSRC

Professor Colin Robinson, €546,575 awarded by EU Commission

Professor Martin Warren, £1,439,202 awarded by BBSRC

Professor Martin Warren, £379,745 awarded by BBSRC

Professor David Brown, €773,835 awarded by EU Commission

Dr Tasos Tsaoisis, £383,723 awarded by BBSRC

Dr Tobias von der Haar, £168,860 awarded by Leverhulme Trust
Biosciences 2014 photography competition winners

The Biosciences image competition, themed “Biosciences through my lens”, once again provided us with images of outstanding quality. Below are examples of images showing the many facets of Biosciences:

- Bottled Sky
  Julian Cook

- Inspiral cell cycle
  Dr Dan Mulvihill

- Candida Albicans
  Moira Talpaert

- Induction
  Dr Evelyne Deery

- The good the bad and the ugly
  Dr Simon Moore

Selected images can be viewed on our newly revamped home page on the Biosciences website along with the story behind the image.