



## SBCS Annual Report 2015

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### Introduction

Welcome to the first Annual Report of the School of Biological and Chemical Sciences.

2014 was an outstanding year for both SBCS and the College as a whole, seeing fantastic results in both the Research Excellence Framework and the QS World University Rankings, alongside a record-breaking intake of students.

We hope you enjoy reading the past year's highlights, and gain an appreciation for the exceptional and ground-breaking work done here at SBCS.

### REF2014 Success at SBCS

Results of the Research Excellence Framework place the College in the top 10 for multi-faculty institutions

The School of Biological and Chemical Sciences has shown itself to be one of the UK's elite research departments in the UK with our latest ranking in the Research Excellence Framework (REF).

In results published on December 18th in the Times Higher Education, Queen Mary saw itself placed 9th out of all multi-faculty institutions in the United Kingdom, up two places from 2008.

Within SBCS, Biological Sciences rose 12 places to 23rd in the UK, one of the most significant improvements of a department

within the College. This was achieved with a GPA of 3.07.

However the most impressive results came from the Department of Chemistry, which had not previously submitted to the REF. In its first assessment it was ranked 22nd out of 37 in the UK, and also placed in the top 10 for research outputs.

These results confirm Queen Mary's position among the best research-intensive institutions in the UK, and are a testament to the hard work and dedication of its staff.



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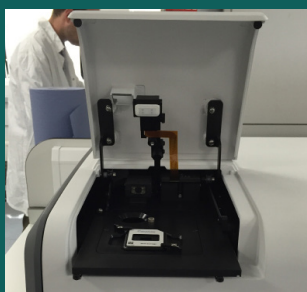
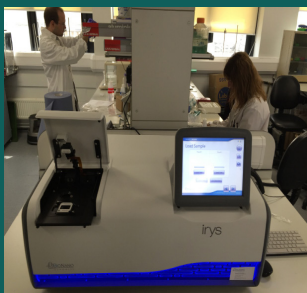
Awards and publications from the School

# School News

## School acquires Irys

Adding to the School's impressive facilities this year was Irys, a state-of-the-art genome-analysis technology by BioNano Genomics. Irys utilises nanochannel mapping to enable the arrangement of genomic fragments into chromosomes.

Purchased by the School with funding from NERC, the machine resides in the genomics laboratory under the care of Dr Monika Struebig.



Images showing the Irys genome analysis platform

## Queen Mary in World Top 100

QS 2014 World University Rankings see the College rise to 19th in the UK

Released in September, the QS World University Rankings recognised Queen Mary as 98th best in the world, an improvement of almost 50 places on two years ago.

The rankings, released annually and based on some 90,000 survey responses from over 3000 universities, saw Queen Mary placed 19th amongst UK institutions.

Professor Simon Gaskell, Principal and President of Queen Mary, said: "The improvement in our ranking over the last two years is a tremendous achievement that stems from the hard work and achievements of all our staff. It is also evidence of Queen

Mary's increasingly prominent role in global academia, and a sign of our ongoing reputation as a destination for the very best students, inspiring teachers, and leading researchers from across the world."

In addition, the university is ranked 10th in the UK for staff-to-student ratio and research impact, while it also ranks very highly in terms of internationality.

The QS World University Rankings, which in 2014 celebrated its 10th anniversary, is IREG approved and scrutinised by an independent body.

## A Brand New Fogg Building is Born

December saw the doors open to a brand new Fogg building

At the end of 2014 the first floor of the Fogg building reopened after improvement work was carried out.

Alongside the Head of School's relocation, the administration team was also moved into a brand new, open-plan office, seeing the SBCS reception relocate to level 1.

Most notable of all, however, is the state-of-the-art, 120-seater Category II teaching laboratory which takes pride of place on

the first floor beside the administration office.

The works continue into 2015, with the third and fifth floors receiving refurbishments including an expansion of the psychology department and a new behavioural genomics laboratory. This continues a campus-wide upgrade of facilities, the most prominent of which being the brand new £36m graduate centre.



The 120-seater Category II teaching laboratory

# School News

## The Department of Chemistry Gets a Seal of Approval

Chemistry courses receive Royal Society of Chemistry Accreditation

We are delighted to announce that all of our undergraduate degree programmes in chemistry have recently been accredited by the Royal Society of Chemistry (RSC). This includes all variants of our Chemistry and Pharmaceutical Chemistry programmes.

The accreditation enables departments and institutions to engage with industry and create exchange opportunities for students and researchers. In addition, the status allows degree curriculums to be developed alongside support from a network of leading academics and industrial specialists.

This is the first time chemistry courses at the College have received RSC accreditation, and this recognition of the department's high standards in teaching and research assures graduates are suitably trained for future careers in the field.

The BSc programme in Biomedical Science also received accreditation by the Institute of Biomedical Science. This is the second time the course has been accredited, and the status will be in place until 2018. The accreditation ensures that students receive training suitable for undertaking careers in biomedical science upon graduation.

## A Fond Farewell to Professor Jeremy Kilburn

In 2014 Professor Jeremy Kilburn, Vice Principal of the Faculty of Science and Engineering, announced his planned departure from the College.

A distinguished member of the Faculty,

Professor Kilburn was Vice Principal for almost five years, overseeing many successes within the School during his time here.

He leaves to take on the role of senior Vice Principal at the University of Aberdeen.

## Doctoral Training Partnerships

The School is now part of doctoral training partnerships with both the Biotechnology and Biological Sciences Research Council (BBSRC) and Natural Environment Research Council (NERC).

Doctoral training partnerships provide postgraduates with superb research opportunities, as well as aiding with personal development. The first-rate instruction given to students ensures that they are equipped with everything they need to succeed in their chosen fields.

The BBSRC awarded 30 studentships, and NERC 24.

## Athena SWAN

In 2014 Queen Mary continued its commitment to promote equality in STEM, working alongside the Athena SWAN programme.

With the help of Dr Angelika Stollewerk, in November SBCS hosted a talk by Professor Michelle Ryan of Exeter University titled 'Uncovering the glass cliff: examining the precariousness of women's leadership positions'.

SBCS was the first school within the College to achieve Athena SWAN Silver status.

## A Record Year for Students

### 2014 proved to be a record-breaking year for admissions

In September the School welcomed a record 693 undergraduate students onto its first-year programmes, almost twice the number of the previous record.

However, the impressive figures were not limited to undergraduate degrees: 37 Masters students also joined the School, spread across six taught programmes.

In addition to this were the 40 new PhD students - another new record for the school, and a number which did not include those enrolled on the Doctoral Training Programme.

Furthermore, the number of associate students reached a record number and for the first time we welcomed undergraduate students via the Science without Borders programme.

With the Conservative government's recent

decision to remove caps on undergraduate degree programmes, it is believed that this subsequent application cycle will become the most successful of the School's history.



# Events of 2014

## London Evolutionary Research Network

On November 5th Queen Mary played host to the London Evolutionary Network Conference (LERN), an annual event which showcases the work of evolutionary postgraduate students and postdoctoral researchers within London institutions.

Keynote talks included Dr Michael Price of Brunel University, 'Conflict is the Mother of Morality', and Dr Chris Faulkes of Queen Mary, 'Social evolution and adaptations in African mole-rats'.

2014 was the first year the conference had been held outside University College London, and it was a great pleasure for the School to host such a respected event.



Talks covered such topics as evolutionary conflict resolution and maternal effects in moths

## Life Sciences in the Spotlight Queen Mary kick-starts its Life Sciences Initiative

At an event held in the Octagon on January 27th 2014, Chairman of the Wellcome Trust Sir William Castell formally launched Queen Mary's Life Sciences Initiative (LSI). Speaking to an audience of over 200 people, Sir William said that were the initiative to succeed, timing was everything: "I believe we are on the threshold of a new lexicon of medicine. The opportunities will only be realised if we break the traditional disciplinary boundaries - universities as knowledge hubs bring together engineering, physics and maths alongside the life sciences," he said.



Sir William Castell at the launch of QMUL's Life Sciences Initiative



The initiative brings together the three faculties of Queen Mary - Science and Engineering, Medicine and Dentistry and Humanities and Social Sciences - and has the aim of addressing and improving health problems of those both in the UK and in countries worldwide.

Research undertaken as part of the LSI could include such things as protein-based membranes in the use of regenerating tooth enamel, and the intersection of sociolinguistics and public health. In addition, Professor Matthew Evans stated that the initiative will bring about opportunities for 100 new academic staff, 1500 extra undergraduates and 500 postgraduates.

In addition to December's conference [below], researchers from each of the university's three faculties have come together to form this year's life sciences seminar series.

## Life Sciences and Population Health

The LSI hosts what it hopes to be the first of its annual conferences

As part of its Life Sciences Initiative, in December the School helped hold a two-day conference on 'Population Health in a Post-Genomic Era'.

Starting on 15 December, the event explored the benefits and limitations of utilising both readily-available genomic data and post-genomic information to determine an individual's response to treatment and susceptibility to disease.

The conference began with a welcome talk from the College's

Principal, Professor Simon Gaskell, before talks and poster presentations began.

Speakers were selected to represent four research domains: Society, Population and Environment; Computational Biology; Basic Biomedical Science; and Translational Biomedical Science.

The event was held in the Education Academy of The Royal London Dental Hospital, at our Whitechapel campus.



Professor Matthew Evans speaking at the conference

# Events of 2014

## Chemistry Celebrates 125 Years in Style

The Department of Chemistry hosts speakers for a day of birthday celebrations



*left: students in the main laboratory of the first chemistry building, 1938  
middle: the opening of the second chemistry building by HRH The Queen Mother, 1967  
right: the second chemistry building, 1966*

On December 18th the Department of Chemistry celebrated its 125th birthday, welcoming speakers from institutions across the country including the University of Oxford and the University of Leeds.

Commencing with a welcome talk from the College's Principal, Professor Simon Gaskell, Professor Mike Watkinson then spoke about the Department's history from its beginnings in the late nineteenth century.

The afternoon included three sessions of talks, chaired by Professor Jeremy Kilburn,

Dr Lisa Rooney and Dr Nathalie Lebrasseur respectively, and was concluded by a reception held in the Senior Common Room. Also featured at the event were research posters, presented in the Bancroft Building foyer.

The celebration ends a very successful year for the Department, which included course accreditation by the Royal Society of Chemistry and an impressive performance in the Department's first submission to the Research Excellence Framework.

## The 2014 SBCS Careers Forum

An insightful afternoon of talks gives students food for thought

Held in the College's exemplary Octagon room, the 2014 SBCS Careers Forum proved another highlight of the year as it welcomed alumni and industry professionals to speak about the many career paths open to School graduates.

Commencing the day were two parallel sessions, one of which was from Dr Maya Mendiratta, the School's careers consultant, detailing the expectations and desirable traits of a successful Ph.D. candidate. Alongside this were speakers from the Royal Society of Chemistry, Teach First and Ark Schools presenting a session on "Routes into Teaching".

The second session saw School alumni speak about their careers in medical marketing and medical information following graduation,

followed by a presentation by a representative of clinical trials company inVentiv Health Europe. Each speaker explored the routes into their chosen careers and the expectations of potential employees.

Following the talks was a panel consisting of three School alumni: Jade Lam of The Priory Hospital, Dr Mark Klewpatinond of ExxonMobil, and Dr Charles van Heyningen, a former Clinical Pathologist. Dr Mendiratta then returned to the stage to conclude the day's talks and invite attendees to a reception hosted by the College's alumni team.

The reception allowed students to network with both local academics and representatives from professional bodies and industry.

## The 2014 Special Lecture Series

The Fogg Lecture  
Ecology

Given by Dr David Atkinson,  
University of Liverpool

The Bevan Lecture  
Evolutionary Biology

Given by Professor James  
Shapiro, University of  
Chicago

The Dewar Lecture  
Chemistry

Given by Professor David  
Leigh FRS, University of  
Manchester

The Drummond Lecture  
Biochemistry

Given by Sir Venki  
Ramakrishnan FRS

## Science & Engineering Academic Society Awards

In March staff and students from the Faculty of Engineering and Science celebrated the achievements of the Faculty's academic societies, awarding prizes for effort and improvement.

SBCS's Professeur Nathalie Lebrasseur also received an award for Staff Liaison of the Year.

# Teaching

## Student Accepted to GSK Chemistry Experience

Undergraduate Chemistry student Nasira Ahmed was selected from hundreds of undergraduates to take part in GlaxoSmithKline's Residential Chemistry Training Experience.

The week-long course, held in Norwich, gives students an insight into the work of a graduate chemist within the pharmaceutical industry.

## Salters' Festival returns to QMUL

In May pupils from schools across London were welcomed to Queen Mary for The Salters' Institute's Festival of Chemistry, a day of chemistry activities for students aged 11 to 13 years.

The festival, organised by Dr Tippu Sherriff, saw students take part in 'University Challenge', a competition to distinguish between various coloured aqueous solutions.

Speaking about the event, Dr Sherriff said he was "extremely impressed" with the students' enthusiasm and curiosity.

## Nanchang Welcomes its New Cohort

A second set of first-year undergraduates begin life at the Chinese university

The Nanchang Joint Programme has now entered its second year, after 250 new students began undergraduate life at the university in Xinjian, China.

The teaching initiative between Queen Mary and Nanchang University (NCU) aims to produce graduates in Biomedical Science who can use their skills to become researchers and

clinical academics within teaching hospitals in Nanchang. The students in China are also able to attend an English language course at Queen Mary during their summer break.

Three undergraduate SBCS students were given the opportunity to visit the Chinese university last year, returning from their three week visit in November.



Nanchang students

## SBCS Launches London's First Plant Taxonomy Course

The Master's course benefits from Kew Gardens' specimen collection

In 2014 the School announced the proposed introduction of a new masters programme in Plant and Fungal Taxonomy, Diversity and Conservation.

The MSc course, taught in collaboration with Kew Gardens, is the only course in London to focus on plant taxonomy and benefits from the Royal Botanical Garden's collection of fungal and plant specimens, which is the largest in the world. In addition to a new Masters programme, Queen Mary and Kew will be jointly supervising a number of PhD students each academic year.

The College also announced the QMUL Masters Support Scheme 2015, 105 scholarships worth £10,000 each for masters study in 2015.

## NSS Results

Results of the National Student Survey find Queen Mary students very satisfied

The ultimate survey of student opinions, The National Student Survey once again handed the score sheet to the students to see how favourably they viewed the College and their time spent with the department.

QMUL saw an overall satisfaction rating of 86%

and nine of its subjects rated best in London for student satisfaction.

Molecular Biology and Chemistry both received particularly favourable results, and were rated number 2 in London. In addition, Zoology received the highest satisfaction rating of any London institution.



# Teaching

## A School Fit for the Future

Alongside a new state-of-the-art laboratory, the Department of Chemistry ensures it won't get out of touch with technology

In 2014 the Department of Chemistry embraced the future of teaching by supplying tablet computers to all first year undergraduate chemistry students.

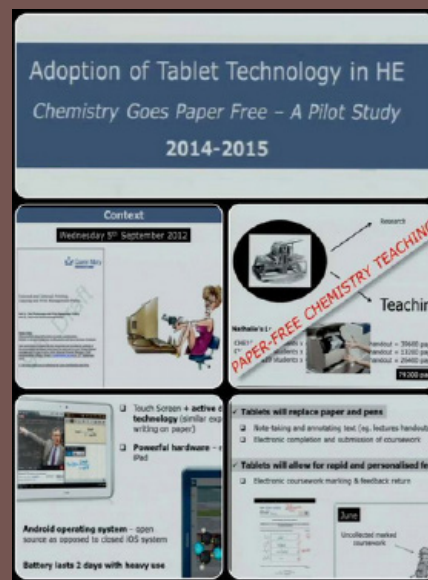
Dr Nathalie Lebrasseur, whose decision it was to introduce the initiative, explained her vision of paper-free chemistry teaching during a presentation for the pilot scheme.

Considering whether tablets could replace traditional note-taking, Dr Lebrasseur said: "Lots of chemistry actually involves drawing; exploring concepts in chemistry is very visual and requires lots of graphical representation. Giving the students tablets will allow staff to encourage them to write

and draw more."

Taking into account the lack of essays required to complete a degree in chemistry, Dr Lebrasseur believes the tablet initiative could replace standard coursework submission: "Students have to solve problems. Again, they need to be able to draw. A tablet would allow this. Staff could then provide rapid and personalised feedback by annotating and returning the coursework."

Further considerations made during Dr Lebrasseur's presentation were the ease of access to online materials and the ability to utilise videos during laboratory sessions.



Dr Lebrasseur's presentation is available to view online

## Bathtubs: An Unexpected Route to Success

In his speech to 2014 graduates, Professor Peter Hudson FRS offers some rather unconventional advice

"I don't believe great discoveries and insight came from waiting to be stimulated. Isaac Newton was thinking when he sat under his apple tree; Darwin had a special "thinking path" that weaved around the woods at Downe House as he pieced together the theory of evolution; and Albert Einstein used thought experiments to give him exceptional and creative ways to think and solve problems.

"You need time to think. You need a place to think and you need somewhere you can avoid the technology—somewhere you can avoid the information abuse and the continual stimulation, and that place is your bath tub—you can lie there and think. Your technology doesn't work and indeed if you take it into the bath it will simply fizzle and break.

"You lie there and there is nothing worth watching and your mind becomes creative and proactive and you think. Showers are no replacement; in showers you jump in, conduct your ablutions and move on.

"You need a bath tub.

"This has many other benefits: it provides the university with a wonderful way of assessing the students and colleagues that are great

thinkers - indeed I am going to propose to the Principal and your lecturers that we scrap all examinations and simply record who are the clean students, the ones that are bright, smell of soap, have wrinkled skin. Those students will be the ones that have been thinking hard and clearly deserve a good degree.

"Graduates of Queen Mary University, the class of 2014: if I can offer you one piece of advice, learn to think and be creative without boundaries and cluttered by technology.

"I recommend you have a bath."



Professor Peter Hudson FRS

## Undergraduate Newsletter Launched

In November the first issue of Bonds + Bees, the new undergraduate newsletter for SBCS, was launched.

The timely publication acts as a more informal mediary between the staff and students of SBCS, and offers School updates as well as delivering information on further study and employment opportunities.



# Biological and Experimental Psychology

## Publications

A selection of publications from the Department of Biological and Experimental Psychology in 2014

Emery, N. & Clayton, N.S., Do birds have the capacity for fun? (2014) *Current Biology*, vol. 25(1), R16-R20

Osman M, Ryterska A, Karimi K et al. (2014) The effects of dopaminergic medication on dynamic decision making in Parkinson's disease. *Neuropsychologia* vol. 53, 157-164. 10.1016/j

Nityananda, V., Skorupski, P. & Chittka, L. (2014) Can bees see at a glance? *The Journal of Experimental Psychology*, 217: 1933-1930

Balakrishnan, C.N., Mukai, M., Gonser, R.A., Wingfield, J.C., London, S.E., Tuttle, E.M. & Clayton, D.F. (2014) Brain transcriptome sequencing and assembly of three songbird model systems for the study of social behaviour, *PeerJ* 2:e396



## Professor Lars Chittka wins School's First Wolfson Merit Award

The success is in addition to two further grant awards won by the psychology Professor in 2014



Professor Lars Chittka

In May the Royal Society announced the most recent recipients of its Wolfson Research Merit Award.

Winning the award for the first time at Queen Mary was Lars Chittka, Professor of Sensory and Behavioural Ecology in the Department of Biological and Experimental Psychology, for his work on 'Radar-tracking the spatial movement patterns of key pollinators.'

Speaking about his research, Professor Chittka said: "There

is a common perception that larger brains mean higher intelligence, however many insects demonstrate sophisticated decision-making so their tiny brains don't hold them back. By building a model of the bees' brain we hope to learn which neural networks and systems are involved in visual learning."

The award is given to scientists of "outstanding research and potential" and is funded by the Wolfson Foundation and the Royal Society.

## Funding Awards

£50,000 to Lars Chittka from the Royal Society for "Research Merit Award"

£312,618 to David Clayton from the Leverhulme Trust for "Neurogenomics of Perception"

£1,548,713 to Lars Chittka From the Commission of the European Community for "SpaceRadarPollinator ERC Advanced Grant"

£10,000 to Caroline Brennan from E.P.S.R.C. for "Innovation Fund: Zebrafish Behavioural Analysis"

£9,963 to Janelle Jones from Richard Benjamin Trust for "Promoting Health, Wellbeing and Engagement"

£69,740 to Lars Chittka from Human Frontier Science Program for "A Neural Circuit Approach to Cognition "

£42,490 to Michael Pluess from Jacobs Foundation for "GENRIEL - Genetics and Relationships"

£9,963 to Janelle Jones from The Richard Benjamin Trust for "Promoting engagement, health and wellbeing in ethnically diverse communities"

£520,000 to Caroline Brennan from B.B.S.R.C. for "A zebrafish screen to identify genes affecting working memory and age-related cognitive decline"

## Research Feature: Goats excel at memorising a highly novel task

Research by Dr Alan McElligott on the cognitive abilities of goats has demonstrated excellent long-term memory in the animals, and has also shown that domestication has not affected their physical cognition.

In a group of 12 goats, 9 were shown to successfully complete an adaptation of the "artificial fruit challenge". By using their mouth to move a lever, food was rewarded to them - a method demonstrated both with and without a demonstrator goat.

Results showed that nine

goats were able to complete the task, however there was no evidence of social learning by observation in the test subjects.

The researchers concluded that goat cognition is mainly driven by the need to forage efficiently, and that this need is greater than the computational demands of sociality.

For the full paper, see: Briefer, E.F., Haque, S., Baciadonna, L., McElligott, A.G., (2014) Goats excel at learning and remembering a highly novel cognitive task. *Frontiers in Zoology*, 11(1): 20



# Cellular and Molecular Biology

## Sabbatical Profile: Professor Conrad Mullineaux

Professor Mullineaux writes about his sabbatical year and his time spent at the Freiburg Institute for Advanced Studies in Germany

As part of the rehabilitation process following REF2014 I was granted a sabbatical for the calendar year 2014. I spent the first few months mainly holed up in my office and writing the papers I didn't have time for before. These include a series of papers in which we look at the localisation and behaviour of specific, interesting proteins in bacterial cells by fluorescent protein tagging and fluorescence microscopy.

We combined the microscopy with biochemistry by breaking open the cells and doing "affinity pull-downs" based on the binding of the fluorescent protein tag with a specific antibody. This makes a nice general approach for figuring out the role of specific proteins in complex cell processes: you use the microscopy to see if your protein is doing something different under specific conditions, then you use the biochemistry to identify the other cell components that your protein is interacting with.

This approach gave us new ideas about two related proteins that play important but ill-defined roles in membrane biogenesis and stress protection in bacteria. Our idea was that both proteins participate in localised protein biogenesis centres, which predicts that specific collections of mRNA molecules should be associated with our proteins.

Answering that question needs expertise in bacterial RNA, which is notoriously tricky to work with. So I was fortunate to be awarded an external senior fellowship at the Freiburg Institute for Advanced Studies (FRIAS),

giving me the chance to work with a group of bacterial RNA experts in Freiburg, a beautiful city in the far south-west of Germany on the edge of the Black Forest.

My PhD student Gianna Bennardo was also able to visit for a couple of weeks, thanks to funding from the College postgrad travel fund. We found that one of our proteins does indeed associate with a specific collection of RNAs: we are waiting for sequencing to tell us what they are.

FRIAS itself was an interesting experience: their approach to fostering interdisciplinary links is to provide free lunches three times per week, plus unlimited free coffee, and to employ someone (the remarkable Britta Küst) specifically to pester academics from different disciplines into interacting with each other, even when they would much rather stay safely in their own burrows. This led me into conversations with a computer scientist interested in analysing fluorescence images and a materials scientist working on photopolymers. I roped both of them into an exciting side-project, which is to work out how a cyanobacterium can see where the light is coming from.

Having excluded all the more likely possibilities, our idea now is that the cell works like a tiny eyeball, with the entire cell body as the lens and the plasma membrane as the retina. Maybe this will launch the new field of bacterial micro-optics. Watch this space!

## Funding Awards

£366,726 to Alexander Ruban from B.B.S.R.C. for "Photoprotection in Photosynthetic Organisms"

£351,591 to Paul Hurd from B.B.S.R.C. for "Nutrition-mediated Caste Identity in the Honeybee"

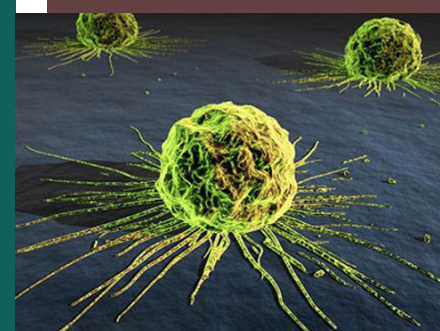
£1,600 to Alexander Ruban from The Biochemical Society for "Summer Vacation Placement"

£117,770 to Conrad Bessant from B.B.S.R.C. for "Proteomics Goes Viral"

## Staff Changes

Dr Isaac Abrahams became Director of Graduate Studies for the Departments of Cellular & Molecular Biology and Chemistry & Biochemistry

Professor Conrad Mullineaux became head of the Department of Cellular & Molecular Biology



## Publications

A selection of publications from the Department of Cellular and Molecular Biology in 2014

Mullineaux, C. W. and Nürnberg, D. J. (2014) Tracing the path of a prokaryotic paracrine signal. *Molecular Microbiology*, 94: 1208-1212

Shane Wilkinson, Papadopoulou MV, Bloomer WD, Rosenzweig HS et al. (2014) Novel nitro(triazole/imidazole)-based heteroarylamides/sulfonamides as potential antitrypanosomal agents. *European Journal of Medicinal Chemistry* vol. 87, 79-88

Erica Belgio, Ekaterina Kapitonova, et al. 'Economic photoprotection in photosystem II that retains a complete

light-harvesting system with slow energy traps'. *Nature Communications*, (2014) 5, 4433

Duffy CD, Pandit A, Ruban AV (2014) Modeling the NMR signatures associated with the functional conformational switch in the major light-harvesting antenna of photosystem II in higher plants. *Phys Chem Chem Phys* vol. 16, (12) 5571-5580

## Publications

A selection of publications from the Department of Chemistry and Biochemistry in 2014

Abrahams, I., Leszczynska M., Liu X., Wrobel W., et al. (2014) Oxide ion distribution, vacancy ordering and electrical behaviour in the Bi<sub>3</sub>NbO<sub>7</sub>-Bi<sub>3</sub>YbO<sub>6</sub> pseudo-binary system. *Journal of Materials Chemistry A* vol. 2, (43) 18624-18634

Richard W. Pickersgill, et al. 'Structural Insights into Higher Order Assembly and Function of the Bacterial Microcompartment Protein PduA'. *Journal of Biological Chemistry*, (2014) 289, 22377-22384

Luo J, Preciado S, Larrosa I (2014) Overriding ortho-para selectivity via a traceless directing group relay strategy: the meta-selective arylation of phenols. *J Am Chem Soc* vol. 136, (11) 4109-4112

Mucsi Z, Chass GA, Ábrányi-Balogh P et al. (2013) Penicillin's catalytic mechanism revealed by inelastic neutrons and quantum chemical theory. *Phys Chem Chem Phys* vol. 15, (47) 20447-20455

## Chemistry and Biochemistry

### REF Highlight: Physical & Theoretical Chemistry

A highlight from 2014's REF submission was the research of Tony Vlcek, Professor of Inorganic Chemistry, which explores the character of photo-induced ultrafast physical and chemical processes.

In understanding the relationship between function and structure of the excited state,

we are able to make further developments in molecular electronics, energy conversion and photonics.

For the full paper see: Shih, C., Museth, A.K., et al. (2008) 'Tryptophan-Accelerated Electron Flow Through Proteins', *Science*, 320 (5884), 1760-1762

### QMUL's 1st Industrial Doctorate Grant

SBCS research project 'Imprinted Polymers for Coffee Sensors' (IPCOS) has successfully received a European Industrial Doctorate grant, the first of its kind to be awarded to the College.

Co-ordinated by Marina Resmini, Professor of Materials Chemistry,

the grant will allow a total of 5 Ph.D. students to work alongside industrial partners Illy Caffè and Biorealis to develop chemical sensors for use in the coffee industry.

For more information, visit [www.ipcos.qmul.ac.uk](http://www.ipcos.qmul.ac.uk)

### Staff Changes

Dr Isaac Abrahams became Director of Graduate Studies for the Departments of Cellular & Molecular Biology and Chemistry & Biochemistry

### Funding Awards

£30,000 to Christopher Jones from Ramsay Memorial Fellowships Trust for "Ramsay Memorial Fellowship"

£241,357 to Ewan Main from the Leverhulme Trust for "Synthetic Biology & Biotechnology"

£166,204 to Igor Larrosa Guerrero from Commission of the European Community for "AUDoubleC-H"

£173,462 to Marina Resmini from Commission of the European Community for "NANOLEM"

£1,520 to Maxie Roessier from Analytical Chemistry Trust Fund for "Summer Studentship"

£970 to Isaac Abrahams from Rutherford Appleton Laboratory for "ISIS Experiments RB 1410488 SANDALS"

£1,520 to Nathalie Labrasseur from the Royal Society Of Chemistry for "Undergraduate Research Bursary: Amin Salehi"

£27,679 to Peter Heathcote from B.B.S.R.C.

for "Probing the Molecular Basis of Oxygen Reduction"

£447 to Isaac Abrahams from Rutherford Appleton Laboratory for "ISIS Experiments RB 1410486 POLARIS"

£8,771 to Isaac Abrahams from the Royal Society for "International Exchanges Scheme: Russia 2014"

£102,126 to Richard Pickersgill from B.B.S.R.C. for "Bacterial Microcompartments"

£9,500 to Ali Zarbakhsh from S.T.F.C. for "Innovation Fund: Microbial Quality Testing"

£4,000 to Christopher Jones from the Royal Society Of Chemistry for "Agents for Metal-Free C-H Bond Functionalization"

£90,887 to Jonathan Nield from Japan Science and Technology Agency for "Transient Macromolecular Complexes"

£119,884 to Jonathan Nield from Japan Science and Technology Agency for "Transient Macromolecular Complexes (2)"

# Organismal Biology

## Sabbatical Profile: Professor Maurice Elphick

In 2013/14 I had a research sabbatical, which provided a rare opportunity to reflect on the 25 years since my first paper was published in 1989. This culminated in writing a review titled – “SALMFamide salmagundi: the biology of a neuropeptide family in echinoderms” – a lexiconic marriage waiting to happen!

One of my objectives during the sabbatical was to build up my group so that we can take advantage of the exciting opportunities provided by transcriptome sequencing for research on the comparative physiology and evolution of neuropeptide signaling systems. Fortunately, my efforts to secure grants and studentships were successful and much of my time recently has been focused on recruiting new PDRAs and PhD students (from the UK, Canada, Belgium, China, Mexico and Russia).

The sabbatical also provided time to establish new collaborations – for example

with Dr. Olivier Mirabeau, a bioinformatician at the Institut Curie in Paris, with whom I wrote a review article for a special issue of *Frontiers in Endocrinology*. A new collaboration with the research group of Prof. Liliane Schoofs at KU Leuven (Belgium) has enabled us to begin to characterize neuropeptide receptors in echinoderms for the first time and this is providing some fascinating new insights on the evolution of neuropeptide signaling systems in the animal kingdom. Because of the building work on the 6th floor of Fogg, the first few months of my sabbatical were spent in an office in the IRC building.... so it is with sabbatical nostalgia that I have watched (and heard) it disappearing!



## Funding Awards

£224,425 to Andrew Hirst from N.E.R.C. for “IMMERSE”

£273,857 to Mark Trimmer from N.E.R.C. for “Large Woody Debris”

£521,150 to Richard Buggs from B.B.S.R.C. for “Pests and Pathogens in Tree Genera”

£14,639 to Elizabeth Clare from the Royal Society for “Low Frequency Vocalizations”

£35,984 to Maurice Elphick from The Society of Experimental Biology for a PhD Studentship

£166,204 to Yannick Wurm From the Commission of the European Community for “Social Chromosome”

£67,879 to Christophe Eizaguirre from the German Research Foundation for “Ecological Speciation of Sticklebacks”

£45,084 to Christophe Eizaguirre from German Research Foundation for “Evolutionary Genetics of 3 Spined Stickleback-parasite interactions”

£4,930 to Christophe Eizaguirre from the Cranfield University for “Predicting the Outcome of Hybridization”

£284,250 to Stephen Rossiter from N.E.R.C. for “Strategic Environment Science Capital Funding”

£66,000 to Stephen Rossiter from the Royal Society for “Newton International Fellowship”

£119,640 to Maurice Elphick from the Leverhulme Trust for “Neuropeptide ‘Cocktails’”

£85,000 to Richard Nichols from N.E.R.C. for “EOS Cloud”

£416,251 to Yannick Wurm from N.E.R.C. for “Pesticide Exposure in Bumblebees”

## REF Submission Highlight: Genomic Plasticity and the Diversity of Polyploid Plants

Professor Andrew Leitch explains his research into plant genomics: “In plants unexpected, fertile hybrid combination occurs; sometimes between distantly related species. The hybridization processes is often associated with the doubling of chromosome numbers, a process called polyploidy.

“Together, these processes of hybridization and polyploidy have driven the evolution of plants. Scientists at Queen Mary have shown that polyploidy leads to astonishing fast genome evolution and altered activities of genes. That directly impacts ecosystem functioning and the foods that we eat; indeed without polyploidy underpinning our crops we could neither feed nor clothe all the people on earth.”

For the full paper, see: Leitch, A.R. and Leitch, I.J. (2008) ‘Genomic Plasticity and the Diversity of Polyploid Plants’, *Science*, 320(5875), 481-483.

## Staff Changes

Dr Brendan Curran became departmental teaching lead for the Department of Organismal Biology

Dr Alan McElligott became Director of Graduate Studies for the Departments of Organismal Biology & Psychology

# Organismal Biology Publications

A selection of publications from the Department of Organismal Biology in 2014

Becher H, Ma L, Kelly LJ, Kovarik A, Leitch IJ, Leitch AR. (2014). Endogenous pararetrovirus sequences associated with 24 nt small RNAs at the centromeres of *Fritillaria imperialis* L. (Liliaceae), a species with a giant genome. *Plant Journal* doi: 10.1111/tpj.12673

Thomas Butts, Mary J. Green, and Richard J. T. Wingate. Development of the cerebellum: simple steps to make a 'little brain' *Development* (2014). 141:4031-4041; doi:10.1242/dev.106559

Davies KTJ, Tsagkogeorga G, Bennett NC, Dávalos LM, Faulkes CG and Rossiter SJ (2014). Molecular evolution of growth hormone and insulin-like growth factor 1 receptors in long-lived, small-bodied mammals. *Gene*, 549, (2) 228-236

Andrew G. Hirst and Thomas Kiørboe, 'Macroevolutionary Patterns of Sexual Size Dimorphism in Copepods'. *Proceedings of the Royal Society*, (2014) 281, 1791

Elizabeth L. Clare, et al. 'Resource partitioning by insectivorous bats in Jamaica'. *Molecular Ecology*, (2014) 15, 3648-3656

Rowe ML, Achhala S, Elphick MR (2014) Neuropeptides and polypeptide hormones in echinoderms: new insights from analysis of the transcriptome of the sea cucumber *Apostichopus japonicus*. *Gen Comp Endocrinol* vol. 197, 43-55. 10.1016/j.ygcen.2013.12.002

We hope you enjoyed the first SBCS Annual Report.

For further information about the School or its departments, contact:

Professor David Clayton,  
Head of Biological and  
Experimental Psychology  
Department

d.clayton@qmul.ac.uk

Professor Mark Trimmer,  
Head of Organismal  
Biology Department

m.trimmer@qmul.ac.uk

Professor Conrad  
Mullineaux, Head of  
Cellular and Molecular  
Biology Department

c.mullineaux@qmul.ac.uk

Professor Richard  
Pickersgill, Head  
of Chemistry and  
Biochemistry  
Department

r.w.pickersgill@qmul.ac.uk



School of Biological  
and Chemical Sciences  
G.E. Fogg Building  
Queen Mary University  
of London  
Mile End Road  
London  
E1 4NS

[www.sbcs.qmul.ac.uk](http://www.sbcs.qmul.ac.uk)