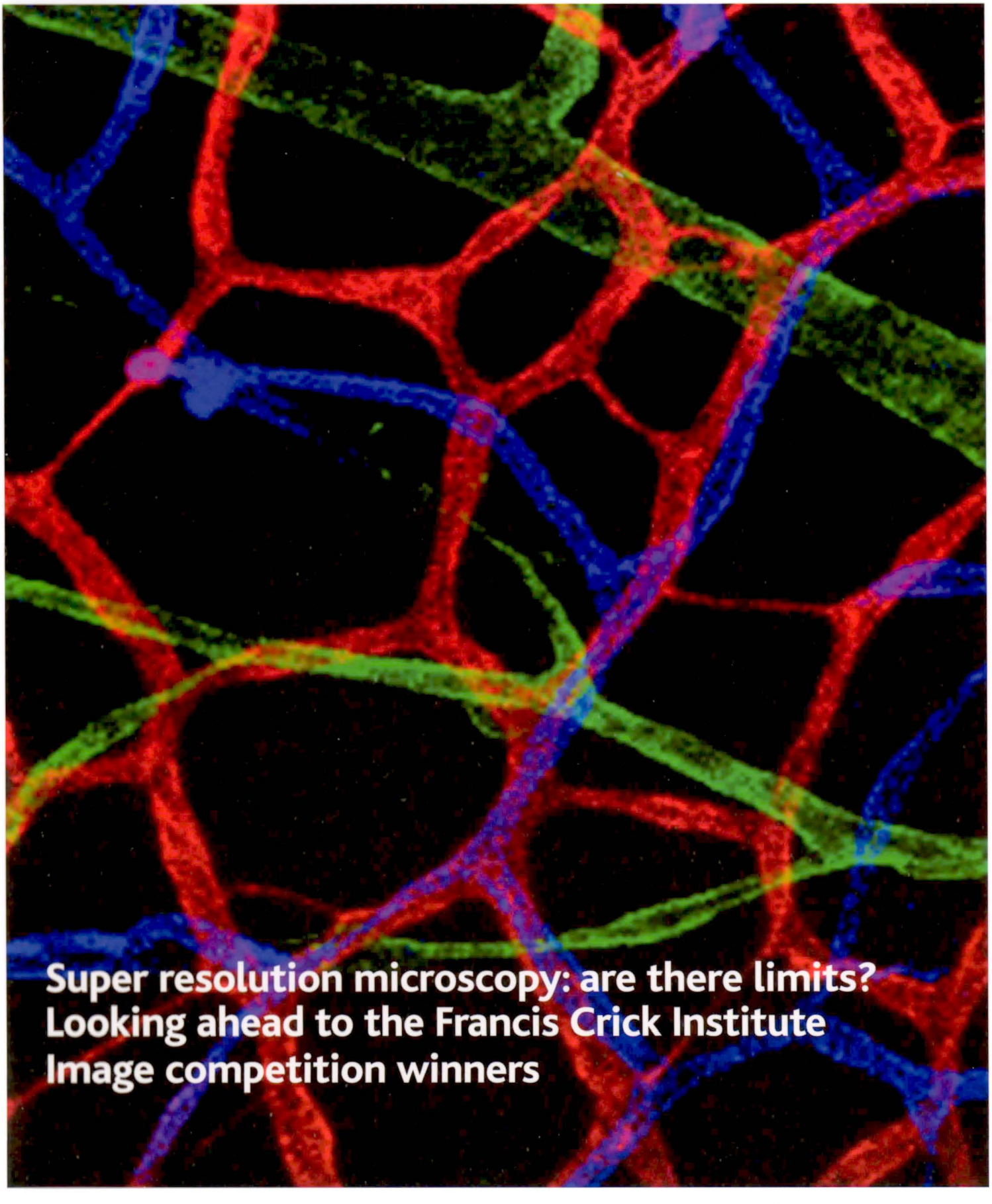
AUTUMN 2011

BSCB Newsletter

BRITISH SOCIETY FOR CELL BIOLOGY



Super resolution microscopy: are there limits?
Looking ahead to the Francis Crick Institute
Image competition winners

Travel to New Dimensions

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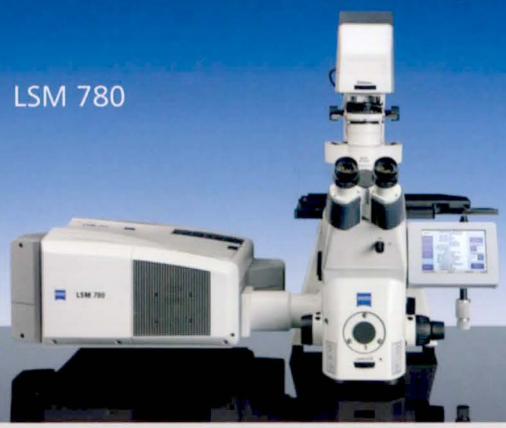

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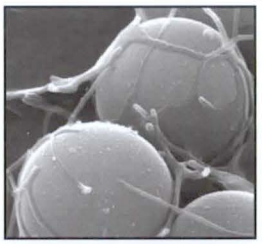
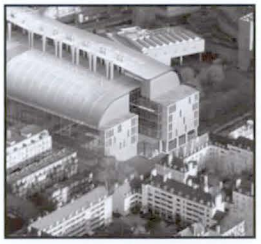
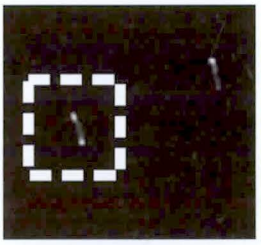




Editorial

Somewhat later than usual, this Autumn issue of the BSCB newsletter should arrive on your desks in time for the Christmas party season. I don't know about you, but this term for me in University-land has been bonkers. What with the mock REF exercise, and figuring out how to improve NSS scores, and preparation for the era of £9000 student fees, there has been practically no time to breathe. So, time now to prepare for sitting by the fire, putting up your feet and reading the latest BSCB newsletter.

Inside you will find feature articles on the developing Francis Crick Institute in central London, the latest on Super Resolution Microscopy, and the BSCB Image Competition winning images are displayed on page 5. Matthew Ashenden's first prize image – mouse retinal vasculature – adorns the front cover of the newsletter. Our BSCB President – Jordon Raff – presents his first report and the BSCB Summer Vacation Studentships are once again advertised on page 3. These offer financial support for high calibre undergraduate students who would like to get research experience in cell biology during their summer holidays.

In addition, read the meeting reports of some of the PhD students and Postdocs who have received Honor Fell/Company of Biologist Travel Awards to attend meetings in far off places such as Canada and Mexico. Also, Kimberley Byron, a PhD student at the MRC-LMCB, UCL, introduces herself as our new PhD student representative.

I would like to encourage you all to provide nominations for committee members, and/or suggestions for candidates worthy of the Hooke Medal 2013. Holger Gerhardt is announced here on page 2 as the 2012 winner of the Hooke Medal. Congratulations to Holger and a very merry Christmas to you all.

Finally, it is with great sadness that we note the passing of Leonard 'Sammy' Franks on the 11th November 2011. Sammy was the first secretary of the BSCB when it was founded in 1965. A full obituary will be in the Spring 2012 issue of the newsletter.

The Editor: Kate Nobes
University of Bristol
catherine.nobes@bristol.ac.uk

The cover image is the winning entry in the BSCB 2011 Image Competition. Matthew Ashenden's image shows the vasculature of the mouse retina stained for collagen IV. Matthew is a PhD student in the laboratory of Clare Isacke at the Breakthrough Breast Cancer Centre, Institute of Cancer Research in London

Newsletter editor: Kate Nobes **Production:** Giles Newton **Website:** www.bscb.org **Printer:** Hobbs

News

Hooke Medal Winner 2012 – Holger Gerhardt

We are pleased to announce that this year's Hooke Medal winner is Holger Gerhardt from the CRUK's London Research Institute.

The Hooke Medal is awarded each year to an outstanding UK cell biologist who has been working as an independent research scientist for less than 10 years. Previous winners have included scientists such as Anne Ridley, Matthew Freeman and last years winner, Alex Gould.

Holger Gerhardt has been an independent researcher since 2004. He currently runs the Vascular Biology Laboratory at CRUK's London Research Institute. He and his team are investigating how blood vessels grow during normal development and in disease, providing tissues with the oxygen and nutrients they need as fuel. Understanding how this process works - and how it can be either improved or shut down – is vital for research into cancer. Holger's lab has published a number of important papers dealing with aspects of angiogenesis and vascular development and his work has been at the forefront of developing innovative strategies in this area of research. His discovery and conceptualization of endothelial "tip cells" has changed the way vascular biologists look at blood vessels, and continues to deliver new insights into endothelial cell biology.

Holger will be presented with his medal and will give the Hooke Medal lecture at the BSCB/BSDB Spring meeting in April next year.

The Hooke Medal 2011 Presentation

The 2011 Hooke medal was awarded to Alex Gould at the BSCB Spring Meeting in Canterbury.

Alex started his scientific career as a PhD student at Cambridge University, in the laboratory of Rob White. Subsequently, he was a Beit and MRC postdoctoral fellow at NIMR with Robb Krumlauf before becoming a programme leader at NIMR in 1998.

On presenting the Hooke Medal to Alex, Clare Isacke, the BSCB President, described Alex as a worthy winner of the award who has made a number of seminal contributions to the field of developmental physiology using *Drosophila* as his model system.

In his Medal lecture, Alex described some of the recent work from his laboratory, which has included the discovery and dissection of the molecular mechanisms involved in regulating the timing of cell cycle exit in the *Drosophila* central nervous system. In particular, he discussed his work on lipid metabolism in *Drosophila*, which has led to the idea that dietary nutrients and remote organs, as well as local niches, are key regulators of transitions in stem-cell behaviour.

The BSCB invites nominations for the Hooke Medal 2013 from any member of the society. If you wish to nominate anyone, please contact the BSCB Secretary providing a brief supporting statement.

BSCB Science Writing Prize 2012

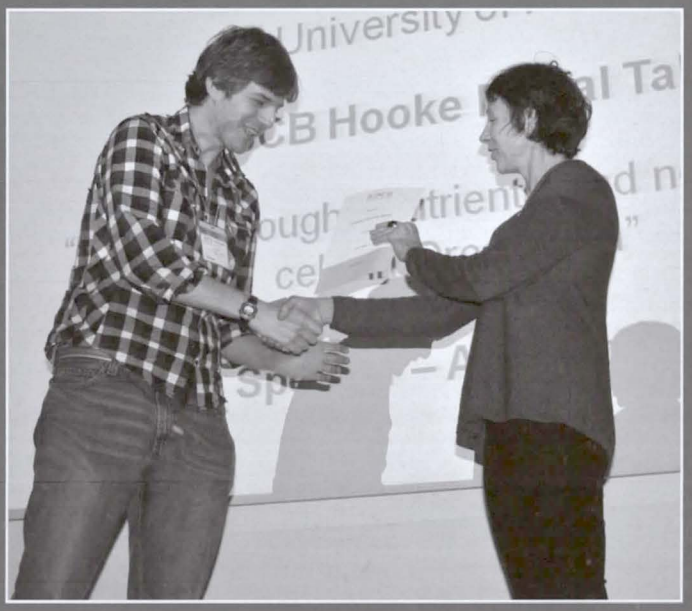
This autumn, the BSCB will again be running its Science Writing Competition for BSCB members. The BSCB Science Writing Prize is open to all BSCB student and postdoctoral members; please note that membership is a requirement for entry. We particularly will be looking for articles that cover topics of key relevance in biomedical science. Articles need not be limited to research areas but you might like to try to communicate your own project in a clear and concise way to a non-specialist audience. Other topics should be relevant to cell biology in its broadest context; examples could include the impact of stem cell technology, a feature on an important disease condition, or a wider science policy issue such as government funding of basic versus translational science.

Articles should be limited to 1000 words but can include images where relevant (these will be reproduced in black and white only in the newsletter).

The winner will receive a prize of £300 and the winning entry will be published in the BSCB newsletter and online.

The deadline for entries is the **16th January 2012.**

Entries should be sent to Paul Andrews (pdandrews@lifesci.dundee.ac.uk) as electronic files (preferably Word format, with any illustrations or images sent separately as TIFF or JPG).



The winner of the 2011 BSCB Science Writing Prize was John Ankers (above) for his essay "What makes us tick?", which you can read on the BSCB website (www.bscb.org).

BSCB Summer Studentships

The BSCB Summer Vacation Studentships offer financial support for high calibre undergraduate students, who wish to gain research experience in cell biology during their summer vacation. Our aim is to encourage students to consider a post-graduate research career in cell biology after their undergraduate studies. The deadline for applications is 27th April 2012 and full details will be available in the Spring so check www.bscb.org for information on applications.

Details

1. Studentships will only be awarded for students who have yet to complete their first degree, usually prior to their final year of studies.

2. Awards comprise a student stipend of £180 per week for up to 8 weeks plus consumable costs of up to £500 to the host laboratory. The award will be made via a supervisor and administered by the host institution.

3. Applications must be made by the prospective supervisor on behalf of a named student, and must include the student's CV together with a reference from their personal tutor (or equivalent). Undergraduate students are encouraged to develop a project with the help of the supervisor.

4. Supervisors must be a BSCB member before, or on the date of, the application. Only one application may be submitted per supervisor. There are no restrictions concerning the nationality of the student, nor do they have to be a student at a UK university.

5. The deadline for applications is 27th April 2012. Full details of the application procedure will be announced on the website at www.bscb.org. The application should include the applicant's name, contact details, host institution and department, the student's CV, a supporting statement from the student's academic tutor reference, and the project title, with a brief description of the proposed research project in the context of the research of the group. The research project must be on a topic in the broad area of cell biology and must not form part of the student's normal degree work. Projects will be assessed for objective, achievability and opportunity to the student. Students are encouraged to undertake a project at an institution other than the one at which they are studying.

6. Applications will be reviewed by a panel of members from the BSCB committee. Feedback on unsuccessful applications will not be provided.

7. The successful applicants will be required to submit a short article describing the outcome of the project for the BSCB Newsletter. To be submitted within two months of completion of the project.

The 2011 summer studentships were awarded to Meng Jin to work with Laura Machesky (Beatson Institute, Glasgow), Majdoulin Abughali to work with Buzz Baum (MRC-LMCB, UCL), Vlad Paraoan to work with Christine Watson (University of Cambridge), Helen Fox to work with Tom Millard (U of Manchester), Ben Trigg to work with James Wakefield (U of Exeter), Michael Allwright to work with Mark Coldwell (U of Southampton), Emily Adcock to work with George Banting (U of Bristol), Phu Le Thanh to work with Caroline Sewry (Great Ormond St. Hospital), Anna Dowbaj to work with David Leach (U of Edinburgh), James Chamberlain to work with Adrian Mountford (U of York) and Johanna Syrjanen to work with Isabel Palacios (U of Cambridge). Congratulations to these awardees – their reports will be published in the Spring 2012 issue of this newsletter.

President's report

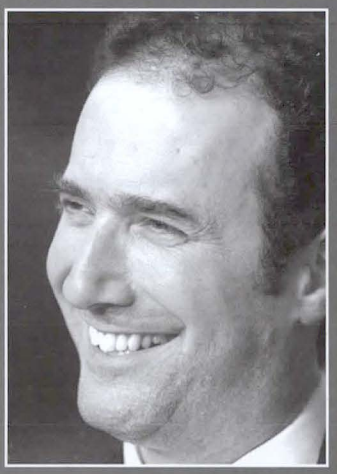
Three questions immediately came into my mind when Claire Isacke asked if I would consider taking over from her when she retired as President of the BSCB this year. The first was how much work it would be to keep the BSCB running as the well-oiled machine it has been under Claire's and Liz Smythe's (the retiring BSCB Secretary) expert guidance. Fortunately, I had been on the BSCB Committee before, and so I knew that I wouldn't have to do that much as the very dedicated Committee members do a lot of the real work. The second question was whether I would enjoy doing it. I had really enjoyed my time on the Committee, and so I was pretty sure that I would enjoy being President at least as much. The final and most important question was whether I would be any good at the job. Here, only time will tell, but I feel greatly honoured to have been given the chance to find out.

These are very challenging times, as we are almost certainly entering an era of prolonged financial stress. Besides organizing outstanding meetings and doling out money to students and postdocs to attend meetings or to work in a lab for the summer, are there other useful things that the BSCB can do to help science and scientists? For example, how much can the BSCB realistically hope to influence Government or university science policy? Although it may be a pipe dream to imagine that it could have any influence at all, I have participated in pro-science political campaigns in the past and have been amazed at how much can be achieved. Save British Science was very effective in the Thatcher years, and the Science is Vital campaign has been a very encouraging recent example.

There was a truly inspiring session on science activism organized by BSCB's PhD student representative, Jay Stone, at the recent BSCB/BSDB meeting in Warwick, which, sadly (and a little ironically), was quite poorly attended. Jenny Rohn, (an initiator of the Science is Vital Campaign) and Rose Wu (from Sense about Science) spoke at the session, and I hope they both will contribute to future Newsletters and our meetings to help us explore what the BSCB might do in the future in the area of science politics.

One aspect of science policy that is of great concern to all BSCB members is the funding of biomedical research by the Research Councils and major charities. These bodies continually explore different ways to distribute their funds, but the consequences of their policies are often hard to predict, and, in some cases, they can be devastating for scientists on the front line. It is especially discouraging these days to see so many excellent scientists, including those who have been running their lab for many years, now struggling to support their research. The funding streams they have previously counted on are drying up, as funding agencies refocus their spending priorities in ways that exclude many scientists. Although it is perhaps hard to see a way that the BSCB can help here, we should be championing the long held view of most scientists that the best strategy for economic success is simply to back the best and brightest - no matter what they work on. Trying to force people to work only on problems that others have identified as being in the national interest is a tried and trusted recipe for funding mediocre research. We need to think of innovative ways of getting this message across.

But the central role of the BSCB is surely to improve cell biology in the UK by ensuring that cell biologists here can regularly hear a broad range of world-class scientists talk about their research, and have the opportunity to talk about their own research to an international audience. To this end, the BSCB has always organized a large annual spring meeting (often in association with the BSDB) and a smaller, more focused, autumn meeting. It is a real concern that attendance at these meetings has been slowly declining for the past few years. We must reverse this trend. We made a real effort at the last spring meeting to talk to attendees to try to understand the reason for the decline. Unsurprisingly, we identified several factors, including the



large number of other meetings, the cost of attending our meetings, the poor attendance of many of the most senior UK cell biologists, and the attractiveness of the competing annual ASCB meetings. We have recently held talks with the BSDB executive and will shortly announce some changes that we hope will revitalize the spring meeting. The goal must be to make the spring meeting a "must attend" meeting for all UK cell biologists, young and old, and we will be working hard to ensure that you simply can't afford to miss it.

I'm looking forward to working with BSCB members on some of these issues over the next few years. Please feel free to contact me, or any of our committee members or Ambassadors, if you have any ideas on what we should be doing and how we should be doing it.

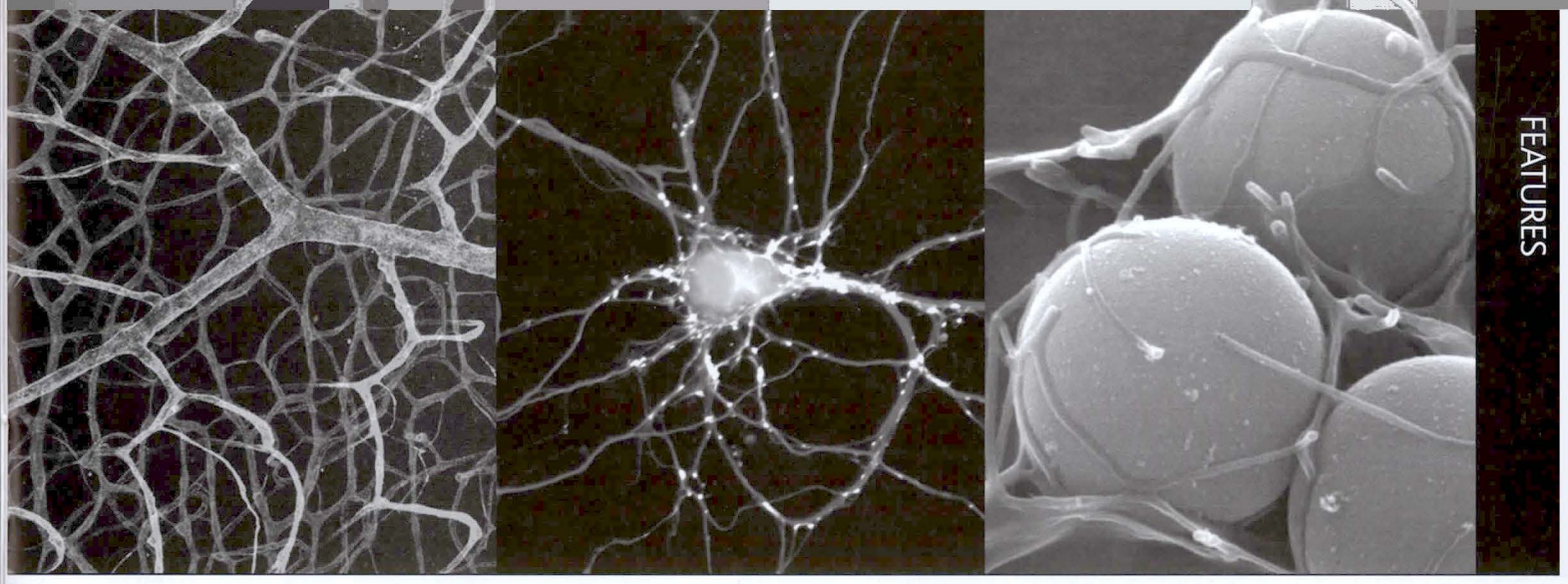
Jordan Raff, President

New PhD rep

Hello! My name is Kimberley and I am delighted to be your new PhD student representative. I have just started my 3rd year of a 4-year rotational PhD program at the MRC Laboratory for Molecular Cell Biology, in London where I am part of the Nurrish group, researching neurotransmission in *C. elegans*.

My role is to make sure that the student community is represented within the BSCB. If you have issues that you wish me to address, or ideas for how the BSCB can better serve your needs, please do get in touch and I will raise them at the next committee meeting. Don't forget that there is also a Facebook page that can be used to stay informed of BSCB events and competitions and hopefully in the near future we will also have a Twitter account. I look forward to meeting many of you at the BSCB Spring meeting inWarwick,

Kimberley Bryon
kimberley.bryon.09@ucl.ac.uk



BSCB Image Competition Winners 2011

Above left: 1st Prize – Mouse Retinal Vasculature (© Matthew Ashenden). Above centre: 2nd Prize – Hippocampal Neuron (© Keiran Boyle) Above right: 3rd Prize – Bead Phagocytosis (© Michael Bright)

Thank you to all the entrants for the 2011 Image competition for sending in your work, which were interesting, visually and technically. After the entries were anonymised and independently judged by four cell biologists, several images caught the eye of all the judges and stood out from the rest. The top five were very close and the three top scoring images are all great. What makes these images outstanding? Predominantly it is quality of the image – the sharpness of focus, quality of staining, sample preparation and image acquisition. But it is more than that because there were technically competent images that didn't quite make the grade – aesthetic qualities such as composition and colour choice played a part in giving the winning images the edge.

So it gives us great pleasure to be able to announce our 2011 winners:

First prize goes to Matthew Ashenden based at Breakthrough Breast Cancer Research Centre at the Institute of Cancer Research in London. His beautiful and graphic image showing the vasculature of the mouse retina is gracing the cover of this BSCB Newsletter.

Matthew's image shows Collagen IV staining which reveals the vasculature of the mouse retina. Initially during development, the superficial plexus (green) expands radially from the centre to cover the retina. Vessels then sprout from the superficial plexus and descend to form the intermediate (blue) and deep plexus (red).

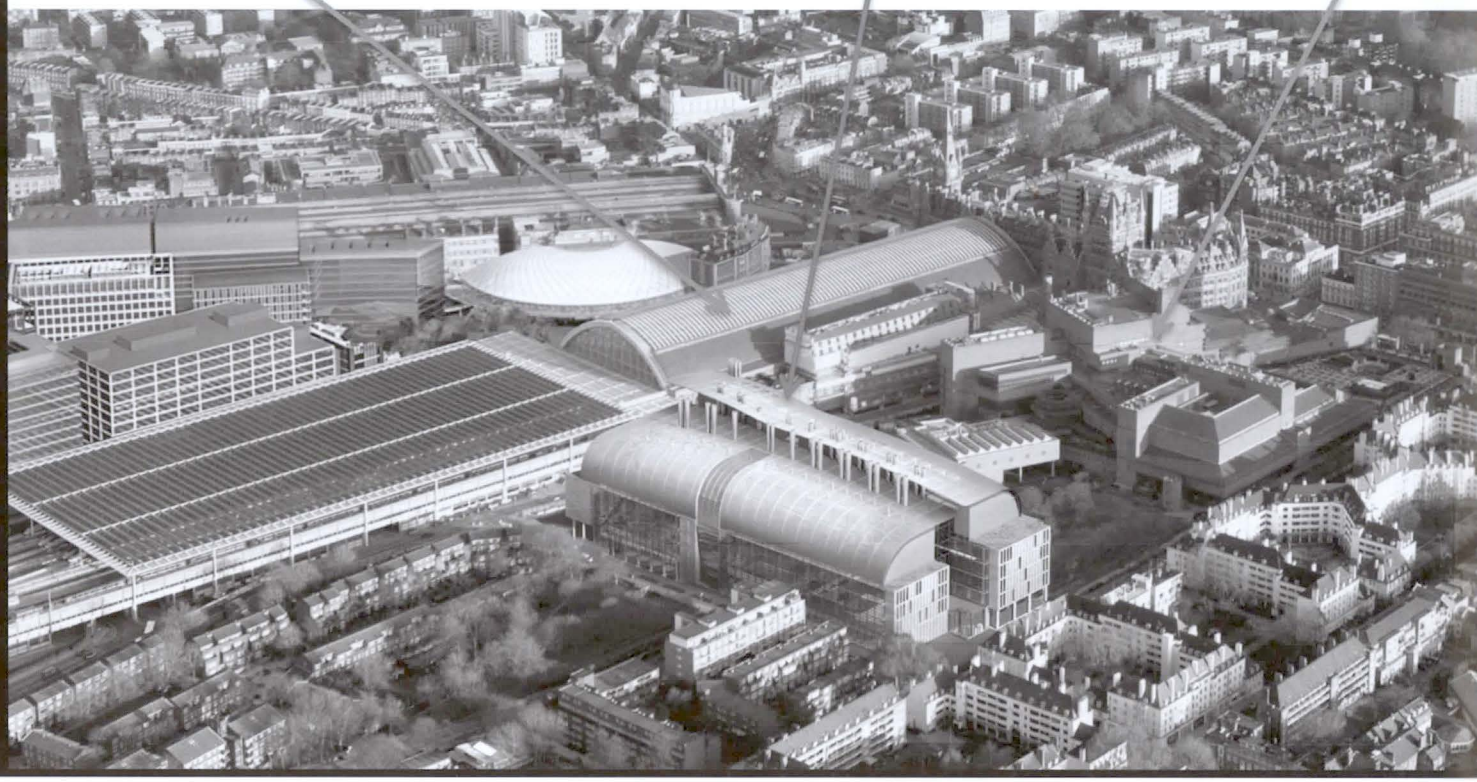
Second prize goes to Keiran Boyle in the Department of Cell & Developmental Biology at University College London. His wonderful image, which looks like an aerial view of a road network at night, shows a cultured hippocampal neuron in the early stages of synaptogenesis. The morphology of the neuron is visualised by staining with an antibody against III-tubulin. Incoming axons form synapses onto the neuron, which are stained with antibodies for the presynaptic proteins VAMP2 and Synapsin-1.

Third prize goes to Michael Bright from Imperial College London for his beautiful space-age scanning electron microscope image.

Michael's image shows COS-7 cells ectopically expressing the Fcγ-receptor performing phagocytosis on beads opsonised with Immunoglobulin G. His false-colour scanning electron micrograph shows filopodia and pseudopodia projecting around the beads, which will subsequently be fully engulfed. The beads are three micrometres in diameter.

Please take a look at our prize-winning entries in their full-colour glory on the BSCB website. Many thanks to all those that entered and if you didn't get selected this time, or are inspired by what you see, please start collecting some images for next year's competition. Happy snapping!

Paul Andrews



The Francis Crick Institute: A new dawn for biomedical research in London?

Behind the British library, diggers have recently taken the first stabs towards construction of the Francis Crick Institute. Upon completion in 2015, central London will be home to the biggest biomedical research facility in Europe, slightly larger than EMBL in Heidelberg. In many ways, The Crick is a bold experiment in science policy. It inevitably stimulates both excitement and anxiety.

The Crick's ambition and structure is a far cry from the initial plans of the MRC to relocate and scale down its largest institute, the NIMR. It is an ambitious project driven by four distinct founding partners, the MRC, CRUK, the Wellcome Trust and UCL. Its funding model is unusual in that the money contributed by the various partners will be pooled together at the top, giving generous core funding to each lab (to be supplemented by grants). The institute will be managed as a standalone organisation with minimal interference from its funders. This

arrangement is expected to foster a spirit of collaboration that is difficult to achieve in places where funding is balkanised. Indeed the main aim of the institute is to foster exchanges between diverse disciplines and thus create unexpected connections and research directions. Although translation is an important aspect of The Crick's mission, it is clear that basic research, including cell biology, will feature heavily in its portfolio. The unashamed ambition of Paul Nurse, the director and chief executive, is to make The Crick one of the most innovative interdisciplinary research institutes in the world. The size of the institute and its location are central to this aim. The large size is necessary to bring together the diverse disciplines, including maths, physics and chemistry that are required to tackle modern biomedical problems. The cosmopolitan nature of London will be an attraction for scientists from around the world and the transport hubs around The Crick will facilitate interactions with scientists from the rest of the UK and beyond.

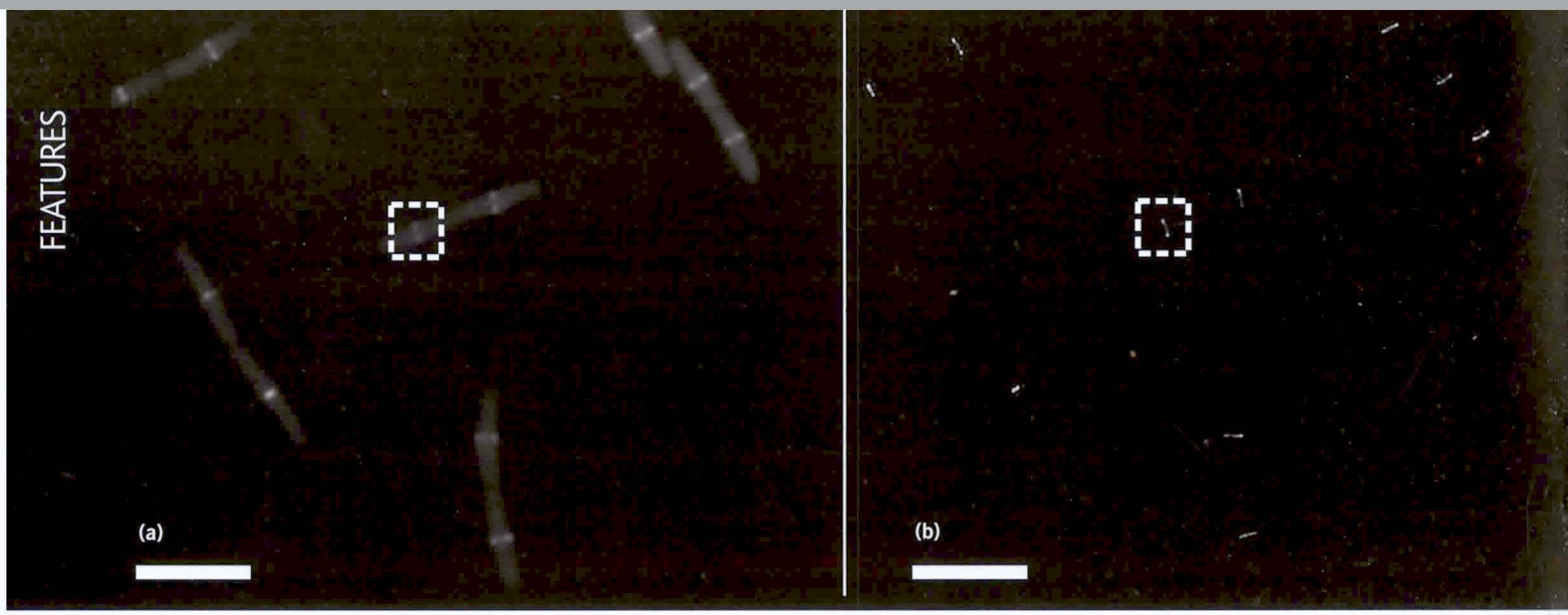
The potential of The Crick as a research powerhouse is clearly generating excitement in many quarters. However, The Crick is also cause for anxiety at various levels. The institute will cost 600 million pounds to build and kit out. One might wonder whether it is right to spend that much money at a time when research funding is getting tight and when project grants are being discontinued by the Wellcome Trust. The Crick's management would argue that a portion of this money will come from new sources. Moreover, The Crick is committed to interact with and support research across the UK. Nevertheless, it will be important that individual scientists outside London become convinced that their own research will not suffer. There is also some anxiety among scientists currently working within institutes of the founding organisations, CRUK's London Research Institute (LRI) and the MRC's National Institute for Medical Research (NIMR). Some worry that there might not be enough space to house everybody along with new hires and groups from UCL, the Wellcome Trust and the two belated partners, Imperial College and Kings College. The allocation of space is currently under discussion and the exact composition of The Crick will begin to take shape during the coming academic year. The proposed career structure at The Crick has also sparked a fierce debate. All groups will be given a 6+6 years-and-then-you-are-out contract. Only a few senior scientists will be hired and not necessarily from the junior ranks. There is no doubt that renewal is important for the dynamism of any institute but we will only find out over time whether a strict renewal policy will provide the stability needed for long term risky research. Time will also tell whether contracts of strict duration will be an issue for applicants who want to ensure geographical stability for their families.

If funds were plentiful, no one would question the benefits of spending new money to reorganise and renew the research infrastructure in the London area. However, in the current climate, questions about the need for the Francis Crick institute will probably continue to be voiced for some time to come. For scientists across the UK to accept that The Crick is a risk worth taking, they will need to be convinced that it will not jeopardise, but instead benefit, their own research. Hopefully this will occur when The Crick reaches steady state and the funding situation improves.

> "If you don't risk anything you risk even more"
> Erica Jong

Further details can be found on www.crick.ac.uk/

Jean-Paul Vincent,
MRC National Institute for Medical Research



Super Resolution Microscopy: are there limits?

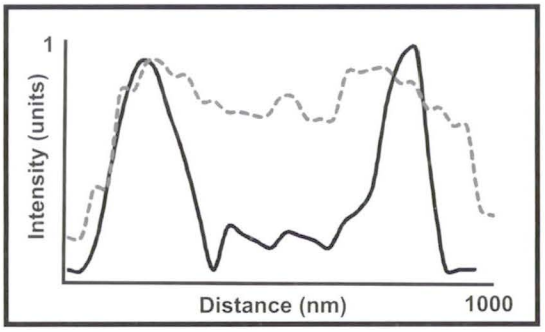
Every so often a new technique, approach or vision comes along that challenges accepted methods and dogma. One may argue that over the past five years or so HD and now 3D TV have transformed our home viewing experience. In a similar way, super resolution microscopy, although having been around for a similar, if not longer period of time, threatens to shake up light microscopy. Like HD TV, super resolution microscopy offers the potential to visualize structures in greater detail but in this case, the benefits are not realized simply by filling the image with more pixels.

Above: Figure 1. Bacteria expressing GFP-FtsZ protein (B. subtilis 2020 (amyE::spc Pxyl-gfp-ftsZ) [3] examined using (a) conventional wide field microscopy and (b) super resolution microscopy (N-SIM). Scale bar 5 μm. Images taken using Nikon N-SIM super resolution system, courtesy of D. Adams (Centre for Bacterial Cell Biology, Newcastle University).

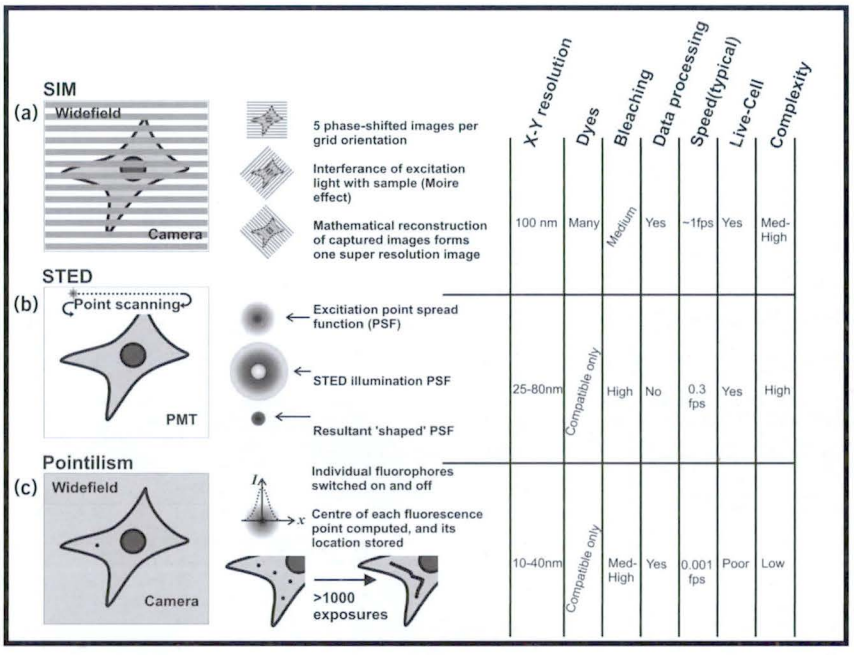
The resolving power of the standard compound microscope is limited by the wave-like nature of light such that simply increasing the pixel density of the captured image has little effect on the resolving power of the system. Abbe's principles dictate that even with 'perfect' optics, it is only possible to resolve details half the wavelength of the studied light. In practice, this means that the lateral (X-Y) resolution limit of GFP-labeled structures is at best around 250 nm; axial (Z) resolution is approximately 500 nm.

Armed with novel fluorescent probes and innovative methods with which to use and visualize them eg. structured illumination and deconvolution techniques, cell biologists and microscopists are pushing conventional light microscopy to its limits. There is however, a genuine requirement to probe structures, complexes and individual proteins beyond them. Naturally, this is where EM takes over but not all biological systems are amenable to EM analysis; it is practically impossible with EM to image specimens in their unperturbed state and many EM techniques themselves introduce artifacts. Super resolution microscopy promises to extend the resolving power of light microscopy into that of EM and with it allow the observation of cellular processes in a different light. Indeed, early adopters have reported the ability to resolve structures half and in some cases, a tenth of the size of that possible using conventional light microscopy.

So should we now disregard Abbe's principles, has this diffraction limitation been broken? In a nutshell no, although Abbe I'm sure if he were alive, would have a wry smile. Super resolution microscopy techniques have successfully overcome the diffraction limitations either by taking advantage of the way in which the incident illumination interacts with the specimen or in other cases exploit the properties of the fluorescent label itself. Over the past decade or so a variety of 'super resolution' methods have been developed and several have made it to market in partnership with microscope manufacturers.



Right: Figure 2 Line profile through FtsZ band indicated in Figure 1.



Right: Figure 3. Overview of SIM, STED and Pointillism super resolution microscopy. Figure adapted from Schermelleh et.al. [1].

There are a number of recent, informative and detailed reviews available [1],[2]. For brevity, I will concentrate on three major approaches: SIM, STED and Pointillism (see figure 3).

Structured Illumination Microscopy (SIM) (figure 3a, figure 2): Nikon (**N-SIM**), Zeiss (**ELYRA S.1**) and Applied Precision Inc. (**OMX**) offer this super resolution microscopy approach. The technique involves projecting a series of sinusoidal 'high frequency' striped patterns (optical grating) onto the specimen. Moiré fringes containing information relating to the specimen's sub resolution structure develop when this pattern illuminates finer labeled structures of the sample. This information is extracted by image processing algorithms and a super resolution image is formed by combining multiple images collected from different grating orientations. With SIM, one can expect to roughly increase the resolving power by a factor of two (~100 nm). As the technique is not reliant on the properties of the fluorescent probe and does not requires special sample preparation, it is possible to image most fluorescent labels.

RESOLFT (Reversible Saturable OpticaL Fluorescence Transition) describes a small number of related approaches with which to bypass the diffraction limitation. **STED** (STimulated Emission Depletion) Microscopy (figure 3b) and a related technique known as Ground State Depletion (**GSD**) microscopy were developed by Stephan Hell in collaboration with Leica; both are now commercially available. STED is the perfect example where novel optics and fluorescent probe properties have combined to yield diffraction 'breaking' results. In conventional point-scanning confocal microscopy, photons in the excitation laser beam (diffraction limited in size) cause electrons of the dye molecule to become excited from the ground state to a higher energy level. Within a few nanoseconds, before these electrons have chance to relax and emit a photon (the basis of fluorescence), a second red-shifted doughnut-shaped laser beam centered on the same excitation spot, is applied. This second beam drives excited electrons, except for those located in the center of the doughnut, back to their groundstate by stimulating emission of a photon of the same wavelength. Thus, molecules located in the hole can to fluoresce normally whereas those surrounding cannot. By increasing the power of the depleting laser, the effective diameter of the hole is reduced and with it, the size of the spot from which molecules are allowed to fluoresce. The result is a fourfold improvement in resolution (~60 nm) with the results visible in 'real time'.

Pointillism microscopy (figure 3c): PALM (Photo Activation Localisation Microscopy), STORM (Stochastic Optical Reconstruction Microscopy) and GSD microscopy techniques have been developed in collaboration with Zeiss (**ELYRA P.1**), Nikon (**N-STORM**) and Leica (**SR GSD**), respectively. In a similar way to the paintings of Seurat and other exponents of the pointillism technique, the resultant image is formed from a number of individual dots; in this case, each dot represent a single fluorescing molecule. These approaches exploit the properties of the fluorophore, in particular its ability to be photoactivated, bleached or photoswitched. The essence of the technique is to switch individual fluorescence molecules on and off and to image them using a camera. The center point of each molecule can then be calculated computationally and its location recorded; the process is repeated hundreds and in most cases thousands of times to form the final image. The results themselves can be impressive; lateral resolutions of ~20 nm have been claimed.

So just like waiting for a bus, you wait for one super resolution microscopy technique to arrive and three come at once. But is super resolution a fad? Like the Betamax–VHS battle of the 80s, will one technology dominate over the other? For researchers, the most crucial questions are 'can my sample be imaged in super resolution?' and 'what technique is the best?' At present, there seems to be no clear-cut answers to these questions or to the imponderable one of which system to invest in/adopt.

There is no question that super resolution microscopy has already had an impact on cell biology. Yes the techniques offer significant improvements over conventional microscopy, but each approach has its inherent strengths and weaknesses that influence its versatility. Pointillism, although offering the best resolution improvement, is time consuming and requires the capture of many hundreds of images. STED microscopy is limited by the availability of compatible fluorophores and photobleaching issues have been raised. SIM offers the greatest versatility in terms of fluorophore compatibility, but it too requires the capture of multiple images and yields the lowest improvement in resolution of the three methods. Only time will tell if one technique will champion over the others. The challenge will be to make super resolution truly live-cell compatible; currently both STED microscopy and SIM can be used with live cells but image capture rates are slow and phototoxicity is an issue.

Alex Laude, Bio-Imaging Unit, Newcastle University
www.ncl.ac.uk/bioimaging

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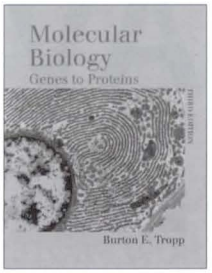
Book Review

Molecular Biology, Genes to Proteins, 4th Edition

BURTON E TROPP.



Molecular Biology, Genes to Proteins. 4th edition.
Burton E Tropp.
Publishers: Jones & Bartlett Learning
Publ. date: April 2011
ISBN: 978-1-4496-0092-1 (paperback) : 1000 pages.
Published price: £39-99 [BSCB members can purchase at discount, see BSCB website for details.]

For me most books fall into one of three categories rather like I consider restaurant meals.

The first is the traditional 'Sunday Lunch' type meal: plenty of good wholesome food prepared in the way that it has been prepared and presented down the years. Some might say 'a bit traditional and heavy' but one rarely hears complaints about not feeling satisfied afterwards.

The second type of meal is one in which the chef is more of a creative food artist than a traditional cook. The food is there but often in a more limited quantity and adorned with sauces drizzled on with varying degrees of artistry and with the addition of interesting, but sometimes distracting, extras such as dried seaweed or flower petals.

Thirdly there is the type of meal that appears acceptable and adequate, satisfies you at the time but is not memorable two hours later.

Using this analogy, Tropp's Molecular Biology, Genes to Proteins, fourth edition, falls into meal category 1. There is plenty of good wholesome material using a 'recipe' devised by the author of the first edition, David Freifelder in 1983, (the same year that Benjamin Lewin's Genes I was published). Freifelder used a 'layering approach', building up from a basic to more complicated level, and in which he 'emphasised basic molecular processing'. Tropp has continued this time tested recipe and layering approach by ensuring key concepts and techniques are introduced early in the first three sections of the book.

The 4th edition content has been thoroughly updated especially in the fields of replication, transcription and translation. A new chapter has been added about regulatory RNA and new parts included on RNA structure, the ubiquitin proteasome proteolytic pathway, epigenetic programming, imprinting and induced pluripotent stem cells (iPS cells). Some of these parts are necessarily brief but at least they are included.

Colour printing is used usefully in both tables and diagrams but the book does not have tinted panels or boxes dedicated to specific items as found in some first edition newer books in the field. I liked the extensive (twenty-five page) detailed contents list, written in a declarative style, at the beginning of the book. These statements are repeated at the beginning of the appropriate chapter just before the chapter overview. If you combine the two you have a useful chapter summary. I like having a chapter summary and missed this in Tropp, but I found going back to the start of the chapter useful.

I very much liked how the end of chapter 'Further Reading' suggestions were grouped under headings such as 'General', 'RNA Structure', 'The RNA World Hypothesis', and so on.

Accessing the Student Companion Website mentioned in the International Edition of the book is not as direct in the UK as it is in the USA, but access is available. To obtain an access code the reader will need to email cgribble@jblearning.com who is the publisher's manager in the UK. Although indirect, this service means that lecturers can apply for a number of access codes for their students even though the readers may be using library copies of the book. Unfortunately at the present time there is nothing in the International Editions on sale in the UK to indicate that this facility is available. The reviewer is informed that future publicity material will indicate this availability. A Media CD ROM of Lecture Outline Slides and images in PowerPoint is available to registered Instructors.

As I found my way round this volume I liked it more and more. It does not have the 'signposting' that is so good in Lewin's Genes and you have to 'know the book' to make best use of it. To use the meal analogy, this book provides a good solid nutritional meal and readers will feel well satisfied.

David Archer

RMS Medal for Life Sciences

Applications are invited for the Royal Microscopical Society (RMS) Medal for Life Sciences. The aim of the award is to celebrate and mark outstanding scientific achievements applying microscopy in the field of cell biology. The award is open to researchers who have run their own research lab for less than 10 years and will be awarded once every two years at the RMS MICROSCIENCE Conference and Exhibition. As the RMS will be hosting the European Microscopy Congress (emc2012) in Manchester on 16-21 September 2012 instead of MICROSCIENCE 2012, the award will be at emc2012, and then at MICROSCIENCE 2014. Applicants may self-nominate or be nominated by a colleague or supervisor. The prize is open to applicants worldwide and will take the form of a certificate and medal.

Applicants should submit a curriculum vitae and a letter to state they wish to be considered for the Life Sciences Medal to the RMS office (Miss Jessica Stanley Jessica@rms.org.uk) or nominators should submit a curriculum vitae for the nominated candidate to Jessica at the RMS office. Nominated candidates will be contacted after the closing date to confirm that they are happy for their nomination to be considered. The curriculum vitae should include a statement (maximum length 1 page) outlining the merits of the candidate and their suitability for the medal. The RMS Life Sciences committee will consider applications and the winner will receive complementary registration to the conference and exhibition and be invited to give an oral presentation at emc2012, where they will be presented with the medal.

Applications should be submitted as soon as possible, with a deadline of 1 March 2012, and the winner will be announced in April 2012.

For further information on emc2012 visit www.emc2012.org.uk

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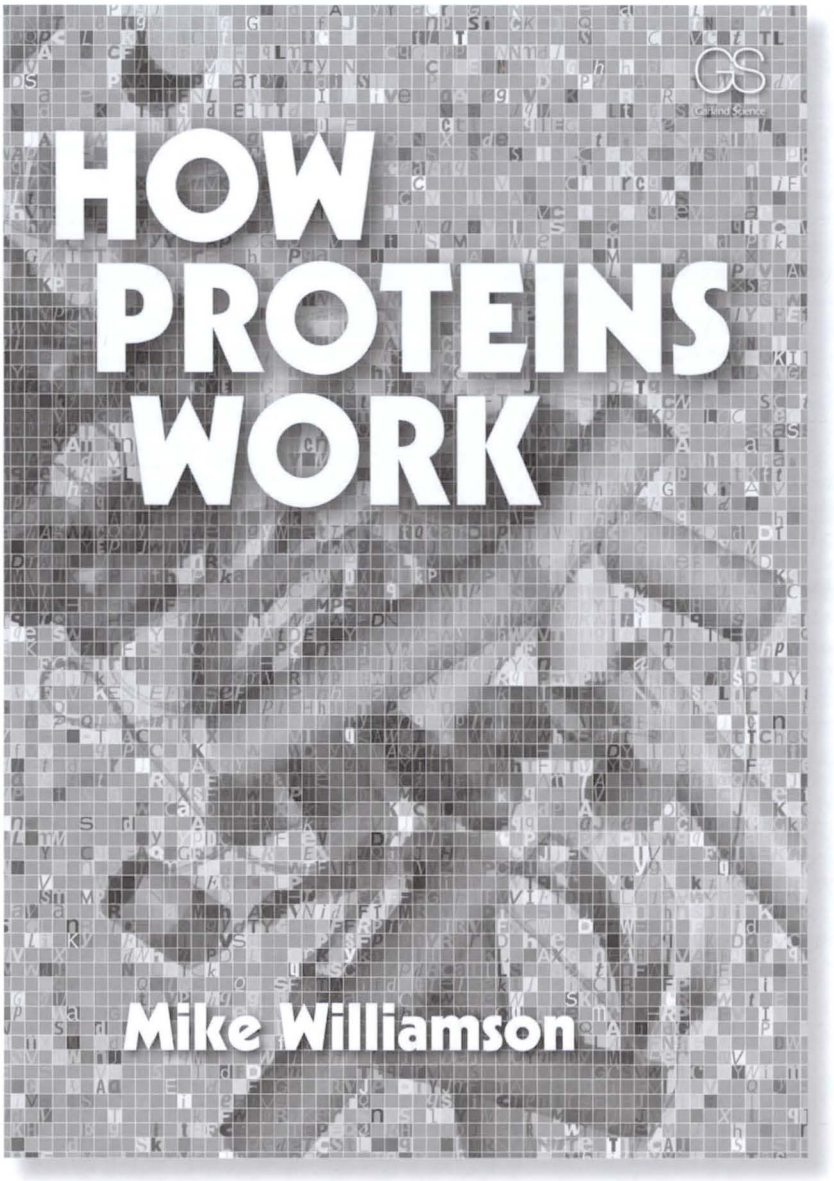


July 2011 • 464 pages • 537 illustrations • Paperback: 978-0-8153-4446-9 • £46.00

Contents

Meeting Reports

Embryonic stem cells as a model system for embryonic development

27 February – 17 March 2011. Cuernavaca, Mexico.

"ES cells as a model system for embryonic development" was an intense course that consisted of practical training as well as talks from world leading experts in the field. It also included one outreach activity and the Latin American Stem Cell Network symposium. The course was focused on how ES cells and ES cell technologies can be used to understand mechanisms of development and differentiation.

The course was organised by Dr Joshua Brickman (Institute for Stem Cell Research, Edinburgh, UK), Dr Jennifer Nichols (Wellcome Trust Centre for Stem Cell Research, Cambridge, UK) and local organisers Dr Iván Velasco and Dr Diana Escalante (Universidad Nacional Autònoma de México (UNAM), Mexico).

The course aimed to strengthen stem cell research in Latin America by exchanging knowledge and providing protocols and ES cell lines from the UK, which is at the forefront of ES cell science. Another objective of the programme was to establish collaborations between Latin America and UK. In order to promote this, six students from the UK were selected to attend the course and train with sixteen students from Latin America. I was one of the lucky students to be selected to take part in this amazing course and I am going to tell you about my experience as a participant.

The course lasted over two weeks and took place in Cuernavaca (Mexico). Normally we had lectures in the morning, practical training in the lab and preparation of talks in the afternoon and scientific discussions in the evenings. After the course we had the opportunity to present our work at the 3rd Latin America Network symposium and we had individually assigned tutors to help us to improve our presentations.

The course started on Sunday 27th February with a social event and assignment of groups. The first lecture of the course was given by Jenny Nichols, on 28th February, who delivered an excellent talk about mouse pre-implantation development and ES cell derivation. She explained how derivation of ES cells can be improved tremendously by using chemically defined media supplemented with MAPK and GSK-3 inhibitors, known as '2i and LIF'. The use of 2i media supplemented with LIF allowed successful derivation of ES cells from CBA and NOD mice, which had proved to be difficult in the past and also allowed ES cells to be derived for the first time from rats.

Another very interesting lecture was given by Prof. Alfonso Martinez-Arias (University of Cambridge) on 1st March, who delivered a very interesting talk about signalling and heterogeneity in ES cells culture, and introduced the concept of transcriptional noise,

which led to very interesting discussion among the students.

The most relevant lecture for my research was the one given by Prof. Austin Smith (Wellcome Trust Centre for Stem Cell Research, Cambridge) on 2nd March. He delivered a fascinating talk about ES cells pluripotency, explaining the discovery of 2i media, defining the ground state of ES cells and then focusing on the molecular mechanisms that may contribute to maintenance of the ground state in 2i. In particular, he provided evidence suggesting that GSK-3 inhibition may increase ES cell's resistance to differentiate by easing Tcf3 repression on the pluripotency network. The practical training and preparation of talks with our individually assigned tutors also started on the 2nd March.

I was fortunate to be assigned Prof. Austin Smith, Prof. Janet Rossant (Hospital for Sick Children Toronto, Ontario, Canada) and Dr Alejando Schinder (Leloir Institute, Buenos Aires, Argentina) as tutors, who were excellent at giving me advice not only about how to improve my presentation but also about my project.

During the practical training we learned very useful techniques such as flushing morulae for ES cell derivation, morula aggregation, analysis of blastocysts from aggregations, blastocyst injection, ES cell derivation, embryo dissection at different stages of development and several methods to differentiate ES cells. Learning these techniques was an amazing opportunity for me and being taught by brilliant leading experts such as Jennifer Nichols, Joshua Brickman, Janet Rossant and Diana Escalante was a unique and very enjoyable experience.

On the 4th March another fascinating lecture was presented, this time by Josh Brickman, who talked about anterior identity and mesendoderm differentiation. He explained how ES cells can model specification of mesendoderm in vitro and thus how they can be used to investigate transcriptional events that take place.

We were also involved in an outreach activity that took place on 9th March in Mexico City. There was a public lecture where faculty members spoke about Stem cells: Science, ethics and legislation. During the break we, the participating students, were available to answer individual questions that the public had regarding any aspect of stem cells. This was a very interesting and pleasant activity.

In between lectures, practicals and tutorials, we were able to enjoy some cultural activities, including a visit to Xochicalco (Morelos State, Mexico), which is an archaeological site thought to be a political, religious and commercial centre founded about 650 AD and it is a UNESCO Heritage site. We also visited the museum of Frida Kahlo de Rivera.

One of the last events of the course was the 3rd Symposium of the Latin American Stem Cell Network, which provided a great opportunity for students to present our work. There were fantastic talks delivered by the students. Ana Hidalgo Sastre (University of Manchester) presented evidence for a crosstalk between Wnt and Notch signalling pathways in mammals and suggested possible mechanisms that underpin the crosstalk. Another exciting talk was given by Carlos Luzzani (University of Buenos Aires, Argentina) who presented data on the identification of chromatin modifying factors which may be important for maintenance of pluripotency and differentiation. One of the most interesting presentations was given by Sophie Morgani (Institute for Stem Cell Research, Scotland), who was a teaching assistant in the course. She talked about heterogeneity of ES cells and highlighted the fact that Oct4 positive ES cells contain some cells which express Hex1 and are primed to an endoderm fate.

The course finished on the 16th of March with informal presentations from the students about our laboratory results and general discussion followed by a party, which included salsa dancing!

This course was not only an excellent opportunity to broaden my theoretical and practical knowledge but also a great chance to interact with key experts, and to meet like-minded colleagues, with whom I had great discussions.

I would strongly recommend this course to those of you who are interested in ES cells and developmental biology as you will have a unique and amazing experience.

I am very thankful to the BSCB for awarding me the Honour Fell Travel Award that contributed enormously towards covering the cost of my attendance at this exciting course.

Yolanda Sanchez Ripoll, Centre for Regenerative Medicine
University of Bath

Stem Cells, Cancer and Metastasis

6–11 March 2011. Keystone Resort, Keystone, Colorado, USA.

Organised by Richard J. Gilbertson (St Jude Children's Research Hospital, USA) and Daniel A. Haber (Massachusetts General Hospital, USA), this meeting focussed on understanding the cellular biology of cancer in order to address important clinical problems.

The topics covered included techniques to detect and track stem cells, investigating the cell of origin for different cancers, and potential therapies for cancers that metastasise or are resistant to therapy.

Overall, the quality of the talks was excellent and several topics had similarities to my project. I especially enjoyed Richard Gilbertson's talk on homo- and heterogeneity which addressed why similar tumours respond differently to the same treatment. I was

interested to learn that there is strong evidence that two separate types of cells can give rise to the same classification of Medulloblastoma, a cerebellum tumour. These two distinct cells of origin formed molecularly different tumours referred to as Wnt subtype and SHH subtype. These two subtypes have mutations in their corresponding pathways which lead to cancers forming in different regions of the brain. MRI and computational analysis of overlapping gene expression between the tumours and regions of expression in the brain validated this argument by illustrating two distinct areas where these tumours form. These two regions comprised of tumours arising in the 4th ventricle compared to those that are attached to the dorsal brainstem. Remarkably, this may suggest that the cell of origin for one subtype of Medulloblastoma, which are currently known as cerebellum tumours, may in fact be tumours of the brainstem that invade. I am studying intracranial germ cell tumours, and I am also investigating the cell of origin for these tumours. Therefore, Richard Gilbertson's talk helped me to develop my own project and gave me several ideas to discuss with my supervisor.

The morning session of the third day focussed on cancer stem cells, with a specific focus on breast cancer. Professor Max Wicha (University of Michigan, USA) described the effects of stem cell directed chemotherapeutics in the advanced and adjuvant setting i.e. during or post-treatment. Breast cancers that express high levels of Her2 receptor have been previously shown to be indicative of highly aggressive cancers. This aggressive nature of cancer is hypothesised to be linked with Her2 because it is a growth factor receptor. Following this finding, several therapies have been developed to target and block the Her2 receptor and Trastuzumab, also known as Herceptin, is one such drug. Interestingly however, it appears that tumours that are Her2 negative respond to Trastuzumab with equal efficacy to Her2 positive cancers. I initially thought this finding was counter-intuitive because blocking the Her2 receptor in normal cells should not have an effect on the entire cancer. However, it is now hypothesised that the cancer stem cells are expressing high levels of Her2 but the bulk of the tumour where the biopsy would have been taken are not. Therefore, treatment is more effective because there is no cancer stem cell population left to form another cancer. I found this talk fascinating even though my research does not focus on either cancer stem cells or breast cancer. He concluded with his plans for clinical trials to investigate therapies that target cancer stem cells given in the adjuvant setting. To complement this, he is also performing further studies involving the cancer stem cell mouse model that he has developed.

During the whole meeting there were recurring themes regarding cancer stem cells. One of these themes was the difficulty in finding a consistent and specific marker for these cancer stem cells in order to better understand their role in tumour formation and progression. Several different labs had evidence that they had found such markers; however, these were often contradicted by different labs. One of the inherent difficulties with these studies is that samples of the cancers involved are difficult to obtain. During the final session, all researchers had the opportunity to participate in an open discussion about several of the themes during the conference, and this topic was briefly addressed. I think the most practical suggestion was for each lab to check all the potential markers against all of their own cancers. I agree that this is the most unbiased way of validating other labs' evidence because no one has a bias in validating their own marker.

Each evening for the first three evenings, researchers were given the opportunity to present a poster on the work their labs are doing. The poster I presented described the epigenetic differences between two types of paediatric brain tumour; yolk sac tumours and germinomas. The researchers interested in my poster ranged from scientists beginning to investigate methylation, to specialists who offered feedback. This process of discussion and feedback was valuable for my broader scientific understanding.

Some of the areas of research presented during the poster sessions mirrored aspects of my work. It was very useful to discuss the problems and solutions to some of the same experiments I am trying as this gave me a new understanding as well as offering alternatives to other peoples' problems.

Aside from the fantastic research at the meeting, the beautiful scenery surrounding the accommodation and conference centre was home to one of the best ski resorts in North America. The conference schedule allowed for ample time to ski on one of 135 ski slopes at the resort. These ranged from beginner slopes to some of the most difficult The Rocky Mountains had to offer, and this was quite evident by the increasing number of arm and leg braces as the conference proceeded!

In summary, the Keystone meeting allowed me to network with potential future employers, examine other researchers' work, and mature my scientific thinking. I enjoyed the conference enormously and I am very grateful to BSCB, BSDB, and The Genetics Society to have been given the opportunity to attend.

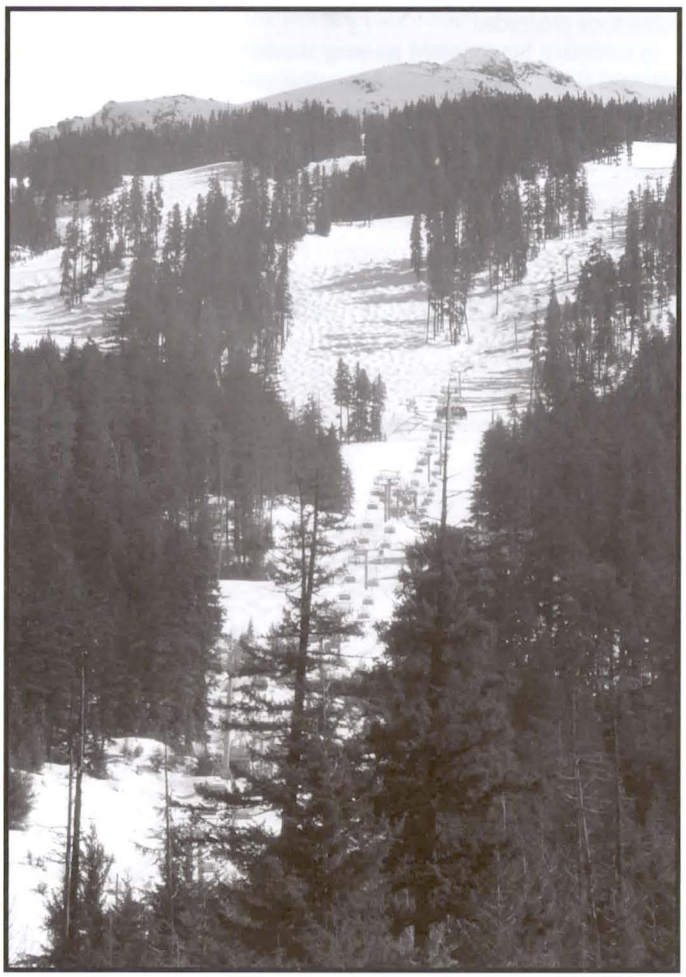
Chris Tan
University of Nottingham

Keystone symposia: Autophagy

27 March – 1 April 2011, Whistler, British Columbia, Canada

Keystone meetings are typically held in breathtaking mountain retreats and this year's 'Autophagy' symposium was no different. The meeting was held in the Olympic standard ski resort of Whistler, Canada, a spectacular 3 hour bus ride through the snowy mountains from Vancouver.

The conference was organised by Ana Maria Cuervo (Albert Einstein College of Medicine, USA), David C. Rubinsztein (Cambridge Institute for Medical Research, UK) and Thomas P. Neufeld (University of Minnesota, USA) and was designed to bring people together from an ever growing and ever diversifying autophagy field. Speakers were invited to discuss topics from cell biology of autophagy to health and disease and clinical implications of the work being carried out at the moment.



The first day of the conference started bright and early with breakfast, giving the attendees the first chance to really interact. It was interesting to discover there were attendees from a diverse range of scientific disciplines, many relatively new to the autophagy field and all very keen to learn. The first day concentrated on novel players in autophagy. One talk I particularly enjoyed was by the charismatic Zvulun Elazar (Weizmann Institute of Science, Israel). He presented data showing GATE-16 and LC3, both members of the Atg8 subfamily are sufficient for complete vesicular fusion. Interestingly, the fusion is mediated by an N-terminal region which is also essential for autophagosome biogenesis.

In addition to the identified fusogenic properties of LC3, the role of this protein in autophagy and its regulation is becoming increasingly more complex. Indeed, an ever growing number of regulatory proteins have been identified to bind directly to LC3 (discussed by a number of speakers throughout the week). In addition, Daniel Klionsky (University of Michigan, USA) discussed the role of LC3 as a scaffold protein, promoting nucleation of the yeast phagophore and a regulator of autophagosome size. Also of interest is how regulation and roles for the mammalian Atg8 orthologs, GATE-16 and GABARAPs are conserved or distinct as demonstrated by Jeannette Messer (University of Chicago, USA). Data was presented from two labs identifying novel interplay between a complex of proteins in the phosphorylation and regulation of selective autophagy of bacteria. Ivan Dikic (Goethe University Medical School, Germany) initially took a biochemical-based approach while Vojo Deretic, (University of New Mexico, USA) carried out a large siRNA-based cell culture screen using a bacterial killing assay to generate complementary data. A fascinating talk by Xuejun Jiang (Sloan-Kettering Institute, USA) has identified that autophagosome fusion to lysosomes occurs via a vps16-independent mechanism which is distinct from the process of late-endosome to lysosome fusion.

The importance of autophagy to cellular homeostasis was highlighted sessions on 'Autophagy in disease' and 'Autophagy, cell death and cancer'. Andrea Ballabio (Telethon Institute of Genetics and Medicine, Italy) beautifully presented the research from his lab on the role of TFEB, a master regulator of lysosome biogenesis, as a key regulator of autophagy-related genes. Induction of TFEB in models of lysosomal storage diseases promotes clearance of the causative protein aggregates by enhancing autophagosome-lysosome

fusion. Further talks presented data on the role of autophagy in the regulation or potential therapeutic treatment of diseases including cancer and tumour development and death (Kevin Ryan, Beatson Institute for Cancer Research, and Eileen White, Rutgers University, USA among many others) and Alzheimer's (Ralph A. Nixon, NYU Langone Medical Center/Nathan Kline Institute, USA), to name just a couple.

A key question facing autophagy scientists today is where the membrane for de novo autophagosome formation originates from. There have been many papers and reviews in recent years discussing this topic and it appears the answer is anything but straightforward. David C. Rubinsztein (Cambridge Institute for Medical Research, UK) presented data published by his lab last year identifying pre-autophagosomal structures that originate from the plasma membrane in a clathrin-dependent manner. Jennifer Lippencourt-Swartz also showed a series of stunning live imaging data identifying that in severe starvation conditions, the outer mitochondrial membrane lends itself to autophagosome formation. Sharon Tooze, London Research Institute, UK, has also identified that the Golgi and recycling endosomes contribute to autophagosome formation.

For those not lucky enough to be out enjoying the Olympic-standard skiing, the afternoon workshops were on hand to provide varied and interesting insights into the very forefront of autophagy research as well as giving more junior scientists a platform to present their work. The workshops included 'Novel techniques to track autophagy', 'A clinical point of view', 'Advantages and limitations of non-mammalian autophagy', and a series of talks on 'Large screening and omics in autophagy'. Each workshop was followed by open and frank discussions with input from PhD students, post docs and PI's and was an excellent opportunity to probe the best minds in the field. I have not even had a chance to mention the evening poster sessions here, but these sessions encouraged more focussed and technical discussions. I found the most useful aspect of these sessions was to see how people addressed questions similar to those I am working on with different experimental techniques, clearly playing on the strength of the expertise in their labs. I was able to get many ideas for future experiments as well as contacts with people who may be able to provide technical and practical help to my project in the future.

The future of autophagy is an exciting one, many people spoke of clinical applications for their work. In addition, further expansion of the field will allow us to better understand the differences between distinct autophagic processes, including starvation-induced macroautophagy, selective autophagy and microautophagy.

Overall, the conference was an excellent experience. It offered not only the opportunity to put a face to all those names you encounter in your research but also the relaxed atmosphere makes it possible to interact with the very best scientists in the field. Everyone was friendly and approachable. It was great to meet people who are working, and in many cases struggling with the same experiments as you. I would thoroughly recommend every PhD student to try and attend an international conference at least once during their studies. I would like to thank Keystone and the BSCB for their generous grants, without which I would not have been able to attend the conference.

Bernadette Carroll
Imperial College London

World Immune Regulation Meeting-V

24–27 March, 2011, Davos, Switzerland

The fifth international conference on immune regulation, with a special focus on Innate and Adaptive Immune response and the Role of Tissues in Immune Regulation took place at the Congress Centre amid the beautiful surroundings of the highest city in Europe, Davos.

Organised annually by Cezmi Akdis (The Swiss Institute of Allergy and Asthma Research (SIAF)), the World Immune Regulation Meeting serves as a key event in every regulatory immunologist's calendar, to hear and discuss the latest developments, in an increasingly established field.

Nestled amongst the Swiss Alps, Davos is one of the biggest Swiss ski resorts, with around sixty miles of pistes. The combination of breathtaking scenery and brisk mountain air served to create a stimulating conference atmosphere, and also gave me the chance to try out skiing for the very first time!

The conference kicked off with a session on innate immunity. As the session progressed, it became increasingly clear that a very 'hot' topic at the moment is that of the influence of an individual's gut microbiota upon their immune system, and hence their disposition to various diseases. One such talk, by Eric Pamer (Sloan-Kettering Institute, USA) highlighted the adverse effect of antibiotic treatment upon the density of gut microbiota, and how this can lead to a reduction in production of Reg3γ, an antimicrobial factor produced by intestinal epithelial cells. Alexander Chervonsky (University of Chicago, USA) followed on from this with a talk linking changes in commensal microbes of the gut to the autoimmune disease Type 1 Diabetes.

Following an afternoon winter sports break, sessions were resumed late afternoon with various workshops. In each, up and coming speakers, ranging from PhD students to lab heads, were given six minutes to present their work. Such brief talks really ensured speakers focussed upon the data, and gave an interesting snapshot of many different areas. Graham Britton, from my lab (University of Bristol), gave an interesting talk in which various microscopic techniques were utilised to show the delocalisation of protein kinase C theta (PKCtheta) from the interface of a regulatory T cell- Antigen Presenting Cell synapse. Also of note, Leona Gabrysova (MRC National Institute for Medical Research (NIMR)) gave an excellent talk highlighting the fine boundary in dosage of various stimulating factors guiding the differentiation of Foxp3+ regulatory T cells.

The evening session of day one focussed upon immune homeostasis, and was followed by the first of each evening's poster sessions. The breakdown of each poster session into around eight different categories ensured the two chairs of each category could discuss each poster at detail with the presenter, and increased accessibility of the posters to all.

The second day of the conference began with a session on effector and regulatory T cells. Takashi Saito (RIKEN Research Centre for Allergy and Immunology, Japan) presented beautiful images obtained using TIRF microscopy to show the formation of T cell receptor microclusters (TCR-MC) upon the surface of a T cell upon its activation. Following a coffee break, Arne Akbar (University College London) showed compelling data to provide a model for the known decline in immunity during ageing. In their model, utilising human samples, it is not T cells which are defective in older individuals, but the activation of T cells, due to reduced TNF-α secretion by macrophages.

The evening session of the second day encompassed a diverse range of talks, ranging from the discovery of a novel innate immune cell 'nuocyte' which requires the cytokines IL-7 and IL-33 for differentiation (Andrew McKenzie, MRC-Laboratory of Molecular Biology), to the requirement of the cytokine IL-2, but not TGF-β, in the development of inflammatory Th17 cells (Daniel J. Cua, Merck Research Laboratories, USA).

Once again, the importance of infectious agents was emphasized the following morning, with a number of talks on the immune response to infectious agents. Yasmine Belkaid (National Institute of Health, USA) discussed the importance of the dietary metabolite Retinoic Acid in restoring immune response during infection. The downregulation of inflammatory responses by parasites was then discussed by Rick Maizels (University of Edinburgh), who has collected the excretory-secretory products from adult H.polygyrus and used these products in vivo to block the development of airway allergy. Anne O'Garra (The MRC National Institute for Medical Research) then presented an interesting systems biology approach to studying individuals suffering from tuberculosis (TB), showing a clear blood transcriptional signature for active TB.

I would finally like to mention the work of Maria Grazia Roncarolo's lab (San Raffaele University, Italy). Prof. Roncarolo presented promising data from three recent clinical trials using regulatory T cells in allogeneic hematopoietic stem cell transplantation (HSCT). In most cases, regulatory T cells were able to prevent Graft-versus-host Disease (GvHD) after allo-HSCT.

With so many brilliant talks, I hope the few I have mentioned here give a taste of the conference. I really enjoyed the chance to discuss my work with so many others, and came away with numerous new ideas. I would like to thank the University of Bristol and the BSCB for the Honor Fell travel award which enabled me to attend this conference.

Laura Carney
University of Bristol

Cold Spring Harbour course on the Cell and Developmental Biology of *Xenopus*

8–19 April, 2011. Cold Spring Harbour, Long Island NY

The Cold Spring Harbour 2011 *Xenopus* course is not just a course but an opportunity for members of the Xenopus community to share their passion for this legendary animal model. It combines both intensive laboratory training with daily lectures from some of the world's leading experts in the *Xenopus* field.

I attended this course from April 8th-19th 2011 which kick started with a wine and cheese reception which I regrettably missed due to late flights. I was however warmly greeted the next day by all of my fellow students attending this course of a variety of ages, ability and stages in career ranging from PhD students to staff scientists. The theme of the first day was localised RNAs in the Xenopus egg for which we received a lecture from Doug Houston (University of Iowa, USA) entitled Symmetry Breaking in the Xenopus Egg; Localised RNAs Set the Stage. He spoke about his lab's interest in how inherited maternal molecules regulate early zygotic signals such as Wnt signalling. We had the opportunity to try host oocyte transfer experiments which allow the study of maternal mRNAs in the Xenopus embryo.

On the second day we received a talk from John Wallingford (University of Texas, USA). His talk entitled The Awesome Power of Live Imaging in Xenopus gives you an idea of just how enthusiastic he was about good quality live imaging and the fantastic results you can obtain from it. He convinced us undoubtedly that Xenopus are an incredible model organism for live imaging for a whole host of tissue types. We were given the opportunity to try some live fluorescence imaging as John had kindly brought with him GFP-tau and Rhodamine, which we used for lineage tracing.

We received a fascinating set of lectures from Kris Kroll (Washington University in St Louis, USA) and Takuya Nakayama (University of Virginia, USA). Kris now works on epigenetic regulation of early cell fate and spoke predominantly about her work on Geminin, a protein which promotes the binding of polycomb repressive complexes to histone H3 and thus brings about repressive modifications leading to genes being kept in a poised state. However she is also praised as one of the pioneers of Xenopus transgenesis for her work on the restriction-enzyme-mediated integration (REMI) method of transgenesis. We were fortunate enough to hear her explain this method and have a go at creating transgenic Xenopus ourselves. Takuya explained two other transgenic methods more recently devised for use in Xenopus; I-SceI meganuclease and Tol2 transgenesis. We were also able to attempt these methods with many obtaining some fantastic images.

Kevin Lin (University of Minnesota, USA) a post-doc from Jonathan Slack's lab gave a talk on the somewhat underestimated regenerative power of the Xenopus. Xenopus have not always been associated with regeneration, as other models such as newts and salamanders have great regenerative capacities. Kevin's talk was able to convince us that Xenopus is a powerful model for this area of research. He discussed his own work showing the ability of a removed tadpole lens to entirely regenerate, Xenopus limb regeneration and the full regeneration of an amputated tadpole tail to give fully restored muscle and pigmentation. As a practical element to this talk we were given our own tadpoles to conduct tail amputations in the presence of various transcription factors which could promote or repress tail growth.

Lyle Zimmerman (NIMR London) and Mustafa Khokha (Yale University, USA) both spoke about their preferred variety of mutagenesis by the use of gynogenetic screens. Gynogenesis utilises UV-irradiated sperm suspensions to fertilise Xenopus eggs so that the

paternal genome will not contribute to the zygote. This would normally give a generation of unviable haploid embryos, however viable diploid embryos can be obtained if these embryos undergo a coldshock to retain their polar bodies before extrusion. Chemical mutagenesis allows the introduction of single gene defects with resulting phenotypes which can be analysed. Lyle and Mustafa spoke about some of the remarkably interesting phenotypes they were able to obtain using this method. These included cyd vicious, one of Lyle's mutants, which due to a mutation in neural crest regulatory pathways showed a reduction in melanocyte migration resulting in a mohican like appearance as pigment cells stay along the back of the embryo. Grinch, one of Mustafa's mutants, showed a loss of the cilia which normally covers the Xenopus surface ectoderm for which he had some stunning electron microscopy images.

On the last few days we received a talk from a legend in the area of Xenopus research, Ray Keller (University of Virginia, USA). He gave a talk on some of his recent work in cell motility, forces and patterning which occur during gastrulation. Cells will undergo convergent extension movements due to cell movements and intercalation during gastrulation and Ray is interested in the measurement of the forces responsible for these processes. Ray Keller is well known for his skills in grafting with his very own graft, the Keller explant. We were fortunate enough to be taught a variety of grafting techniques with Ray more than happy to give advice and guidance as we did so.

We finished the course on the exceptional high note that was a delicious steak and lobster banquet. I came away from this fully equipped with the skills to deshell a lobster, a challenge I had never previously come up against. After this we were fortunate that some of the students and course leaders were musically talented and thus we were able to have a few drinks and a dance to celebrate the last night. I had an amazing time at the course and have found the Xenopus community to be a fun, dedicated and welcoming community of which I am proud to be a member. I would like to thank the BSCB for their generous funds which allowed me to attend the course and Amy Sater and Jerry Thomsen for organising the course. I came away with many new friends, fantastic memories and a t-shirt with the take home message of the course "It's never just a frog thing".

Victoria Hatch
University of East Anglia

Sixth International Congress on Electron Tomography

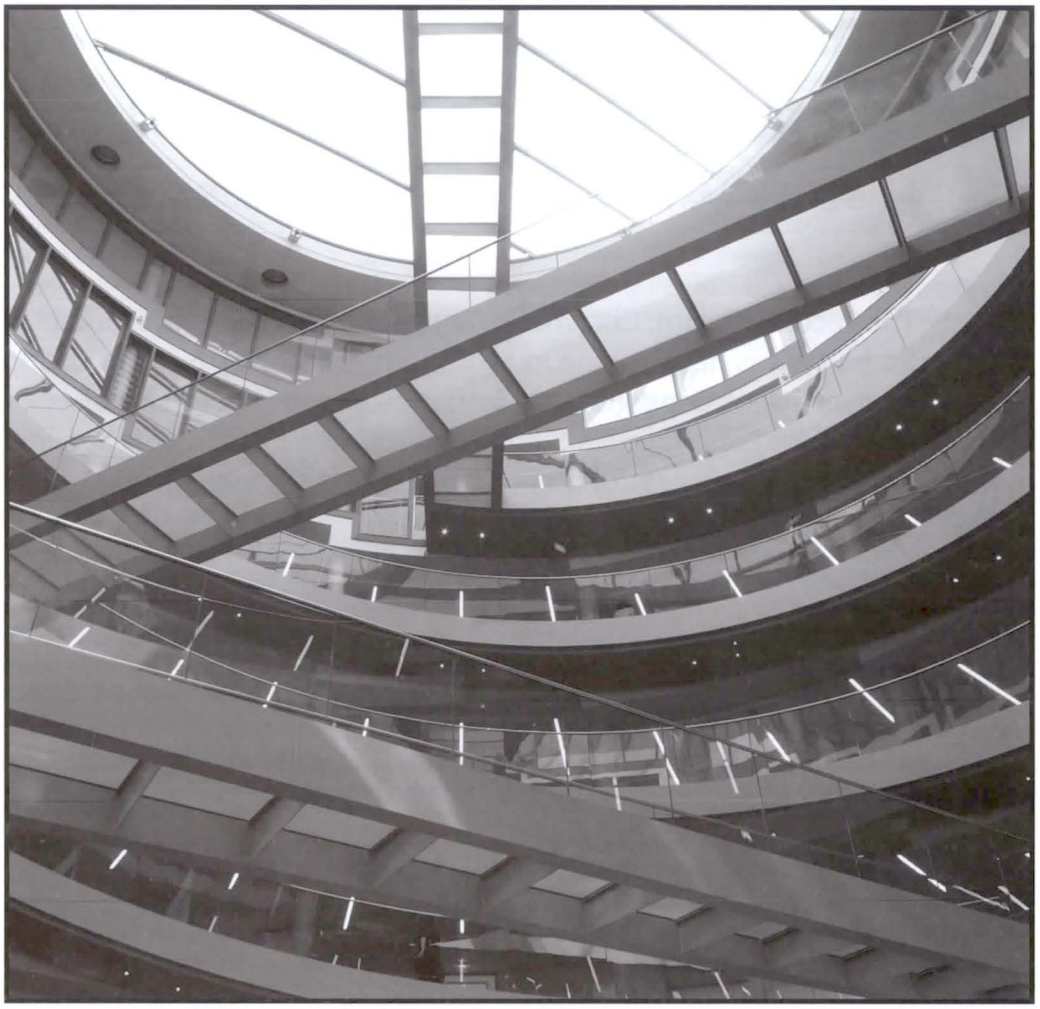
5–8 May, 2011. EMBL Advanced Training Centre, Heidelberg, Germany.

Over 230 participants (including users, prominent scientists and technology developers) gathered in Heidelberg for the Sixth International Congress on Electron Tomography. This meeting discussed recent major advances in all things structural – from single proteins at subatomic resolution to entire organism 3D reconstruction.

Electron microscopy (EM) in European universities appears more vibrant now than at any time in the past decade or more. Arguably, biological EM came close to extinction as a core technique in the 1980s and 90s, as researchers ventured into new techniques in light microscopy and molecular biology. Many departmental facilities became under-used and several were shut down. EM acquired a reputation for being fiddly, costly and – perhaps the greatest of sins – 'descriptive'. However, advances in cryo-electron microscopy and 3D electron tomography, along with a rediscovery of the importance of the ultrastructural, has lead to a renaissance in biological EM that many university departments are again keen to access.

The daily schedule of the Congress consisted of talks from invited speakers and oral presentations, followed by a poster session at the end of the afternoon. There was plenty of new and exciting information to keep our brains busy through the entire programme. And despite the diversity in applications, questions and models, for me, two dominant trends emerged. One was a bridging of some of the gap between light and electron microscopy through the use of correlative techniques. Such techniques varied from fairly 'routine' registering of images captured by both methods, to engineering fluorescence capabilities into a cryo-electron microscope, allowing sequential light and high resolution ultrastructural work in one single instrument (demonstrated by Abraham Bram Koster, Leiden University Medical Center, Netherlands). The second trend was the huge increase in the scale of ultrastructural datasets afforded by the use of high-throughput tomographic reconstructions. The first electron tomographic reconstructions of an eukaryote were published just 4 years ago and involved small algae or yeast cells of ~2μm in diameter. Since that time, electron tomography has been used to reconstruct fly whole embryos as well as adult tissues. The growth of information content displayed at this meeting was astonishing, with single montaged reconstructions measuring up to 600 Gb. The bottleneck, however, is still in data analysis, and the development of more automated tools is a clear priority for the coming years.

Among the talks given by invited speakers, one highlight for me was Thomas Müller-Reichert (University of Technology Dresden, Germany), who is applying light microscopy in combination with electron tomography (ET) of high pressure frozen material to study



the very final stages of cytokinesis. The involvement of ESCRT-III in this constriction was known, but Thomas has now shown its structural side, with ESCRT-III forming helical filaments that narrow the cortex of the intercellular bridge to a single stalk. John Briggs (EMBL Heidelberg, Germany), one of the conference organisers, also talked about hybrid methods – in this case used to study coated vesicle budding – and showed some very detailed structural information on assembled COPI coats. Using cryo-electron tomography (cryo-ET) and subtomogram averaging of a reconstituted budding reaction, he showed how subunits of the COPI coat adopt different conformations and interact with different stoichiometries so as to accommodate vesicles of different sizes and shapes (as opposed to the very regular sizes seeing for clathrin- and COPII-coated vesicles). It was interesting to see how this fundamentally novel basis for vesicle coat assembly shares features with some viral protein coats. Takashi Ishikawa (Paul Scherrer Institute, Switzerland) showed how ET and subtomogram averaging could decipher the bending mechanism of eukaryotic flagella/cilia. A striking feature of cilia/flagella is the conservation of structure displayed in most axonemes, in which nine peripheral microtubule doublets surround two singlet microtubules. Despite this canonical architecture, cilia and flagella can bend in many different ways. Takashi's incredibly detailed 3D structural analysis revealed a series of asymmetries along and showed how these features would explain different waveforms to be formed in cilia and flagella. Sam Li (University of California – San Francisco, USA) then moved us to the base of the cilium, showing the structure of the basal body (BB) at a fantastic 3 nm resolution. By fitting the solved structure of tubulin into his tomographic reconstructions, he showed how it was possible to build a pseudo-atomic model of the BB triplet. The 3D density map revealed novel densities that represented non-tubulin proteins attached to the BB. Rather than averaging the whole structure, Sam showed us subvolumes at different spatial locations along the BB which, just as for the axoneme mentioned above, also displayed heterogeneity along its length, suggesting a sequential and coordinated mechanism for BB assembly. Finally, Wah Chiu (Baylor College of Medicine, USA) gave a fantastic keynote session on cryo-electron tomography single particle analysis as an emerging structural technique for imaging individual macromolecular assemblies close to atomic resolution. Wah Chiu, who was present at the birth of cryoET as a technique, showed a huge amount of work on bacteriophage structure to illustrate the key concepts behind the method. I found his talk both highly informative and enjoyable. My favourite selected oral presentation was from Wanda Kukulski (John Briggs's lab at EMBL Heidelberg, Germany). She used correlative fluorescence and electron tomography to directly map the signals of ~20 endocytic proteins (Ede1, Sla1 and Rvs167 among others) tagged with GFP or RFP, and gave us a 4D description of the yeast plasma membrane during the transition from a plane membrane to tubular invaginations, through formation of a constricted neck followed by abscission of a vesicle. Wanda's comprehensive, spatiotemporal description gives new insights into how protein modules of the endocytosis machinery coordinate the changes in membrane topology required for vesicle budding. The meeting was hugely enjoyable and gave me an invaluable opportunity to see developments in structural cell biology. I presented a poster describing my own work using ET to study how some human pathogens organise their surface membrane into specialised domains, and was able to get some great feedback from some of the experts in the field. For this, I'm very grateful to the BSCB for awarding me the Honor Fell Travel Award to meet the costs of my travel to Heidelberg.

Catarina Gadelha
University of Cambridge

abcam: Chromatin, Replication and Chromosomal Stability

20–21 June 2011. Werner Gren Centre, Stockholm, Sweden.

The second abcam: Chromatin, Replication and Chromosomal Stability was held in June in Stockholm, organised by Anja Groth (University of Copenhagen), Catherine Green (University of Cambridge) and Camilla Sjögren (Karolinska Institute), following the previous successful meeting in 2009 in Copenhagen.

I was fortunately able to attend this meeting through BSCB Honor Fell Travel Funding, and amazingly my work was selected for oral presentation; my first talk at a conference.

The conference kicked off with a fascinating broad ranging talk from one of the keynote speakers, Helen Blau (Stanford University), who highlighted the importance of a correct demethylation programme during reprogramming and the effect of 'stiffness' on the regenerative ability of Muscle Stem Cells (MuSCs). Although reprogramming of cells can also be achieved through iPS cell generation or nuclear transfer, her lab uses the method of cell fusion to investigate the mechanisms involved during reprogramming, specifically those of DNA demethylation, an 'epigenetic bottleneck'. She described their discovery of Activation Induced Cytidine Deaminase (AID) expression in heterokaryons, and the subsequent elucidation that demethylation during reprogramming is achieved through nucleotide base replacement rather than direct demethylation, as was previously thought. Prof. Blau ended the talk with an example of how much a cell's environment can alter its phenotype. She used a Goldilocks analogy to describe how MuSCs grown on the much too 'stiff' tissue culture plastic are unable to regenerate in vivo but those grown on a 'comfy bed' of PolyEthyleneGlycol (the same stiffness as muscle), have a greater capacity for regeneration, thereby conveying some of the previously ignored 3D requirements of cells.

The first session covered Replication, Chromosome Structure and Cellular Memory and I thankfully had an early talk slot. This meant I would be able to concentrate fully on the later talks rather than worrying about my own. Speaking in a session with well-known cell cycle personalities was rather intimidating however, my talk went well and I was able to speak with several people in breaks who asked interesting questions and offered helpful suggestions. Although it was a bit scary, I would definitely recommend pushing yourself as a PhD student and trying to get an opportunity to talk about your work.

From this session I found Marcel Méchali's (Institute of Human Genetics, CNRS) talk particularly interesting. He described some of the features his group are finding in higher eukaryotic DNA replication origins, by mining a large data set. It has long been known that higher eukaryotes, unlike yeast, do not have a strict DNA sequence that specifies origins. Work from his group showed that origins are enriched just before or after transcription start sites but not at the site itself, and that there is in fact some sequence impact, with origins having a TG/CA bias. He also described their 'flexible replicon model' where 4-5 origins are grouped in a replicon from which one origin will be stochastically activated and then silence the others in that replicon. The question everyone wanted to know when I spoke to him after was, how does this happen? I hope we soon find out!

After lunch, and meeting and chatting with various people, the second session on 'Chromatin Replication and Histone Dynamics' started. It covered topics from a potential histone modification-based therapeutic against *Candida* infections, to how stalled replication forks are resolved. I particularly enjoyed the talk from Patrick Varga-Weisz (Babraham Institute) telling us about how pericentromeric and centromeric boundaries are maintained. The heterochromatin found at these points has a complex combination of specific histone modifications and recruitment of additional proteins. The correct disruption and then reassembly of these structures must be undertaken during each cell cycle and this maintenance is critical for genomic stability and chromosome segregation. Varga-Weisz described the work from his lab on the role of the chromatin remodeler SMARCAD1 during this process, which appears to complement those roles performed by histone modifying enzymes such as Histone Deacetylases (HDACs) and Histone Methyltransferases (HMTs). SMARCAD1 interacts with many proteins, including some involved in DNA replication, repair, silencing and heterochromatin maintenance, and localises to pericentromeric heterochromatin during late S-phase when it is replicated. Although initially found to be required for ES cell maintenance, the knock out mouse generated was viable with only a small number of defects. This paradox is undergoing further investigation. However, it was clear that depletion of SMARCAD1 by siRNA led to a global increase in euchromatin marks and corresponding decrease in heterochromatin marks through apparent failure to correctly recruit histone modifying proteins which interact with SMARCAD1; and led to an increase in mitotic defects. This was the first of several fascinating talks on how chromatin is faithfully maintained after DNA replication.

On the Tuesday, session three covered 'Initiation, Timing and Epigenetic States'. The first talk by David Gilbert (Florida State University) made sure we were awake and had brains engaged as he discussed replication timing. In order to investigate the importance of when particular regions of the genome are replicated (early, mid or late S-phase) his lab has produced genome wide profiles for replication-timing from a wide number of cell lines, cells at different stages of differentiation and also for various human pathological conditions. Changes in replication-timing can affect half of the genome but surprisingly, correlated only slightly with transcriptional status and epigenetic marks. The factor that correlated strongest was long-range chromatin interactions suggesting importance of spatial organisation. Using the huge change in global replication timing between the early and late epiblast (which is not accompanied by a significant change in the transcriptional programme) work from his group showed that most genes which change their replication timing at this transition, move from early to late replication, and are linked to increased compaction of chromatin. Echoing the model of DNA fractal globules by Erez Lieberman-Aiden and Nynke van Berkum, early and late replicating genomic regions appear to segregate, with like associating with like. Consistent with this, regions of the genome that change in timing of

replication are of the size 400-800kb suggesting this is the domain size for a region of the genome which is replicated at the same time. Interestingly the genes which change replication timing status correlated with genes which are difficult to reprogramme, clearly impacting on attempts to improve iPS efficiency and further highlighting the importance of spatial organisation.

The final session was entitled 'Replisome Structure, Fork Progression and Repair' and covered some of the recent data about a wide range of mechanisms involved in maintaining faithful DNA replication. I found the talk on how DNA replication machinery deals with the predicted bulky DNA tertiary structure at G-quadruplex (G4) motifs by Virginia Zakian (Princetown University) particularly fascinating. She presented work that replication through large protein complexes or DNA structures such as G-quadruplexes are facilitated by the helicases Rrm3 and Pif1 (S. cerevisiae) (or related Pfh1 in S. pombe and Pif1 in H. sapiens). From genome wide ChIP, ~25% of G4 motifs were bound by Pif1 and DNA replication dramatically slowed in and around these regions in pif1 mutated cells. Startlingly, knocking down Pif1 by RNAi also led to a huge mutation rate at these sites, 20% of Gs became mutated and 97% of these sites were no longer predicted to form G4 structures. The predicted G4 structures therefore do appear to form in vivo and be resolved by Pif1 to prevent them causing problems for DNA replication machinery and subsequent fork stalling, breakage and mutations

For the last talk of the day, the second keynote speaker, Michael O'Donnell (Rockefeller University and HHMI), gave us a different perspective, focussing on the bacterial replisome. It was fascinating to hear the story of the third polymerase, about the flexibility of polymerases and how the replisome varies its composition as required. In vitro di-polymerase and tri-polymerase replisomes have similar rates for DNA synthesis but the three polymerase version has several advantages. Firstly the processivity is much greater due to more contact with the lagging strand, also no gaps are left on the lagging strand unlike those seen when only two polymerases are permitted. The specific polymerases found in the replisome however, varied dramatically, with pol III found under normal conditions but replaced by pol II and pol IV during times of DNA damage. These alternative polymerases slow the helicase dramatically and are stable, presumably allowing time for DNA repair. It is sometimes too easy to ignore bacteria within the cell biology field, but this definitely showed how much we can learn about mechanism from bacteria.

As well as attending this illuminating conference and meeting other scientists from across the world I also managed to have a look around Stockholm. The city is beautiful, spread across 14 islands, so there are boats and bridges everywhere; not without reason is it known as the Venice of the North. I also saw some of the distinctive, colourful and very pretty wooden houses on the 13,000 islands of the archipelago and of course went to the Nobel Museum and saw one of the famous medals!

I would like to thank the organisers for a fantastic conference and also the BSCB for their generous funding which allowed me to attend this stimulating event.

Rosemary H C Wilson ,
University of York

Inaugural Cambridge Stem Cell Symposium: Pluripotency and Development

6–7 July 2011, Downing College, Cambridge

The inaugural Cambridge Stem Cell Symposium took place over two sunny days in early July at Downing College. Organisers Dr Jenny Nichols and Dr Brian Hendrich (Wellcome Trust Centre for Stem Cell Research, University of Cambridge) had brought together a large number of experts in the fields of pluripotency and development with talks covering topics from lineage fate decisions in the early mouse embryo to mesoderm differentiation in human embryonic stem cells.

The first session of the meeting, Specification of Pluripotency, was chaired by Jenny Nichols. The first talks by Kat Hadjantonakis (Sloan-Kettering Institute, New York) and Berenika Plusa (University of Manchester) both covered the topic of lineage specification of the primitive endoderm from the pluripotent inner cell mass. They presented data outlining roles for growth factors PDGF and Fgf4 in the early embryo. The session was finished by Takashi Hiiragi (EMBL, Heidelberg) who shared his exciting research using fluorescence-based gene-trap mouse lines to visualise embryonic patterning, and single cell expression profiling in the embryo.

After a coffee break the session was continued by a talk from Hitoshi Niwa (RIKEN Center for Developmental Biology, Japan) on the role of Sox2 in the maintenance of pluripotency in both embryonic and trophoblast stem cells. He presented data indicating an evolutionary conservation of Sox protein function, with Drosophila Sox protein being able to maintain embryonic stem cell pluripotency. Further talks in the session were given by Alfonso Martinez Arias (Wellcome Trust Cancer Research, Gurdon Institute, University of Cambridge), Aoife O'Shaughnessy (Wellcome Trust Centre for Stem Cell Research, University of Cambridge) and Claire Chazaud (Genetique, Reproduction et Development, France) who introduced us to the roles of Wnt signalling in mouse embryonic stem cells, chromatin remodeller Mi-2 in lineage decisions of mouse embryos and gave further insight into the primitive endoderm differentiation and the roles of Fgf4 and Nanog in early mouse development respectively. The evening was then continued by the poster session with drinks until the sound of the gong called the

conference participants to the dinner that was served in the formal hall of Downing College.

The second day of the conference started with a session titled: Perdurance of Pluripotency, chaired by Brian Hendrich. The first talk by Philip Avner (Institut Pasteur, France) was the EMBO talk, and he gave a very extensive overview of the X-inactivation process and its lineage dependency and developmental programming. This talk was followed by Ian Adams (Institute of Genetics and Molecular Medicine, University of Edinburgh), who shed light on the important role of Tex19.1 in protection against aneuploidy and suppression of retrotransposons in the germline cycle. The morning talks were finished by Amanda Fisher (Clinical Sciences Centre, Imperial College London) who shared data from her experiments with the heterokaryon reprogramming method.

Following a brief break for coffee the talks were continued by Antoine Peters (Friedrich Miescher Institute for Biomedical Research, Switzerland). He introduced us to epigenetic reprogramming by members of the Polycomb Group of proteins, and how they regulate inheritance of epigenetic information between generations. Yusuke Miyanari (Institute of Genetics and Molecular Biology, France) then continued the talks by sharing his interesting findings on the expression of Nanog in the early mouse embryo and how it is regulated on the level of individual alleles. By creating dual colour system with GFP and mCherry linked to each allele respectively, he showed data demonstrating real time fluctuations of Nanog expression in the early embryo. The final talk of the session was given by Anne Helness (Institute of Reproductive and Developmental Biology, Imperial College London) on bivalent chromatin domains. Interestingly their data demonstrated the existence of bivalent domains in both the ICM and the newly formed trophoectoderm in vivo and high-lighted mutually exclusive roles for Ring1b and Suv39h1 in regulating distinct chromatin states at key developmental genes.

After a quick lunch, to catch up with the time table, we started the final session of the conference, Exit from Pluripotency, chaired by Prof Austin Smith. The first talk was given by Shinichi Nishikawa (RIKEN Center for Developmental Biology, Japan) detailing the developmental pathway of hematopoietic stem cells. Joshua Brickman (Institute of Genetics and Molecular Medicine, University of Edinburgh) presented his groups findings about heterogeneity of anterior/primitive endoderm marker expression in self-renewing ES cell cultures. We also heard talks from Jerome Collignon (Institut Jaques Monod, France), who presented data about the role of Nodal in the early mouse embryo and pluripotent stem cells, and from Dean S. Griffiths (Department of Haematology, University of Cambridge), who outlined a role for JAK/STAT signalling in mouse ES cells parallel to LIF. This role involves the control of HP1 binding through histone phosphorylation.

The talks of the final part of the conference were started by Valerie Wilson (Institute for Stem Cell Research, University of Edinburgh). Her talk dealt with the timing of loss of pluripotency in the postimplantation embryo and events regulating it. This was followed by Anton Wutz (Wellcome Trust Centre for Stem Cell Research, University of Cambridge) who returned to the topic of control of stem cell identity and differentiation by Polycomb group complexes. He showed data on Prc1 and Prc2 deficient ES cells, demonstrating that both Prc1 and 2 contribute to the maintenance of the epigenetic identity of stem cells. The final talk of the conference was given by Roger Pedersen, who covered mechanisms of mesoderm differentiation in pluripotent stem cells, demonstrating data indicating a key role for Brachyury in the lineage differentiation.

I would like to congratulate the organisers for a successful and stimulating conference. Keep your eyes out for the 2nd Annual Cambridge Stem Cell Symposium next year. I would also like to express my gratitude to the BSCB for generously providing funding for me to attend the conference.

Matias Ilmari Autio, IRDB, Dept Surgery & Cancer, Imperial College London

BSCB Sponsored Meeting: 8th North of England Cell Biology Forum

9 September 2011. University of Sheffield

The North of England Cell Biology Forum is a one-day annual forum, which brings together molecular cell biologists, located in the North of England, working in the areas of membrane trafficking, cytoskeleton, molecular motors and signal transduction. We are fortunate that within this region there is a critical mass of scientists with related interests in these fields. With strong support for the meeting from PIs, the scientific programme of talks and posters is delivered and chaired entirely by PhD students and post-docs. The meeting has become a well-established part of the calendar for cell biologists in this area and the 8th meeting was held at The Edge Conference Facilities at the University of Sheffield on Friday, September 9th.

As always it was a most enjoyable and stimulating day with 13 talks presented by PhD students and postdocs in 4 sessions, all chaired by postdocs. The talks covered a diverse range of cell biological topics including chromatin structure, secretion, ER, nuclear and chloroplast translocation, and endocytosis in different contexts. All were of an extremely high standard and first prize was awarded to Dr Mark Morgan (University of Manchester) for his talk on 'Syndecan-4 Phosphorylation: a critical control point regulating integrin recycling and cell migration'. Second prize went to Anna Willox, a postdoc from Steve Royle's lab at the University of Liverpool for her talk on 'Stonin 2 is the major adaptor for clathrin-mediated synaptic vesicle retrieval'. Additionally there was a lunchtime poster session and the prize for best poster went to Liz Granger from Viki Allan's lab at the University of Manchester for her poster describing proteins that interact with dynein.

There were 94 registered delegates from the Universities of Sheffield, Sheffield Hallam, Manchester, Hull, York, Leeds and Liverpool at the meeting and, as in previous years, to encourage as broad an audience as possible, there were no registration fees and costs were met by sponsorship alone. We are therefore extremely grateful to BSCB for its generous sponsorship of this event. Its contribution, together with sponsorship from the Biochemical Society and various commercial companies, was essential for us to hold this successful event which so nicely showcased the work of the next generation of young cell biologists.

Elizabeth Smythe, University of Sheffield

Jacques Monod Conference on cell division in time and space

11–15 September, 2010. Roscoff, France.

This meeting covered a broad range of cell cycle research topics. The talks were divided into ten sessions on asymmetric cell division, DNA replication and chromosome cohesion, modelling the cell cycle, late mitosis and cytokinesis, spindle assembly, spindle dynamics, organelles in mitosis, mitotic progression, nuclear dynamics and meiosis, and the spindle assembly checkpoint.

This conference in the peaceful seaside town of Roscoff was opened with the Plenary talk by Kim Nasmyth, University of Oxford. He described his laboratory's findings that the Rec8 kleisin subunit, as opposed to scc1, holds together the cohesin rings that maintain attachment of bivalent chromosomes during female meiosis from birth to ovulation. At the point of fertilisation the place of Rec8 is taken by the scc1 subunit, prior to the first mitosis.

Among the highlights were the two EMBO Young Investigator lectures. Monica Gotta, University of Geneva, Switzerland, described a role for SPAT-1, the *C.elegans* homologue of Bora, in regulation of both cell polarity and cell cycle progression during asymmetric division. This is achieved in conjunction with Plk1 and Aurora A kinases. The second was from Philippe Pasero (Institut de Génétique Humaine, France), who has found that the known budding yeast replication stress-responsive kinases, Mec1 and Rad53, are also activated during a normal S phase at sites where transcription interferes with replication.

Sometimes multiple groups were approaching similar questions, for example how sister chromatid cohesion by the cohesin complex is regulated through S phase and into mitosis. During S phase the replication forks need to progress past the cohesin, while the sister chromatids must remain attached. Prasad Jallepalli (Memorial Sloan-Kettering Cancer Center, USA) showed that the RFC-Ctf18 complex regulates positioning and velocity of replication forks, and is required for acetylation of the smc3 subunit of cohesin. This acetylation is required for replication fork progression. In mammals, Sororin may then bind and stabilise cohesion rings post-replication. Work described by Jan-Michael Peters (Research Institute of Molecular Pathology, Austria), found that Sororin competes with the cohesin cofactor WAP1 for binding to the cohesin complex. His group found that loss of WAP1 in mice caused an excessive cohesion, while loss of Sororin caused the opposite effect. Sororin binds cohesin early in S phase, but this is reduced as cells enter prophase, when cohesion is lost along the chromosome arms in a WAP1-dependent manner. These findings were elaborated upon by Tomoko Nishiyama from the Peters laboratory in her poster, which described that Sororin association with cohesins is dependent upon cohesin acetylation following DNA replication, a mechanism which is conserved in Drosophila.

On the second day we moved on to mitosis. Tarun Kapoor (Rockefeller University, USA) described elegant *in vitro* experiments revealing that when a PRC1 homodimer interacts with a single microtubule it adopts a flexible conformation, while binding of both subunits to a pair of antiparallel microtubules forms a defined bridge. These bridges do not significantly slow the rate of microtubule sliding by kinesin 5, suggesting that PRC1 acts as an antiparallel microtubule tip tracker. Daniel Gerlich (Swiss Federal Institute of Tehnology Zurich, Switzerland) presented a purse-string model for abscission of cells during cytokinesis. In this model, spastin-mediated microtubule disassembly at the midbody facilitates contraction of the intercellular bridge by ESCRTIII complex-rich filaments that underlie the cell cortex.

In the talks on spindle assembly, Helder Maiato (Instituto de Biologia Molecular e Cellular, Portugal) spoke about the still controversial spindle matrix. He has found that the *Drosophila* nuclear-pore complex protein Megator and the spindle checkpoint protein Mad2 form a conserved complex that localises to a spindle matrix. Megator is proposed to act as a spatial regulator of the spindle assembly checkpoint here, by ensuring efficient loading of Mad2 onto unattached kinetochores.

The following day Sue Biggins (Fred Hutchinson Cancer Research Centre, USA) described the successful purification of functional kinetochores from yeast. These kinetochore particles were able to bind microtubules and remained attached to dynamic microtubule tips in a manner that was stabilised by tension. Furthermore the kinetochores decreased microtubule catastrophe events showing that microtubule tip dynamics are altered. Later Marina Bacac (University Hospital Lousanne CHUV, Switzerland) introduced a novel interphase role for mammalian securin and separase, during which they associate with cell membranes. Depletion of these proteins disrupts morphology and function of the Golgi Apparatus and endosomes.

One of the speakers on the last morning was Jon Pines (University of Cambridge) who described how the spindle assembly checkpoint regulates the choice of substrates degraded by the APC/C, by regulating the site on the APC/C to which the APC/C co-activator cdc20 binds.

This meeting was characterised throughout by a convivial atmosphere, lively scientific discussion and celebration of the fascinating cell cycle research being undertaken around the world. The quality of the work being presented was excellent, and the enthusiasm of each delegate infectious. Particularly striking was the eagerness of everyone, even the most experienced principal investigators, to meet all the other attendees and hear about their work. I left the meeting inspired, and with useful feedback from my own poster. Even the traditional airport workers strike causing cancellation of my return flight was unable to dampen my enthusiasm! I am very grateful to the BSCB for contributing to the cost of my attendance at this meeting. I would encourage any other members who have the opportunity to attend this conference in future years to grasp it with both hands; it was the best meeting I have attended.

Fiona Hood, Physiological Laboratory
University of Liverpool

BSCB Sponsored Meeting: British Yeast Group 2011 annual meeting

23–25 March 2011. Brighton

At this meeting, 140 delegates enjoyed the beautiful spring weather which set the scene for an exciting and interactive meeting. There were 32 platform presentations from leaders in the field, new investigators, postdocs and students.

In a plenary session, Sir Paul Nurse described his labs' recent data on stripping down the cell cycle machinery to its bare minimum. Surprisingly, this reveals a new layer of homeostasis regulated by cell size which now becomes amenable to genetic analysis. He was followed by Phil Zegerman (Cambridge), who described work that aims to delineate what establishes the temporal timing of DNA replication in an unperturbed cell cycle.

In the Genomics and Evolution session, Rick Dunn (Manchester) discussed the role of metabolomics in systems biology and the use of flux analysis for studying carbon metabolism. Ken Wolfe (Dublin) introduced the evolutionary conservation of the arrangement of the mating type locus of yeast, and how this has also influenced the evolution of the adjacent chromosome arm. Tim Levine (UCL) explained how the use of the most recent homology search engines such as HHpred allowed the identification of distant homologies, which can help assign function to apparently orphan proteins. He gave the example of how BLOC-1 complex subunits were identified in S. cerevisiae, thus demonstrating conservation of a pathway in this organism that was originally thought to be missing.

In the Chromosome and their Dynamics session, Robin Allshire (Edinburgh) discussed the complex role of histone modifications in the regulation of heterochromatin and centromere function. Adele Marston (Edinburgh) described the role of PPA2-Cdc55 phospatase in helping to co-ordinate the various changes to chromosome dynamics and function that define the dual chromosome separation evens of meiosis. Jonathan Baxter (Sussex) introduced us to the concept that positive supercoiling of DNA during mitosis is necessary to drive decatenation by topoisomerase II in a manner dependent on mitotic spindle attachment to kinetochores and the condensation of DNA via the condensin complex. Further talks on the analysis of histone modifications emphasized the session's common theme of the complexity of understanding chromosome function and the subtle roles played by a myriad of interacting genes and pathways.

The importance of yeasts as model systems for understand basic biological questions was evident throughout the meeting, but in the Shape and Morphogenesis session an additional layer of interest was added because of the links between growth modalities and pathogenicity in *C. albicans*. Peter Sudbery (Sheffield) described elegant cell biological approaches to understanding how cells polarize growth to the hyphal tip and explored the role of phosphorylation by cell cycle kinases in the regulation of growth polarity, a topic expanded upon by Jamie Correa-Bordes (Badajoz, Spain) in his analysis of Mob2 phosphorylation. Alexandra Brand (Aberdeen) discussed how cells respond to their environment by regulating the GTP cycling activity of the Cdc42 polarity complex and showed some beautiful examples of live microscopy where cells respond to contact with an obstacle in specialized growth cambers. Equally impressive microscopy was presented by James Dodgson (Cambridge), who imaged cells "end on" to reveal a further level of physical organization at the growing cell tip. Finally, this session contained the prize presentation by Michelle Leach (Aberdeen), who elegantly linked mathematical fitting of her data to new predictions and experimental verification of these while discussing how *Candida albicans* uses its chaperones to regulate a heatshock response essential for virulence.

In the Cell Biology and Signaling session Fritz Muhlschlegel (Kent) described the linking of carbon dioxide signaling with virulence of *C. albicans* through the Zn^{2+} finger transcription factor Rca1, the activity of carbonic anyhdrase and the regulation of adenylyl cyclase. Andrew McAinsh (Warwick) then introduced us to the self-organization of complex systems and the *in vitro* study of mechanisms by which microtubules and their motors organize the interphase microtubule arrays. The intriguing complexity of biological systems was further emphasized by a number of talks relating to DNA damage and damage signaling including an analysis of ATR activation in *S. pombe* by Chris Wardlaw (Sussex) and an intriguing presentation by Thomas Caspari (Bangor) who reported a novel heat-induced translational initiation in the S. pombe rad9 gene. Finally, last years organizer, Tim Humphrey (Oxford), discussed his genome wide screen for factors that influence chromosome rearrangements in response to a DNA double strand break, which identified a number of unexpected genes that clustered together with homologous recombination factors to define an "HR gene set".

The Modeling Processes session consisted of talks emphasizing the role of yeast research in modeling complicated and conserved events and pathways. The presentations included a discussion by Alan Morgan (Liverpool) on how dietary restriction of yeast extends lifespan and the identification of roles in this process for the heatshock proteins Hsp12 and Hsp16. Katherine Ayscough (Sheffield) explained her work which identified the importance of actin in various steps of endocytosis, including a role in counteracting the turgor pressure of yeast to allow the invagination of the membrane as well as the more defined role in constricting the membrane to pinch off the vesicle. Campbell Gourley (Kent) explained new roles for the actin regulatory protein Cofilin in stress and mitochondrial regulation, showing that one protein can participate in apparently unrelated processes. Jakai Wen (Birmingham) presented work which aims to understand the mechanism of nonsense mediated decay, a phenomenon by which mRNAs with a mis-positioned stop codon are preferentially degraded. Mike Stark (Dundee) told us how the potentially misnamed elongator complex is responsible for tRNA wobble uridine modifications and not for directly mediating transcription elongation.

The meeting finished with three presentations relating to meiosis. Jesus Carballo (NIMR) led us through the complex regulation of DNA double strand break formation in meiosis, concentrating on the role of the ATM and ATR kinases and on their targets within the Spo11 complex. Alastair Goldman (Sheffield) and Valerie Garcia (Sussex) explored how DNA double strand breaks formed in meiosis are processed collaboratively by Mre11 and Exo1. The model that emerges may explain why the exonuclease activity of Mre11 is 3'-5' and not the originally expected 5'-3'.

Tony Carr, Genome Damage and Stability Centre, University of Sussex

BSCB postdocs

Postdocs forever? How can we mend this broken system?

Iman van den Bout

Did you know that less than 7% of scientists below the age of 35 will get a tenure track position in America? Unfortunately, I expect that this percentage will be very similar here in the UK and may possibly get worse as funding streams dry up due to government austerity measures. Throughout the years, articles have regularly appeared in major scientific journals lamenting the state of the science career path and especially the plight of postdocs.

The current career progression in science has been compared to a nail on an ironing board with the ironing board resembling the many PhD students and postdocs vying for the minute number of permanent independent positions available. Amazingly however it seems that we still do not appreciate the obscenity of this system. The 2011 Careers in Research Online Survey 2011(1) shows that 80% of scientists still held fixed-term contracts with some still on these even after 5 previous contracts at the same institution. Only 40% of respondents felt there were enough opportunities for progression or promotion at their institution. Yet, 75% still aspired to work within the higher education sector either teaching, performing research or a mix of both. Striking, no? Are we collectively sticking our heads in the sand holding thumbs that we will be the lucky ones that do get that coveted PI position? The reality this observation underlines is that most of us will have to give up our dream and commitment to our chosen career and settle for a, in our own opinion, second rate career option.

Can the scientific endeavour allow this wastage of young, committed and ambitious talent without any consequence? It seems at the moment that it can but make no mistake the really bright young ones are good at sizing up their options and opting out of the science career for something more beneficial leaving science with fewer and fewer people to choose from.

How can this deficiency be addressed? One of the solutions was proposed by Jennifer Rohn in an article published in Nature recently (2). She argues that postdoc careers should be professionalized. This means a permanent position on a level somewhere between scientific officer and the PI. While this would be good for people not willing or able to lead a research group it will be limited in its scope and will not help those still intent on achieving some scientific independence. It can form part of a package of solutions which could include the following:

Firstly, funding agencies should allow and actively promote PIs to apply for grants together with their postdocs in a collaborative setup. Both parties will be named on the grant application so both can take credit for it. Next, postdocs should have input into who is employed on the grant money and they will supervise these employees. Any publications arising will have the PI and postdoc as co-last authors. This setup would allow a PI to have a number of these subgroups in his lab which would be beneficial for him since there are more people working in his lab while has to supervise fewer people. The postdocs, on the other hand, can establish themselves as independent scientists and get used to running a small group.

Secondly, science student numbers should be restricted. Selection of the best students should begin earlier making the reduction in numbers more gradual and giving students that did not make the cut the opportunity to pursue another career before having invested too much in their education. There should also be honest and realistic career advice given to students early on to inform them of the obstacles of academic research and the possibilities for alternative careers.

In the end nothing will change unless we as postdocs start to make an effort to inform the parties involved that we want change. Joining efforts from campaign groups such as 'Science is Vital' is essential and I implore you to take the time to add your comments on their website which they are using to compile a report for the minister of State for Universities and Science, David Willets. Vitae and The Concordat are also looking after researcher issues. Furthermore, a number of universities have postdoc societies that may have some say in university issues.

Repairing this broken system will be beneficial for postdocs but also for science as a whole and all those involved in its endeavours.

References:

Careers in Research Online Survey (CROS) 2011 Analysis of UK aggregate results, Vitae, 2011

Rohn, Jennifer. Give postdocs a career, not empty promises. Nature 471, pg 7, 2011

BSCB PhD students

Three nuggets of wisdom

Jay Stone (and friends)

I have been writing for the BSCB newsletter for three years. Yep, you have had three years of my (sometimes) meandering thoughts, so for this issue I have decided to do things differently. I have called upon some fellow students and asked them to do a short report on something they feel is important and should be mentioned. The results have been their individual insights into three very different issues. I hope you find the stories interesting and their advice useful.

'Coping with the commute' by Natalie Hudson

Commuting to and from work is commonplace. However, some of us are faced with longer commutes than others. Although this means we have to drag ourselves out of bed a few hours earlier, it also means that we can make use of our travel time; catching up on some work, planning the day, reading that book everyone is talking about or even giving in and having a little nap.

I used to commute from Brighton to London – spending approximately three hours a day on a train. The one thing I learnt was that public transport can be annoying with endless delays, breakdowns or in the case of extreme weather, cancellations (snow days seem like fun but can be a huge problem when you have key experiments planned). My advice would be to map out 'plan B' options for getting home or even keep a lab mate on speed dial should you need a place to rest your head that evening.

Commuting negates the luxury of procrastination. If you want to get home at a reasonable hour you have to work efficiently. I often find it is better to focus your attention on one long experiment or two overlapping ones instead of trying to do too many things. Overstretching yourself will lead to mistakes and unwanted stress.

Some people say that you can't do a PhD whilst commuting long distance, but I am in my final year and have managed it. All I can say is plan, prioritise and catch up on your sleep at the weekend!

'Insomnia irritation' by Emily Steed

Our work is not easy to leave in the lab is it? And sometimes that buzz you get from an exciting result, the confusion you feel from observing something unexpected or the anxiety you can't shake from an upcoming presentation can make it difficult for us to relax. Having the odd night of sleeping less then your recommended seven hours isn't too much of a hassle, but when this lack of shut-eye continues for several nights you can be left feeling exhausted, miserable and frustrated. But don't worry! There are lots of things you can do to break the cycle and get that all-important rest you desire.

Obviously it is important to have some down time at the end of each day where you can forget about work. Different things work for different people; some of you might find socialising is the key, for others it could be reading a good book and for some people the secret of a good nights sleep is having a nice warm bath before bedtime. Either way it is important to put work problems out of your mind, your ability to be able to deal with them tomorrow will be much better if you get some rest. Also, do your best to keep work out of your bedroom – it is good to only associate it with sleep so you will naturally want to rest there.

If you have tried all of this and find you still can't sleep, don't lie there getting frustrated, get up and go to another room. If there is something on your mind write it down and tell yourself you can sort it out tomorrow, then go back to your room and try again. If the problem persists you can try talking to your doctor, but usually I find stealing some time for yourself and instilling a sense of calm, is enough to help you switch off and drift away.

'A world beyond the lab' by Kimberley Byron

A PhD is a full time job! It always feels like there is more you could be doing; numerous papers that you should read, extra experiments you could do and another presentation to plan. However, I think it is important to remember that there is scientific community outside the lab and if you plan your time wisely there is no reason why you can't explore it!

I am really interested in public engagement and jump at the chance to get involved in all things science communication related. Volunteering for school visits or science fairs are a small commitment and can be flexible so you can fit it around work. Writing for newspapers or websites can feel more time-consuming, with research and drafting being needed but these activities can easily be broken up to fit into an incubation time or cell treatment time-course.

Getting the balance right can be challenging, as there are always more science communication opportunities than you'll have time for. However, I think that you only get as much out of your PhD as you put in and when I am having a particularly bad experiment day, it is refreshing to realise that there is more to my scientific career then what I do in the lab.

Being the student rep at the 2011 BSCB:BSDB conference

Jay Stone

This year was my first (and only) BSCB-BSDB conference as the BSCB student rep.

Trying to fit those last experiments in, rejigging your poster for the millionth time or practicing your presentation so much it feels like you are reciting lines, can make the last few weeks before a conference incredibly stressful. But this year, at the joint conference, I was not presenting a poster, or giving a talk. I was there as the student rep, there to attend committee meetings, chat to people and crown a winner at the student social. So this year it wouldn't be as stressful for me, it would just be fun.

Now months after the event I want to remind those of you who attended of the fun we had and tell those of you who couldn't come what fun you missed so that you can ensure you are fully prepared and ready for 2012's meeting!

The student symposium

This year we saw the return of the student symposium. We received a lot of abstracts and it was so hard to narrow it down to just three but somehow we managed it and the presentations we heard were truly brilliant. Covering topics from Wnt signalling to chick neurons, it was a great way to kick off the conference.

The student and post-doc social

For this years conference I wanted to organise a student / post-doc social where people actually socialised; all to often social nights are just drinks where people turn up and talk to the people they already know. This year was going to be different so Hayden (BSDB student rep) and I wrote a science pub quiz featuring 'Guess the microscope image', 'Who is this Nobel Laureate' and three question rounds to test everyone's general scientific knowledge. We secured truly amazing prizes ranging from Roche mugs to Bio-line polo shirts; the competition was immense. After two rounds it became clear that the BSCB committee were going to take the title but between you and I, their knowledge of modern Sci-Fi films is truly appalling!

The student and post-doc workshop

As the student rep I have to try and cover topics which I think represent the interest of the BSCB members. Obviously this can be tricky because, for one thing, I don't know you all (although I am sure you are all lovely people). However, what I do think I can do is select a topic, which we should all know about, something that has the ability to affect all of us no matter what area of work we are in or where we are in the world. So this year I designed the workshop to promote discussion of science matters outside of the lab. It is all too easy to get totally immersed in your project, buried under western blots and the pressure for data, that sometimes we forget that by being in science we are part of a bigger community and there are things happening which could threaten us.

During the workshop the audience heard a talk from Dr. Peter Wilmshurst who is currently being sued for libel by NMT over some comments he made about a trial he oversaw for them. I encourage those of you who couldn't attend or haven't heard of his case to look it up, as it was clear during his talk just how shocked and outraged the audience were by the way he had been treated by the English libel laws.

The second talk was by Rose Wu who works for Sense about Science (SAS). I invited her along because SAS do some amazing work standing up for misrepresented science and educating the public on controversial matters. I heard from a lot of students after the workshop saying they had never heard of SAS before but now they had they would be signing up to their 'Voice of young scientists' network so they could do their bit to protect good science.

The last talk was from Dr. Jenny Rohn. I wanted her to come and talk to us because she is one of those people who will refuse to sit by and watch as something she disagrees with happens. She spoke about the Science is Vital campaign, how she started it, how it has helped. She mentioned future concerns she had and pleaded for the audience to get involved and not to think that ignoring things would make it better. Her talk was humble and passionate. I know a lot of people felt invigorated to get involved in the campaign afterwards.

The conference this year was a great success and everyone I spoke to got a lot out of it, whether that be by feedback for their work, making useful job contacts or just gaining knowledge about who is doing what. If you were unable to make it this year and are considering whether to go to the Spring BSCB/BSDB conference in 2012, I would definitely recommend it. You'll have a new student rep so I can't promise the quiz will be as fantastic as it was this year, but I am sure they'll give it a go!

Below: Hayden (BSDB rep) handing out quiz prizes

BSCB / BSDB / JSDB Joint Spring Meeting

Warwick University, 15–18 April 2012.

The Joint Spring Meeting of the BSCB, BSDB and JSDB is to take place in Warwick University between the 15th and 18th April 2012. The meeting is an exciting blend of cell and developmental biology and, for the first time, co-organized with the Japanese Society of Developmental Biologists (JSDB).

The BSCB programme will be kicked off by the plenary lecture given by Professor J. Richard McIntosh (University of Colorado), a world-renowned cell biologist who has pioneered biophysical cytology using innovative methods. He has made several groundbreaking discoveries about the mitotic spindle organization and kinetochore-microtubule interactions.

As always, at this flagship meeting, the speaker line up is excellent and the sessions include: DNA Replication, Cell Division, Cell Growth/ Differentiation, Chromosome Structure/Organization, and Cell Death/Senescence. The BSCB Hooke Medal winner of this year will also give a talk in this meeting. There will be a call for abstracts to present short talks that will be interspersed between invited speakers and, of course, plenty of poster slots to fill.

Warwick University accommodates a fantastic conference facility and several social events will be arranged to facilitate informal communication between meeting participants. Details on speakers, venue, bookings and so on can be found by visiting the website (www.bscb.org). We look forward to welcoming you in April.

Scientific organizers (BSCB programme)
Tomoyuki Tanaka, Helfrid Hochegger, Andrew McAinsh

2012 BSCB Programme Outline:

15th Sunday

Evening
Plenary Lecture: J. Richard McIntosh (University of Colorado)

16th Monday

AM: DNA Replication
Hiroyuki Araki (NIG, Mishima)
Helle Ulrich (CRUK London)
Anindya Dutta (University of Virginia)
Julian Blow (University of Dundee)
Plus 2 short talks selected from abstracts

PM: Cell Division
Toru Hirota (Cancer centre Tokyo)
Andrea Musacchio (MPI Dortmund)
Jan Loewe (LMB Cambridge)
Monica Bettencourt-Dias (IGC Portugal)
Plus 2 short talks selected from abstracts

Evening: BSCB Hooke Medal Talk

17th Tuesday

AM: Cell Growth/Differentiation
Norio Nakatsuji (Kyoto University)
Denise Barlow (CEMM Vienna)
Anton Wutz (CSCR Cambridge)
Arp Schnittger (MPI Koern)
Plus 2 short talks selected from abstracts

PM: Chromosome Structure/Organization
Tatsuya Hirano (RIKEN Wako)
Robin Allshire (University of Edinburgh)
Ana Pombo (MRC CSC)
Juri Rappsilber (University of Edinburgh)
Plus 2 short talks selected from abstracts

18th Wednesday

AM: Cell Death/Senescence
Tamotsu Yoshimori (Osaka University)
Anton Gartner (University of Dundee)
Andreas Villunger (Innsbruck Med Univ)
Fabrizio d'Adda di Fagagna (IFOM Milan)
Plus 2 short talks selected from abstracts

Note that BSCB programme integrates JSDB speakers.

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BSCB Calendar of related meetings in 2012

Gordon Conference: Autophagy in Stress, Development & Disease
March 11–16, 2012
Four Points Sheraton / Holiday Inn Express
Ventura, CA
http://www.grc.org/programs.aspx?year=2012&program=autophagy

Keystone Conference: Molecular Basis of Vascular Inflammation and Atherosclerosis
March 25–30, 2012
Big Sky, Montana
http://www.keystonesymposia.org/Meetings/ViewMeetings.cfm?MeetingID=1140

Keystone conference: Cell Biology of Virus Entry, Replication and Pathogenesis
Mar 26 – 31, 2012
Whistler, British Columbia
http://www.keystonesymposia.org/Meetings/ViewMeetings.cfm?MeetingID=1167

ESF-EMBO Symposium Cell Polarity and Membrane Traffic
31 March - 5 April, 2012
Polonia Castle in Pultusk, Poland
http://www.esf.org/index.php?id=9163

Gordon Conference: Fibroblast Growth Factors in Development & Disease
May 13-18, 2012
Les Diablerets Conference Center
Les Diablerets, Switzerland
http://www.grc.org/programs.aspx?year=2012&program=fgf

EMBO Conference Series Microtubules: Structure, Regulation and Functions
EMBL Heidelberg, Germany.
May 23-26, 2012
http://www.embl.de/training/events/2012/MSF12-01/index.html

EMBO Conference series Cellular Signaling & Molecular Medicine
May 25–29, 2012
Cavtat – Dubrovnik
http://events.embo.org/12-signaling-molmed/speakers.html

Gordon Conference: Intermediate Filaments
June 17-22, 2012
Bates College
Lewiston, ME
http://www.grc.org/programs.aspx?year=2012&program=intermed

Gordon Conference: Lysosomes & Endocytosis
June 17-22, 2012
Proctor Academy
Andover, NH
http://www.grc.org/programs.aspx?year=2012&program=lysosomes

Gordon Conference: Cell Biology of the Neuron
June 24-29, 2012
Waterville Valley Resort
Waterville Valley, NH
http://www.grc.org/programs.aspx?year=2012&program=cellneuron

Gordon Conference: Notch Signaling in Development, Regeneration & Disease
August 12-17, 2012
Bates College
Lewiston, ME
http://www.grc.org/programs.aspx?year=2012&program=notchsig

Biochemical Society Conference: G-protein-coupled-receptors: from structural insights to functional mechanisms
September 12—14, 2012
Monash University Prato Centre, Italy
http://www.biochemistry.org/Conferences/AllConferences/tabid/379/Page/3/MeetingNo/SA124/view/Conference/Default.aspx

The EMBO Meeting 2012 – Advancing the life science.
September 22-25, 2012
Nice.
www.the-embo-meeting.org/

Biochemical Society Annual Symposium: Epigenetic mechanisms in development and disease
December 11–13, 2012
University of Leeds, UK
http://www.biochemistry.org/Conferences/AllConferences/tabid/379/Page/3/MeetingNo/SA141/view/Conference/Default.aspx

Honor Fell/Company of Biologists Travel Awards

Honor FellTravel Awards are sponsored by the Company of Biologists (the publishers of ***The Journal of Cell Science*** and ***Development)*** and they provide financial support for BSCB members at the beginning of their research careers to attend meetings. Applications are considered for any meeting relevant to cell biology. The amount of the award depends on the location of the meeting. Awards will be up to **£300** for UK meetings (except for BSCB Spring Meeting for which the full registration and accommodation costs will be made), up to **£400** for European meetings and up to **£500** for meetings in the rest of the world.

The following rules apply:

- Awards are normally made to those in the early stages of their careers (students and postdocs)
- Applicants must have been a member for at least a year (or be a PhD student in their first year of study).
- No applicant will receive more than one award per calendar year and three *in toto*
- The applicant must be contributing a poster or a talk.
- Members who are based outside of the UK **can only** receive funds to attend BSCB-sponsored meetings in the UK.
- **No lab may receive more than £1000 per calendar year.** ***Awards are discretionary and subject to available funds***

All applications must contain the following:

- the completed and signed application form (below)
- a copy of the abstract being presented
- a copy of the completed meeting registration form
- **proof of registration, travel and any other costs claimed**

(See additional comments at foot of page)

Applications should be sent to:

Ewald Hettema
Dept. of Molecular Biology and Biotechnology
University of Sheffield
Firth Court, Western Bank, Sheffield S10 2TN

Application for Honor Fell/Company of Biologists Travel Award

Please complete, print out and send to Ewald Hettema at the address above together with supporting information

Full name and work/lab address:

Email:

Age: BSCB Memb. No:

I have been a member for years

Years of previous Honor Fell /COBTravel Awards:

Degree(s) (dates):

Present Position:

Meeting for which application is made:
title/place/date:

Expenses claimed:

Travel:

Accommodation:

Registration:

Have you submitted any other applications for financial support? **YES/NO** (delete as applicable)
If YES, please give details including, source, amounts and whether these monies are known to be forthcoming.

Supporting statement by Lab Head:
This applicant requires these funds and is worthy of support. I recognise that in the event of non-attendance at the meeting, the applicant must return the monies to the BSCB and I accept the responsibility to reimburse BSCB if the applicant does not return the funds.

My lab has not received more than £1000 in Honor Fell/ COB Travel Awards during this calendar year

Signature:

Name:

Applicant's Signature:

Name:

$ > If proof of payment for ALL costs claimed is available at the time of application, successful applicants will be awarded a grant in advance of the meeting

> If proof of payment for ALL costs is not available at the time of application, successful applicants will be awarded a provisional grant and a cheque will be sent when BSCB have received the receipts.

> Incomplete applications will not be considered.

Have you included all the necessary information/documentation in support of your application?

The British Society for Cell Biology

Statement of Financial Activities for the year to 31 December 2009

	2009			2008
	Unrestricted	Restricted	Total	Total
	£	£	£	£
Incoming Resources				
Incoming resources from generating funds:				
Voluntary income	30,000	27,500	57,500	57,500
Incoming resources from charitable activities:				
Meetings	2,264	–	2,264	48,023
Subscriptions	31,443	–	31,443	20,084
Investment income:				
Bank interest	782	–	782	6,547
Other incoming resources	177	8,358	8,535	2,461
Total incoming resources	64,666	35,858	100,524	134,615
Resources Expended				
Charitable Activities:				
Grants payable:				
CoB/Honor Fell travel awards		27,016	27,016	33,776
Other grants	611	–	611	–
Studentship	9,709	–	9,709	11,590
Costs of meetings	39,876	–	39,876	66,556
Newsletter costs	5,139	–	5,139	5,450
Website expenses	7,295	–	7,295	2,180
Governance costs	6,808	–	6,808	7,462
Bad Debt	–	–	–	900
Total resources expended	69,438	27,016	96,454	127,914
Net movement in funds for the year	(4,772)	8,842	4,070	6,701
Reconciliation of funds				
Funds brought forward at 1 January	225,096	–	225,096	218,395
Funds carried forward at 31 December	220,324	8,842	229,166	225,096

		2009		2008
	£	£	£	£
Current Assets				
Debtors:				
Prepayments and accrued income		433		406
Cash at bank and in hand:				
National Savings Investment Account		71,635		71,314
HSBC Bank Accounts		159,951		156,126
		232,019		227,846
Less: Creditors falling due within one year				
Creditors and accruals	2,853		2,750	
		2,853		2,750
Net Assets		229,166		225,096
Funds				
Restricted		8,842		
Unrestricted		220,324		225,096
		229,166		225,096

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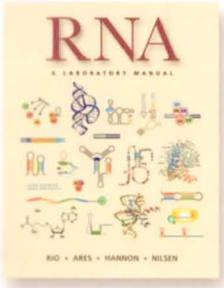

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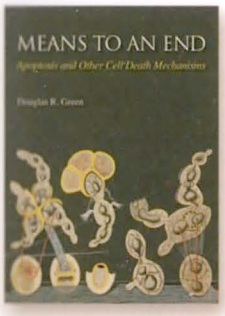

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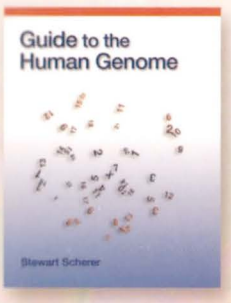

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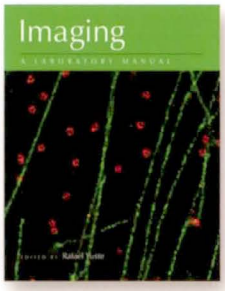

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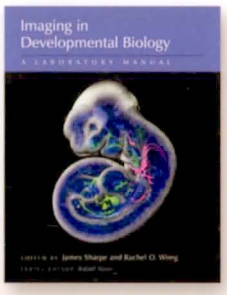

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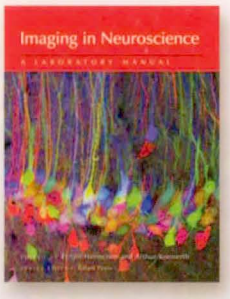

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