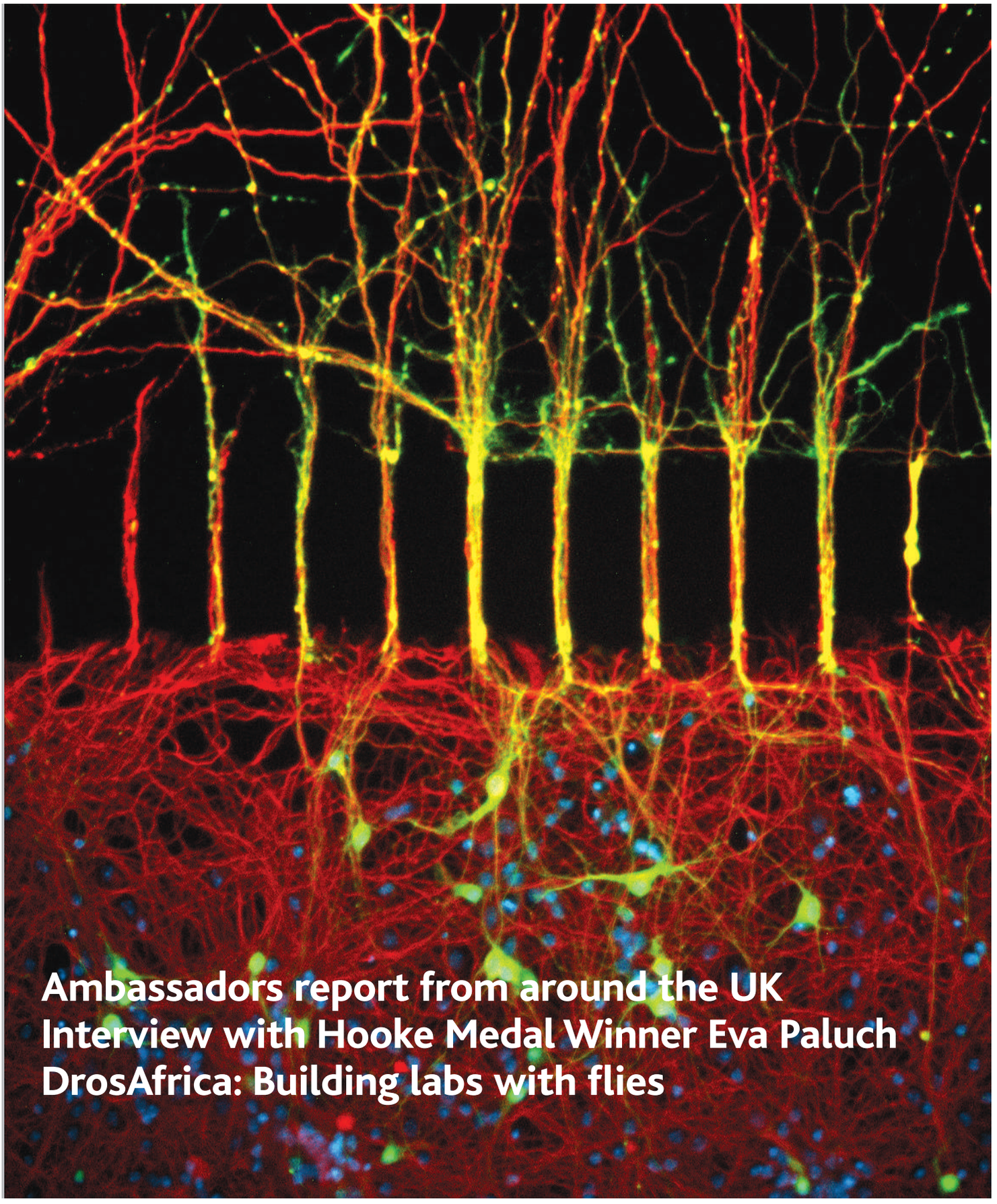
2018

BSCB Magazine

BRITISH SOCIETY FOR CELL BIOLOGY



Ambassadors report from around the UK

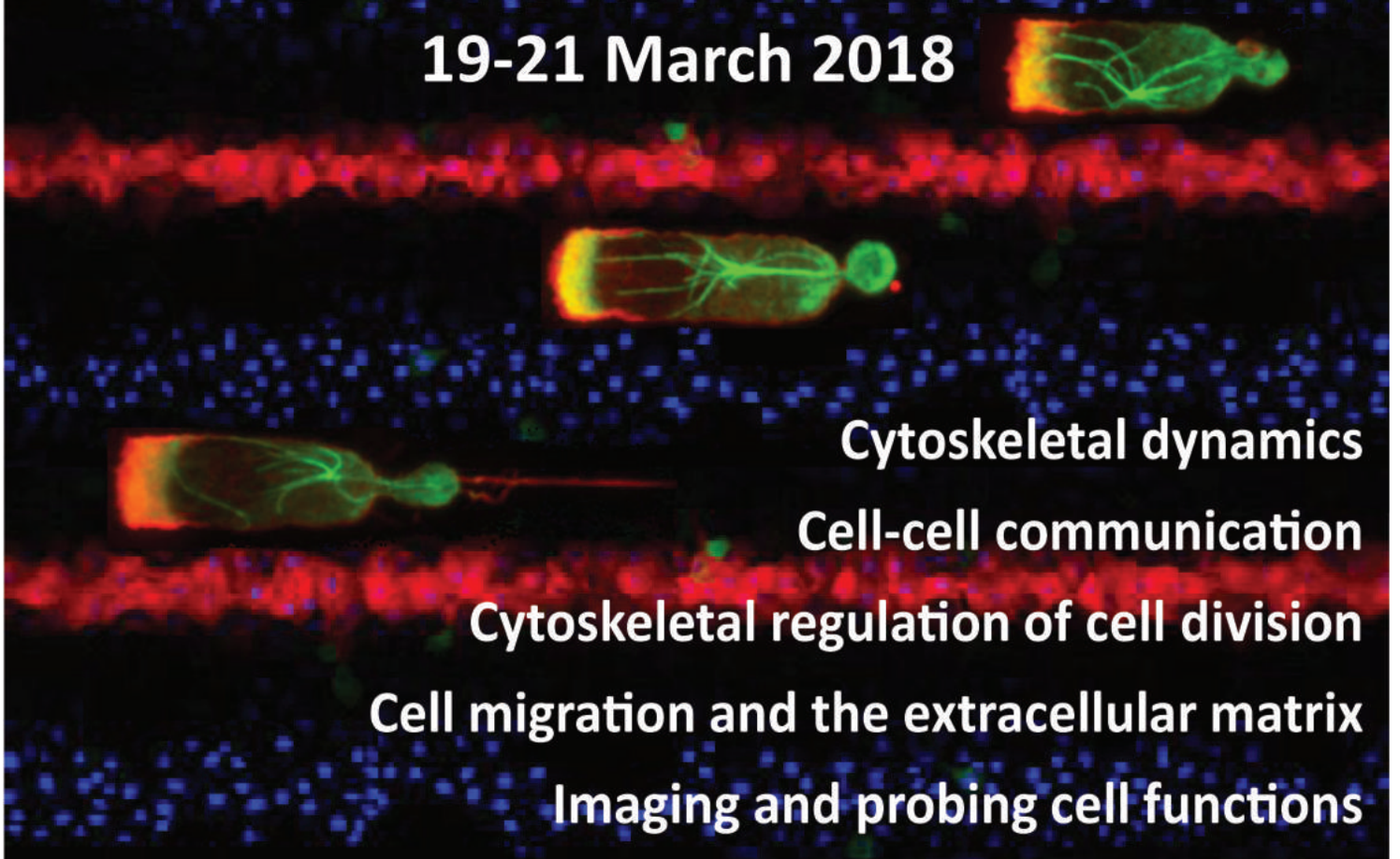
Interview with Hooke Medal Winner Eva Paluch

DrosAfrica: Building labs with flies

The Dynamic Cell III

Manchester Conference Centre

19-21 March 2018



Cytoskeletal dynamics

Cell-cell communication

Cytoskeletal regulation of cell division

Cell migration and the extracellular matrix

Imaging and probing cell functions

Plenary: Tony Hyman (MPI-CBG, Germany)

Péter Lénárt (EMBL, Germany)
Isabelle Vernos (CRG, Spain)
Susana Godinho (QMUL, UK)
Brian Stramer (KCL, UK)
Peter Friedl (Radboud, Netherlands)
Raphaël Voituriez (UPMC, France)
Jenny Gallop (Cambridge, UK)
Antonina Roll-Mecak (NIH, USA)
Serge Mostowy (Imperial, UK)
Ann Miller (U. Michigan, USA)
Alpha Yap (U. Queensland, Australia)
Bénédicte Sanson (Cambridge, UK)
Gaia Pigino (MPI-CBG, Germany)
Andy Oates (EPFL, Switzerland)
Martin Schwartz (Manchester, UK)

Additional speakers will be selected from abstracts.

Find out more at: www.eventsforce.net/dynamic-cell-iii

Organizers:
Anne Straube, Jeremy Carlton, Guillaume Charras, Thomas Surrey, Sarah Woolner, Theresa Ward

BSCB

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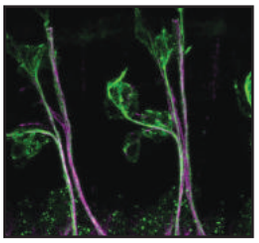
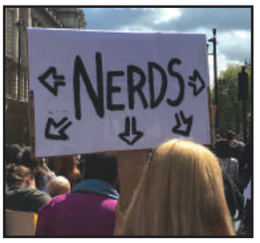
BIOCHEMICAL SOCIETY

BSCB Magazine 2018




Editorial

Welcome to the 2018 *BSCB Magazine* – yes we have a new name! 2017 has been a bonanza for Women of the BSCB in Science. Professor Amanda Fisher was awarded a DBE this year. Two of our senior members were admitted to the Royal Society including our own President Anne Ridley and both winners of the BSCB prizes were inspiring young women in science.

This year with our new president on board we have been busy – we have a new line of BSCB mugs and other small items. We have streamlined the process for applying for one day meetings. Please see our article on page 4 from our Meetings Secretary, Anne Straube, to find out more. We have also been in touch with our Ambassadors and have several new folk on board. Their contribution has revitalised the society this year. Competition for our Imaging and Science writing prize was tougher than ever. Our Ambassadors have been very busy around the country, launching new institutes, running symposia, reaching out into our communities and schools inspiring the next generation of Cell Biologists and raising funds for Charity. Its great to hear what they have been up to – hopefully you'll get a flavour of what's going on!

We enjoyed sharing our Spring meeting with the Genetics Society and BSDB this year and was ably organised by Andrew Carter and Julie Welburn from the BCSB. The meeting was very broad in focus and comprised of no less than 7 prize lectures, including those from our own Hooke Prize winner Ewa Paluch and WICB prize winner Vicky Sanz Moreno. If you missed out on seeing them talk you can read about their scientific journey in their interviews and catch up on our Youtube channel here: www.youtube.com/user/BritishCellBiolSoc.

The BSCB conference dinner was an emotional event as Jordan Raff handed over to Anne Ridley formally. We also awarded our BSCB young cell biologist of the year to Christina Dix (University College London) for her poster 'Adhesion, not cortical tension, is vital for successful cytokinesis in RPE-1 cells'. Our postdoc prize went to Girish Mali (MRC Laboratory of Molecular Biology) for his poster 'Assembly Mechanisms of Dynein Motors'. Congratulations to both of them. The party after the conference dinner went onto to small hours; you can catch up on the fun at our Twitter feed @Official_BSCB. The meeting finished with an excellent lecture from Iain Cheeseman and the closing plenary by Xiowei Zhuang.

In 2018, the BSCB spring meeting will be 'The Dynamic Cell III' at Manchester Conference Centre 18–21 March. We will jointly organise this with Biochem Soc, as with the previous Dynamic Cell meetings in 2009 and 2014. The venue has enough space for 250 delegates so make sure you register soon! The sessions will encompass Cell Division, Cell Migration and cytoskeletal dynamics, Cell–Cell interactions and Imaging cell function. Tony Hyman will give the plenary lecture.

This year we have several articles from our undergraduate students who carried out research in BSCB members laboratories over the summer. Its impressive to see the standard of research carried out and the enthusiasm of the students for Cell Biology. I hope you enjoy this years magazine. If you have any ideas for articles I'm always happy to hear from you.

Looking forwards to seeing you in Manchester in March

Ann Wheeler, BSCB Newsletter Editor

Front cover: Primary cortical neurons in compartmentalised microfluidic chambers, which separate axons and cell bodies. Neurons were stained with acetylated tubulin antibody (Red) and DAPI (blue). Calcein (Green), is a cell-permeant dye applied in the axonal side and which is used to label those neurons that have extended axons to the other side.

Newsletter editor: Ann Wheeler **Production:** Giles Newton **Website:** www.bscb.org **Printer:** Hobbs

Society News

BSCB President's Report 2017

I am delighted to be the new BSCB President, starting in April 2017, and to serve the BSCB. I remember well the first BSCB meeting I went to as a PhD student, when cell cycle control was the really hot news – it was bursting with a plethora of regulators for cyclins and cyclin-dependent kinases. It was so exciting to be there as this new area of research unfolded, and to hear first-hand from the leaders in the field. Several years later, the Nobel Prize for Medicine was awarded for discoveries on the cell cycle.

I hope that current PhD students will sense the excitement of new cell biological discoveries when they go to their first BSCB meeting. The broad programmes of our meetings allow you to sample new areas that are not directly related to the details of your own research, yet will inspire you with fresh ideas and approaches to your research. We always aim to include talks on 'hot topics', which, who knows, could be Nobel Prize topics for the future. You will also have the privilege of hearing from and meeting top scientists in their fields.

We often run our annual BSCB meeting with other societies with related interests, which allows us to offer a wider range of topics to meeting attendees. For example, in April 2017 our annual meeting at the University of Warwick was jointly held with the British Society of Developmental Biology and the Genetics Society. It was fun to get to know people from these two societies better, sharing not only scientific sessions but also meals, bar socials and the dance floor with them. The meeting organisers deliberately did not badge any session as belonging to a particular society, but instead mixed the sessions into themes that included speakers that were relevant to the interests of all three societies. We are really grateful to the organisers (including Andrew Carter and Julie Welburn from the BSCB) for doing such a fantastic job in choosing session topics and speakers.

In March 2018 our annual meeting will be shared with a different society, the Biochemical Society, and will be held in Manchester. This is the third of what has now become a series of meetings entitled 'The Dynamic Cell', which started in Edinburgh in 2009, followed by a joint BSCB/Biochemical Society 'Dynamic Cell II' in Cambridge in 2014.

In addition to our annual meetings, the BSCB sponsor smaller one-day focused meetings on a variety of cell biological topics. This are organised by BSCB members, and several of them have been running annually for over 10 years. These include the annual 'Actin meetings', 'Microtubule meetings' and 'Endocytosis meetings'. The ethos is to serve the UK cell biology community through these meetings, particularly by giving PhD students and postdocs the opportunity to give talks. By providing sponsorship, the BSCB helps to keep the meeting costs down so that whole laboratories can afford to attend. We welcome new proposals for meetings in areas of cell biology that are not already covered by one of the existing sponsored meetings. Please see the BSCB website for more information about current BSCB-sponsored meetings and how to apply for meeting sponsorship.

The BSCB is generously funded by the Company of Biologists, which allows us to fund summer studentships for undergraduates to gain experience in working in a BSCB member's laboratory, as well as provide travel awards for BSCB members to attend meetings. Whether you are a PhD student or postdoc, you can apply for travel funds towards any meeting relevant to cell biology. Group leaders who do not have any travel funds in their grants are also eligible to apply. Please do check out our website to find out what is available and how to apply.

The BSCB would not exist without the BSCB committee, who all provide their time voluntarily to organise BSCB meetings, run the finances, communicate with BSCB members, and run the travel awards and summer studentships. Each person commits to being on the committee for a minimum of three years, which can be extended to a maximum of six years. This year we said thank you to several committee members who finished their term, including Jordan Raff (departing BSCB President), Caroline Austen (Treasurer), Steve Royle (Meetings Secretary), James Wakefield (Membership Secretary, Alexis Barr (Postdoc Rep), and Jean-Paul Vincent. Existing committee members took over new positions, including David Elliott (Treasurer), Anne Straube (Meetings Secretary), Andrew Carter (Membership Secretary) and Maria Balda (Summer Studentships). We also welcomed new committee members Gautam Dey (Postdoc Rep), Jenny Rohn, Sharon Tooze and Chris Bakal.

We send an email to BSCB members each year whether they would like to join the BSCB committee, and we always have a good number of applicants. Although we cannot take all the applicants each year, because of committee turnover there will always be a few positions available each year, so do apply again if you are not accepted the first time around. Importantly, we aim to ensure a balance of research areas covered by committee members, as well as representation from different regions of the UK.

We are also particularly grateful to the BSCB Ambassadors, who act locally within their Institute/University to promote the BSCB, BSCB meetings, and the values of BSCB membership. This year Andrew Carter and Ann Wheeler did a fantastic job of updating the BSCB Ambassador list, and we are very glad that several new Ambassadors have joined. If you are interested in being a BSCB Ambassador, please contact Andrew Carter (BSCB Membership Secretary) and he will send you details.

The BSCB committee members look forward to meeting many BSCB members in 2018, either at 'Dynamic Cell III' and/or at one of our sponsored meetings.

Anne Ridley
BSCB President

News in brief 2017

Our Annual Spring Meeting for 2017 was held jointly with the British Society for Developmental Biology (BSDB) and the Genetics Society. Over 400 delegates attended and the conference provided a unique forum to network and socialise with a wide cross-section of the Genetics, Cell and Developmental Biology community.

The meeting featured plenary and parallel sessions, with an outstanding line up of speakers from around the world. This year's BSDB and BSCB plenary lectures were presented by Bonnie Bassler and Xiaowei Zhuang. The Genetics Society had two plenary lectures, one by Marisa Bartolomei (Genetics Society Medal Lecture) and David Baulcombe (Mendel Medal Lecture).

The meeting also included the BSCB Hooke Medal awarded to Dr Ewa Paluch, and Dr Victoria Sanz-Moreno was awarded the BSCB Women in Cell Biology prize. Our dedicated early career symposium and workshop events which are organised by postdoc and student representatives of our three societies were popular and well attended. The meeting included several well-attended, lively and stimulating poster sessions and social events (including the now infamous annual "Pub Quiz").

At the 2017 AGM, our new president Professor Anne Ridley was welcomed to the helm. Dr Sreenivasan Ponnambalam was welcomed as Secretary and Dr David Elliot as Treasurer. We also delighted when Anne was elected as a Fellow of the Royal Society in August 2017 and wish her many congratulations.

Our committee membership has changed considerably with Buzz Baum, JP Vincent our postdoc rep Alexis Barr and our membership secretary James Wakefield stepping down; we would like to thank them all for their work. We welcome Andrew Carter as our new membership secretary and Gautem Dey as our Postdoc rep as well as Susana Godhino, Stephen Robinson, Chris Bakal and Sharon Tooze as committee members.

Over the past year we have also reconnected with our Ambassadors which has invigorated the Societies activities and raised the bar of BSCB competitions. Firstly, thanks to those who have stepped down for their service to and support of the BSCB. We would like to welcome 20 new Ambassadors to the society. This is particularly good news for the society as we now have Ambassadors in around 80% of actively researching Universities and institutes in the UK.

Journal of Cell Science most-read articles of the last 12 months

By Manuel Breuer, Features and Reviews editor Journal of Cell Science.

3D correlative light and electron microscopy of cultured cells using serial blockface scanning electron microscopy.
Matthew RG et al. J Cell Sci 2017 130: 278-291;
doi: 10.1242/jcs.188433

Deep nuclear invaginations are linked to cytoskeletal filaments – integrated bioimaging of epithelial cells in 3D culture.
Jorgens DM, et al. J Cell Sci 2017 130: 177-189;
doi: 10.1242/jcs.190967

The LINC complex contributes to heterochromatin organisation and transcriptional gene silencing in plants
Axel Poulet A, et al. J Cell Sci 2017 130: 590-601;
doi: 10.1242/jcs.194712

For reviews and Cell Science at a Glance posters, the Top3 are:

Cancer cell behaviors mediated by dysregulated pH dynamics at a glance.
White KA, et al. J Cell Sci 2017 130: 663-669;
doi: 10.1242/jcs.195297

Tissue mechanics regulate brain development, homeostasis and disease.
Barnes JM, J Cell Sci 2017 130: 71-82;
doi: 10.1242/jcs.191742

Microtubules in 3D cell motility.
Bouchet BP and Akhmanova A. J Cell Sci 2017 130: 39-50;
doi: 10.1242/jcs.189431

BSCB focussed one-day meetings

In addition to the annual meeting at which the BSCB awards the Hooke and WICB medals and holds its AGM, the BSCB sponsors a number of focussed one-day meetings. Amongst those regularly supported are the Bristol-based Actin meeting, the Edinburgh-based Microtubule meeting and the London-based Endocytosis meeting. These meetings attract more than 100 participants from the UK cell biology community, are relatively informal with speaking opportunities mainly for students and postdocs, and have very low registration fees.

Thus these meetings allow early career researchers to become part of the scientific community in their field of research without the need for a large travel budget.

If you like the idea, but there is not yet a one-day meeting for your field, why don't you organise one? To get started, first gather support from colleagues in your field to make sure there is demand and a minimal number of participants guaranteed. Find a suitable date and venue and then apply for funding from the BSCB and other sources. We would expect the BSCB to be the main or one of the main sponsors and that the society contribution is acknowledged accordingly.

An application form is available on the BSCB website, please submit these at least 6 months before the meeting to one of the two deadlines: 1st March and 1st October for consideration by the BSCB committee. When we decide sponsorship applications, we use the following criteria:

1. Topic of the meeting falls within the remit of BSCB and does not overlap with other sponsored meetings.

2. The meeting provides presentation opportunities predominantly for early career researchers and is open to the entire UK cell biology community.

3. It is a small one-day meeting and the BSCB is the main sponsor.

4. BSCB sponsorship is clearly indicated - ideally by attaching BSCB to the name of the meeting.

Anne Straube, Meetings Secretary

BSCB Sponsored or allied meetings 2018

March 2018

The Dynamic Cell III BSCB/Biochemical Society joint meeting 19–21 March 2018 Manchester Conference Centre. www.bscb.org/meetings/sponsored-meetings/

April 2018

AutophagyUK meeting, Cambridge University, Clare College, 18–19 April 2018. onlinesales.admin.cam.ac.uk/conferences-and-events/pathology/4th-uk-autophagy-network-meeting/4th-uk-autophagy-network-meeting

British Microtubule Meeting in Edinburgh, Monday April 30th, 2018. http://microtubule.bio.ed.ac.uk/

June 2018

I'm a scientist, Get me out of here – an event which allows scientists to talking to school students: https://imascientist.org.uk/scientists/

September 2018

North of England Cell Biology Forum, Huddersfield UK

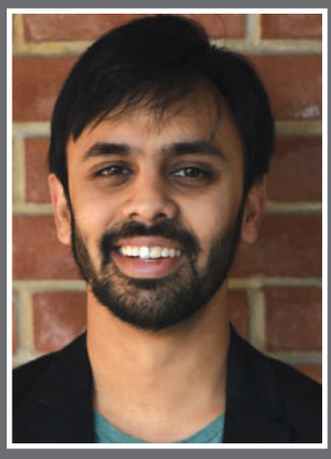
December 2018

American Society for Cell Biology 2018 – 8–12 December San Diego, California, USA www.ascb.org

UK membrane traffic meeting bscb.org/meetings/sponsored-meetings/

Actin 2018 – The Watershed Theatre Bristol UK. 14 December https://mellorlab.wordpress.com/actin-2017/

Introducing our new Postdoc Rep – Gautem Dey



Gautem is a Postdoc in the laboratory of Buzz Baum at the BSCB. We welcomed Gautem to the BSCB committee at our AGM at the BSCB Spring meeting.

Gautem has had the role handed to him by Alexis Barr. He is motivated to support postdocs in the BSCB and is considering ideas such as mini-symposia for postdocs to hold early career research meetings which may complement our one day meetings – expanding our career roundtable. He's also politically active and has participated in the March for Science with other LMCB postdocs and students.You can see more of what he is upto through our @official_bscb and his own @Dey_Gautam twitter feed. He will be keen to hear about how the BSCB can work with its Postdoc members.

So what brought Gautem to the UK? "I am interested in the evolution of the eukaryotic cell. While it is widely accepted that eukaryotes are a genomic merger of a putative archaeal host and a bacterial endosymbiont, the origins of the complex organization of the eukaryotic cell – with its nucleus, specialized organelles, diversified cytoskeleton and membrane trafficking systems-remains one of the biggest mysteries in cell biology.

Before my work at UCL, I developed tools for quantitative cell biology: biosensors for translation control in human cellsand novel statistical methods for RNAi screens in *Drosophila*. During my PhD with Tobias Meyer at Stanford University, I developed a novel algorithm to extract functional modules in the human genome from patterns of shared evolutionary history, an extension of the technique termed phylogenetic profiling (Dey et al. 2015a, Dey et al. 2015b). I used this map to make functional predictions for uncharacterized human genes, a subset of which I verified experimentally in human cell lines. I developed a keen interest in understanding the evolution of signaling networks and the origins of cellular architecture, bringing me to the Baum lab in June 2015."

As well as stepping up to be postdoc rep, this year Gautem was awarded a Marie Sklodowska-Curie Individual Fellowship; the BSCB would congratulate him on this. Gautem is looking forwards to hearing from you and seeing you at the BSCB Spring meeting in Manchester.

Schools news: new GCSEs: out with the 'new', in with a modified 'old'

Autumn 2015 heralded the use of a revised type of course and examination system for 16 year old pupils in most secondary schools in England. The main changes were to: [1] remove the element of course work in the marked assessment and to rely on an 'old style' final end-of-course examination and mark and, [2] change the grade labelling scheme so that the lowest grade is 1 and the highest is 9, with grades 9, 8 and 7 being the equivalent to old grade A* and A. The new style courses started with English and Maths in 2015 for exams in 2017, and were joined by more subjects, including biology, in September 2016 for exams in 2018.

The new system also provided an opportunity to revise the subject curriculum frameworks. So what is the position of cell biology within biology in the new schemes? With such a fundamental subject as cell biology it is not surprising that the biology of cells and cell systems are found in all the specifications. The degree of detail rather depends on the organisation offering the exam facilities, but the specifications offered by the AQA organisation approach cell biology in perhaps the most direct way.

The government lays down the general framework of the subject matter; it is the job of the exam organisations to produce detailed specifications which are then subjected to accreditation by government office. Most secondary schools in England will choose one of these organisations to provide examinations and material for their school.

The different organisations approach the framework in their unique way and detailed specifications can be found on their websites (see below). If we take the summary offered by AQA as an example, the topics are: Cell biology; Organisation; Infection and response; and Bioenergetics. [Examined in Paper 1] and Homeostasis and response; Inheritance, variation and evolution; and Ecology [Examined in Paper 2]. Each (AQA) Paper is set for 1 hour 45 minutes.

AQA: 'Google': aqa gcse biology specifications 2018

/filestore.aqa.org.uk/resources/biology/specifications/AQA-8461-SP-2016.PDF

Edexel: 'Google' edexcel gcse (9-1) biology edexcel Pearson

qualifications.pearson.com/content/dam/pdf/GCSE/Science/2016/Specification/Edexcel_GCSE_L1-L2_Biology.pdf

OCR: produce two specifications: 'Google' gcse gateway science suite – biology A(9-1) –J247

http://www.ocr.org.uk/Images/234594-specification-accredited-gcse-gateway-science-suite-biology-a-j247.pdf

Google – gcse twenty first century science suite – biology B(9-1) J257

www.ocr.org.uk/Images/234595-specification-accredited-gcse-twenty-first-century-science-suite-biology-b-j257.pdf

David Archer, BSCB Schools Liaison Officer.

Obituary: Christien Merrifield 1972–2017

Christien Merrifield, a cell biologist and gifted experimentalist distinguished for his work on endocytosis, died tragically on 28 October in France while under treatment for depression.

Christien was born on the Isle of Wight, where Merrifields have lived for centuries. He loved the island and the sea, roaming with his lifelong friend from teenage years, the marine biologist Kim Last, and developing an interest in palaeontology. He crossed the Atlantic under sail as a qualified First Mate and served as Navigator and Biologist on the World Wildlife Fund yacht 'Song of the Whale' in 1994.

Christien began his career as a cell biologist by doing a PhD under Prof Stephen Moss in UCL. While a PdD student, he began to visit and collaborate with Wolfgang Almers in the Max Planck Institute in Heidelberg. Almers invited him to accompany him to the Vollum Institute in Portland Oregon, where he worked until 2002. As well as becoming a key researcher in the Almers group he developed imaging apparatus which was commercialised by the US company Optical Insights. He then took up an appointment at the MRC Laboratory of Molecular Biology, Cambridge and set up a small research group which published an outstanding paper in PLOS Cell Biology which has become a classic. The astonishing movies which he made showing individual endocytotic events also gained him the Selwyn Award of the Royal Photographic Society for excellence in scientific imaging in 2007. When asked to disband his group in Cambridge in 2011, he moved to France.

In France, there was delight and excitement at the arrival of such a distinguished young scientist. Dr Jaqueline Cherfils, the chairperson of the CNRS Laboratory of Enzymology and Structural Biology and her colleague Dr Maghel Zeghouf, have also commented on the simple modesty that made it a delight to stroll down to his lab for a discussion, which contrasted with his high distinction. The latter was recognized in his appointment to a long-term position as a Research Director of CNRS at his unusually young age. His friends, David Perrais, Stéphane Vassilopoulos and Nathalie Sauvonnet, have described him as kind, patient, a real gentleman as well as a scientist of genius.

Recently, in France he invented a new modification of his instrument for total internal reflection microscopy, using polarized light.

He returned regularly to the UK to teach in the EMBO Practical Course on Advanced Optical Microscopy in Plymouth each Spring, giving masterly lectures. Typically, he often lectured on photoproteins rather than on his own field of endocytosis when the course programming demanded this. Gerard Marriot (UC Berkeley) , who teaches at that course, has contributed the following words:

I always enjoyed Christien's lectures and our interactions at the Plymouth Workshop. He always struck me as a remarkably talented scientist, who led a research group that produced high-quality, innovative and high impact publications. It was only after listening to his lecture during my first visit to Plymouth that I connected his name to the influential papers I had read on the molecular mechanism responsible for clathrin-mediated endocytosis. He made these discoveries by cleverly integrating principles and practices of cell biology, physical chemistry with advanced biosensors and optical microscopy techniques. In fact, I still use the article he published in Trends in Cell Biology (2004) to show my students how fluorescence microscopy can be used to unravel dynamic molecular events on the surface of an individual femtoliter nanovesicle at the plasma membrane of living cells. In particular, you may recall that Christien showed that endocytosis proceeds by way of a defined sequence of molecular events that begins with the recruitment of dynamin at the plasma membrane followed by a massive pulse of actin polymerization on the cytoplasmic face of the plasma membrane, regulated in part by the Arp2/3 complex and coronin. Christien also used pH-sensitive GFP mutants fused to transferrin to correlate these distinct molecular events with the acidification of individual endosomes. Christien also showed that the localization of these molecular events to the membrane-facing side of the endosome introduced a functional polarity to the endosome that accounted for their directional movements towards the peri-nuclear region. Christien excelled in the development and application of high-quality genetically-encoded fluorescent fusions to study dynamic events at the plasma membrane of living cells. The scale of his studies and a measure of his collaborative spirit can be seen in the number of expression plasmids he deposited with Adgene and the large number of high impact papers in the field that thank him for providing these molecular tools. Christien leaves behind a legacy of outstanding academic scholarship and research innovation.

Gerard's words underline Christien's distinction in cell biology, so early in his young life. Anyone who worked with him grew to respect his determination to run his own research lab and be guided by nothing except his own marvellous curiosity about the natural world and his skill and scientific rigour. To those who were his friends there is now shock and inconsolable sadness.

Professor Brad Amos

Taylor MJ., Perrais D & Merrifield CJ. (2011) A High Precision Survey of the Molecular Dynamics of Mammalian Clathrin-Mediated Endocytosis PLoS Biol 9(3): e1000604. https://doi.org/10.1371/journal.pbio.1000604.

BSCB Ambassadors News

'Malfunction junction' – a public engagement project with Einstein's garden/The Wellcome Trust

This summer a group of researchers from the European Cancer Stem Cell Research Institute teamed up with Einstein's garden to deliver a public engagement project at the annual Green man Festival in the heart of the Welsh Brecon Beacons.

Einstein's garden links researchers with artists to collaborate on playful and experimental ways to deliver public engagement on science and nature. A major focus of this space is to inspire public engagement as a two-way conversation between the public and researchers that should stimulate new ideas and discussions for both parties. Under the direction of Ellen Dowell (Creative producer of Einstein's garden) we teamed up with Sophie Pendrell, Education Pioneer at Technology Will Save Us (www.techwillsaveus.com), a London-based company that designs and produces kits to help children play, learn, code and invent using technology.

Supported by The Wellcome Trust, Einstein's garden projects generally are designed to align to specific themes and this year our project was inspired by the concept of 'Mis/behaviour'; an easy fit for us cancer researchers since cancer could be interpreted as a collection of cells behaving badly! Our collaboration with Sophie worked brilliantly and we had many fun-filled and imaginative meetings discussing and interpreting the behaviour of cells, how cells listen and obey environmental signals to maintain tissue health, and how they can become 'rogue' to drive disease. From these meetings, Sophie and her team took all this information and translated it as a board game of colour, circuits, play dough and glitter, which we called 'Malfunction Junction'. To play the game, participants had to choose an instruction from a deck of cards and carry out the instruction using coloured play dough.

Using special salty play dough that conducts electricity, players were asked to make 'cells' and fit the new cells on to a Perspex board wired with small electrical circuits. If the 'cell' had a regular shape and size, and 'obeyed' the rules, the electrical circuit fuelled small lights on the board. Mutated or 'rogue' cells could break the rules and the electrical circuits to create 'tumours' of all shapes, sizes and colours. Through this, we could also explore cell division and cell death, function of stem cells (or 'factories'), cancer stem cells (or 'rogue factories'), how mutations render cells 'invincible', the role of the immune system (or 'sweeper') and how stem-like cells can invade neighbouring tissues in metastasis.

At the festival, the project was a great success and particularly a big hit with children of all ages, including pre-schoolers, many of whom returned several times during the three days to play! As a scientist, it was a fun and playful way to talk about the science of cancer cell biology, which is normally a very emotive topic, and instead focus on the exciting and fascinating biology behind how cells make decisions.

Catherine Hogan, Cardiff University

Beatson Stand up to cancer

It's an exciting time to be a researcher working here at the Beatson Institute in Glasgow. Apart from the modern lab spaces and excellent facilities we have, one of the most striking things I have found is how interactive and supportive the environment is. This really encourages a lot of collaboration and is particularly helpful for someone like me who is just starting out on a career path to independence.

This year saw Owen Sansom appointed as our new Institute Director, following the departure of Karen Vousden to become Chief Scientist at Cancer Research UK. In an inspirational research career spanning just 16 years, Owen has already made major contributions to our understanding of the key molecular drivers of colorectal cancer. This has included

People Elected to be FRS

Its been a truly fantastic year for women in Science in the BSCB.

Firstly We would like to congratulate our President

Anne Ridley on her election to the Royal Society in 2017. A very well deserved accolade. She has been elected for her contributions to understanding cancer progression and inflammation through her work on cell migration. It has been a very busy year for Anne as she has also been confirmed as the new Head of the School for Cellular and Molecular Medicine in Bristol.

Professor Wendy Bickmore, Director, MRC Human Genetics Unit, who was also our BSCB Ambassador for many years, has also been elected to fellowship of the Royal Society for her contributions to understanding how the expression of genes is controlled. Her current research focuses on how spatial genome organisation influences the regulation of genes in development and disease.

https://royalsociety.org/people/wendy-bickmore-13380/

Finally, Professor Amanda (Mandy) Fisher was made a Dame for her fundamental scientific discoveries in HIV, subsequent work on stem cell science and epigenetics, and her strong advocacy for women in science. In the 2017 New Years Honours. Dame Mandy is Director of the MRC London Institute of Medical Sciences (LMS) at Imperial and our BSCB Ambassador.

defining the roles of the tumour suppressor protein APC and the WNT signalling pathway as well as the involvement of intestinal stem cells in tumourigenesis.

Under Owen's leadership, the mission of the Institute continues to be to identify the key cell biology underlying cancer progression but with a greater emphasis on applying these findings to the clinic for the benefit of cancer patients. The Beatson's ambitious research themes focus on understanding the regulation of the tumour microenvironment and cancer metabolism - in particular the intrinsic cancer cell vulnerabilities caused by cell growth, and the interplay between the tumour microenvironment, metastasis and recurrence.

As well as carrying out world class research staff and

students at the Beatson are committed to Public engagement and fundraising for Cancer research. Recently some of our students promoted Cancer Research UK's new fundraising campaign Stand Up To Cancer by being sponsored to adop some extreme haircuts.

Twitter: @CRUK_BI

Kirstina Kirschner, BSCB Ambassador based at the Cancer Research UK Beatson Institute in Glasgow

In brief

Nic Georgopoulous – University of Huddersfield

Local BSCB members were involved with our European Researchers' night last Friday at our University. This event ran for the second year in a row and was again very successful www.hud.ac.uk/steam/) with thousands of members of the public coming along and receiving great feedback. It was a university-wide event for the public, and Applied Sciences (and the department of Biology in particular) ran several events that evening.

Stuart Jenkins – Keele University.

We are investing £45m in the creation of new state-of-the-art science facilities on its campus, including new laboratories and teaching spaces, as part of the biggest single investment in learning and teaching in the University's history.

The first phase of the investment includes an £11m complete redevelopment and major extension of the University's Huxley Building, home to the School of Life Sciences, which will open later this year. The larger and fully refurbished building will provide two state-of-the-art teaching laboratories plus additional research laboratories for both undergraduate and postgraduate students, and will significantly increase capacity.

Book Reviews

Lewin's Genes XII

JOYCELYN E. KREBS, ELLIOT E. GOLDSTEIN, STEPHEN T. KILPATRICK

The 2018 version of *Lewin's Genes* is now available and marks the XIIth edition of this well established and relatively reasonably priced text. The format follows the general style of '*Lewin's Essential Genes*' published in 2013 and continued in *Genes X1* published in 2014. In *Lewin's Genes XII* there has been some rearrangement and updating of certain sections of text to reflect current ideas and approaches. Some new material has been added together with new or improved figures. Topics on chromatin structure and function, epigenetics, regulation by noncoding RNA and microRNAs in eukaryotes, have been given greater emphasis.

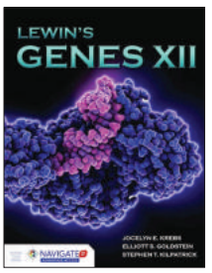
For every publisher and writer a balance has to be struck between text length and price. *Genes XII* has 111 fewer pages of text and figures than *Genes XI*. Contents pages at the beginning of the book are fewer and some of the type size is also smaller.

In the '*Lewin's Genes*' series I particularly like the feature in which, at the beginning of each section, a bulleted list of Key Concepts is provided and written in declarative style. Placing it at the beginning of the section seems a good learning and teaching feature, and 'signposts' the main points too look out for. Other books list Key Concepts, but not always in this way. I just wish the print was bolder in form than the text that follows it.

Various 'Teaching Tools' are available to tutors and the book comes with a code giving access for 365 days to 'Navigate 2' online course material for students, including an ebook version. '*Lewin's Genes*' volumes are well thought of and are produced with advanced students in the tertiary sector in mind.

Incidentally, if you ever wondered what happened to Benjamin Lewin himself, explore the food and wine section of your bookshop. Lewin has turned his considerable writing talents from molecular cell biology to the applied science of wine. Benjamin Lewin is a 'Master of Wine' and has written several books and articles on the subject. His book 'Wines of France' is priced just a little less than *Genes XII*. Which one will you buy?

David Archer



Lewin's Genes XII
Joycelyn E. Krebs, Elliot E. Goldstein, Stephen T. Kilpatrick
ISBN: 9781 284 104493 h/b
Publication date: 2018
Recommended price £69.99, Amazon UK price £55.82 (book includes Navigate 2 access code for 365 days to student Online Course Material, including ebook)
Publisher: Jones and Bartlett Learning, represented in UK by Classlearning Ltd.

Herding Hemingway's Cats

KAT ARNEY

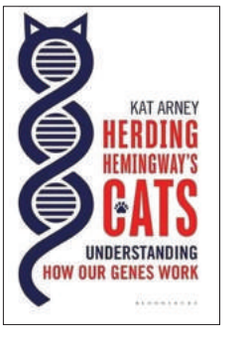
The language of genes has become common parlance. We know they make your eyes blue, your hair curly or your nose straight. The media tells us that our genes control the risk of cancer, heart disease, alcoholism or Alzheimer's. The cost of DNA sequencing has plummeted from billions of pounds to a few hundred, and gene-based advances in medicine hold huge promise.

So we've all heard of genes, but how do they actually work?

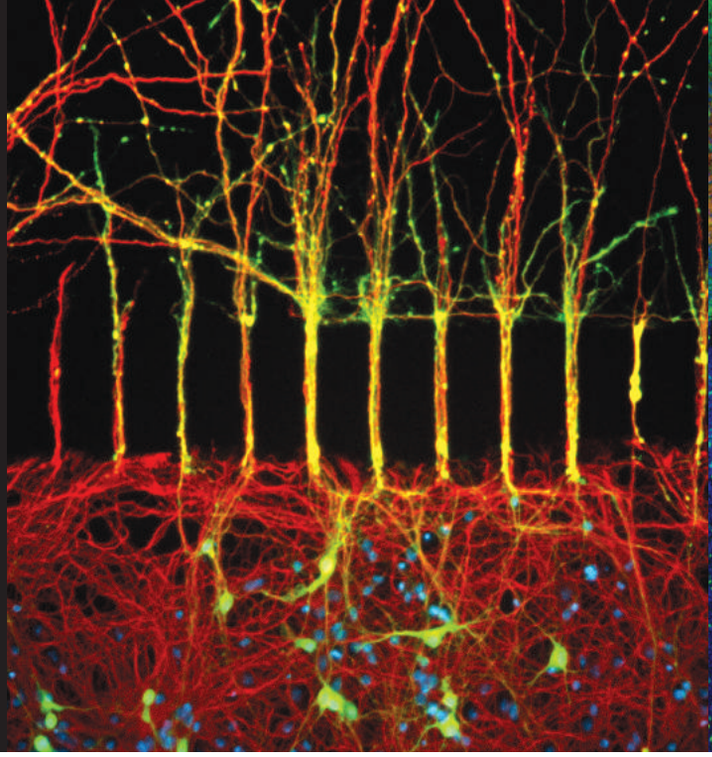
There are 2.2 metres of DNA inside every one of your cells, encoding roughly 20,000 genes. These are the 'recipes' that tell our cells how to make the building blocks of life, along with myriad control switches ensuring they're turned on and off at the right time and in the right place. But rather than a static string of genetic code, this is a dynamic, writhing biological library. Figuring out how it all works – how your genes build your body – is a major challenge for researchers around the world. And what they're discovering is that far from genes being a fixed, deterministic blueprint, things are much more random and wobbly than anyone expected.

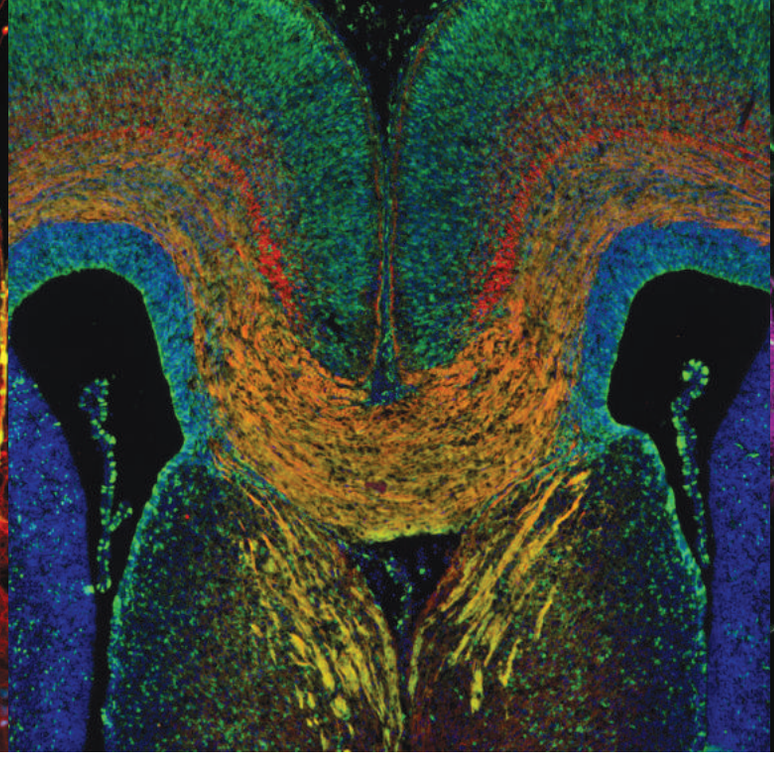
Drawing on stories ranging from six toed cats and stickleback hips to Mickey Mouse mice and zombie genes – told by researchers working at the cutting edge of genetics – Kat Arney explores the mysteries in our genomes with clarity, flair and wit, creating a companion reader to the book of life itself.

"A witty, clued-up report from the front lines of genetics ... Kat Arney unravels the intricacies of the discipline with a romp through 'thumbed' cats, hipped fish and frank interviews with scientists." – Nature



Herding Hemingway's Cats
Kat Arney
ISBN: 978-1-4729-1004-2
Publisher: Bloomsbury Sigma





BSCB Imaging competition 2017

The winners of the 2017 BSCB Image Competition are:

First: Cristiano Lucci; University of Nottingham
Second: Anneliese Norris; University of St Andrews
Third =: Mohammad Mofatteh; MRC LMB, Cambridge
Third=: Alan Prescott; University of Dundee

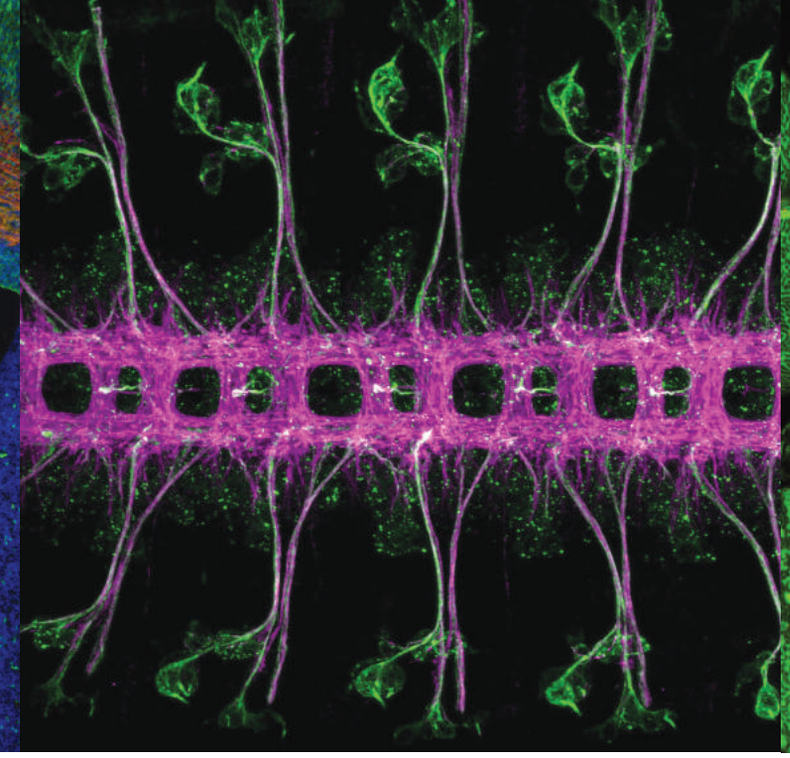
1st Prize winner: Cristiano Lucci, School of Life Science, University of Nottingham.

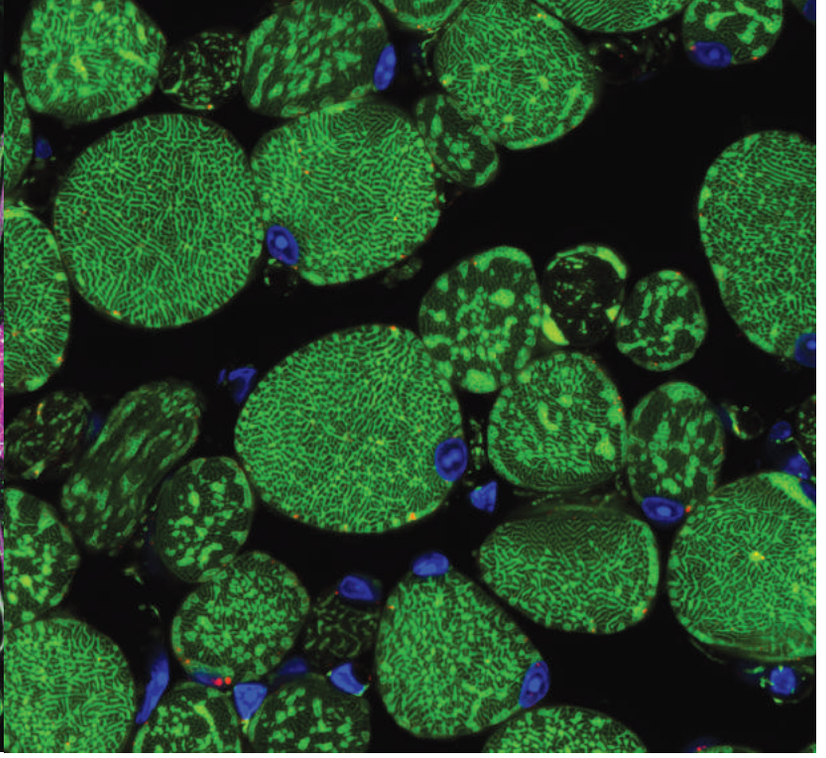
Cristiano's image (above, left, and front cover) shows primary cortical neurons in compartmentalised microfluidic chambers, which separate axons and cell bodies. Neurons were stained with acetylated tubulin antibody (Red) and DAPI (blue). Calcein (Green), is a cell-permeant dye applied in the axonal side and which is used to label those neurons that have extended axons to the other side.

"After completing my MSc degree at the University of Camerino (Italy), I moved to the University of Nottingham where I was awarded a Vice-Chancellor's scholarship for Research Excellence. This allowed me to start my PhD in the lab of Dr Federico Dajas-Bailador at the School of Life Sciences. As part of the general research interests of the lab, my project focused on the role of microRNAs in the development and maintenance of neuronal connectivity. In particular my work aims to shed light on those molecular mechanisms that can control neuronal polarity via microRNA function.

The understanding of axonal mechanisms in neuron connectivity is a crucial process in the investigation of impaired network integration capacity in the brain. Indeed, the loss of connectivity is concomitant with the observation that axons are lost before cells body in many neurodegenerative diseases. To study these mechanisms, we use microfluidic chambers, which allow the compartmentalisation and fluidic isolation of axons from the cell bodies, providing an invaluable tool for the study of the local phenomena that can regulate neuronal development and degeneration.

The image shows primary cortical neurons cultured in these compartmentalised microfluidic chambers. The labelling is for acetylated tubulin in red (identifying all axons), and green for the cell permeable dye calcein,





which is only applied on the axonal side of the chambers (top half) and allows the identification of those neuronal cell bodies (bottom half) that have extended axons to the other side of the microfluidic device. Blue staining indicates nuclei labelled with DAPI. The image was taken using a fluorescent microscope at the SLIM facility in the School of Life Sciences."

2nd Prize Winner: Anneliese Norris, School of Biology, University of St Andrews.

Anneliese's image (facing page, above right) shows a section through the embryonic mouse telencephalon at E18.5 showing the L1 expressing corpus callosum (labelled orange) and cells of cortical origin labelled with GFP (green). Section is counterstained with DAPI (blue). This image was taken whilst working with Dr James Clegg at the University of Edinburgh.

"After my degree in Human Genetics, I completed my MSc by research at the University of Edinburgh in Developmental Cell Biology and Neuroscience, working in both mouse and zebrafish. I then carried on working (as a research assistant) in the laboratory of Prof Catherina G. Becker, focussing on motor neuron regeneration in zebrafish. Following this I moved to King's College London to do my PhD in Prof Andrea Streit's laboratory working on optic vesicle development in the chick. I am now a postdoctoral research fellow in the laboratory of Dr Marcus Bischoff at the University of St. Andrews, studying morphogenesis of the *Drosophila* abdomen."

3rd Prize Winners: Mohammad Moffateh, MRC LMB, Cambridge and Alan Prescott, College of Life Sciences, University of Dundee.

Mo Moffateh

Mo's image (above left) shows beautifully repeated segments of *Drosophila melanogaster* embryonic nervous system, stage 16/17, ventral view. Stained for Futsch (green, segmented sensory neurons and dispersed cell bodies in the ventral nerve cord) and Ank2-L (magenta, segmented ventral nerve cord and a subset of sensory neurons). Imaged with a Zeiss LSM780 confocal microscope.

"After graduating with a First Class Honours degree in Biomedical Science from King's College London, I was awarded an LMB Cambridge Scholarship for international students to study my PhD under Dr Simon Bullock supervision.

My PhD project focuses on understanding biological processes involved in transportation and localization of messenger RNAs in the nervous system using *Drosophila melanogaster* as a model system."

Alan Prescott

Alan's image (above right) shows a confocal image of a transverse section of the rectus muscle of the eye taken from the mito-QC mouse (McWilliams et al., (2016) JCB, 214(3)). Mitochondria express eGFP and mCherry but in lysosomes the eGFP, green fluorescence is quenched. Bright red dots are mitolysosomes. Nuclei are DAPI blue.

"I studied the Biology of Man and his Environment as an undergraduate and then did a PhD characterising the microtubule cytoskeleton of the exocrine pancreas at Aston University. I then worked as a Research Fellow at the University of Keele and University of East Anglia before moving to Dundee where I am a Senior Lecturer specialising in many aspects of cell biology particularly those studied by confocal and electron microscopy."

Hooke Medal winner 2017 – Ewa Paluch

Ewa Paluch is Professor of Cell Biophysics at the MRC Lab for Molecular Cell Biology, and Head of the Institute for the Physics of Living Systems at UCL in London. She was awarded the Hooke Medal by the British Society for Cell Biology at our 2017 annual meeting in Warwick. The BSCB awards the Hooke Medal each year to an emerging leader in his or her field who has made outstanding contributions to UK cell biology.

Ewa's group investigates the fundamental principles that underlie the control of cell shape and morphogenesis, using a winning combination of quantitative cell biology, high-resolution imaging, microfabrication, and biophysical modelling. In recent years Ewa's lab has focused on the actin cortex, an extremely thin but dynamic meshwork in close contact with the plasma membrane that defines and modulates cell shape and shape transitions in animal cells. Ewa's team has made major contributions to our understanding of the role of the cortex in regulating cell division, migration and blebbing.

Ewa started her scientific career in Paris, with an MSc. from University Paris 7 and later a PhD in Biophysics at the Institute Curie under the supervision of Cécile Sykes and Michael Bornens. Unusually, she started her own group straight after her PhD, with a joint appointment between the IMCB Warsaw and MPI-CBG in Dresden in 2006. She led this group until 2012, when she moved her lab to the UK. At the LMCB, she immediately set about making a dramatic impact on the institute's links to biophysics and theoretical biology, resulting in the 2014 creation of UCL's Institute for the Physics of Living Systems.

I had the great honour of interviewing Ewa in London for this magazine a few months after she was awarded the Hooke Medal. We spoke about her science, interdisciplinary biology, and tough career choices facing early career scientists. Read on!

Q: Ewa, thank you for speaking to me, and congratulations once again on winning the Hooke Medal! As you know, awardees have already made a big impact on their fields in a fairly short time. Could you tell me a little bit about how you have shaped the direction your lab has taken – among other things, leading to this award?

A: I want to understand what actin networks can do, in terms of their physical properties, and how that influences shape. And in fact, that's still what we're doing! You might know, I got my group leader position when I was rather young – straight out of my PhD – so I didn't really have that much time to think about the direction I wanted my career to take. Instead, it was influenced heavily by a random set of circumstances. I was a physicist working on actin, and physicists typically try to find generic principles underlying diverse phenomena. This might strike you as a bit naive from a biological perspective, but in a way, it helped me to be so young because I just had fewer doubts. Doubts came later, once we already had data – and they were easier to handle. All in all, I probably wouldn't be doing what I'm doing now if I had done a postdoc!

What got us into the textbooks – Alberts, specifically – is blebbing. The first picture of a healthy bleb, in the latest edition, is from my lab! This is also probably how many would perceive our major achievement as a young lab, the lab I started back in Dresden. We contributed to the rehabilitation of blebs as a healthy cellular phenomenon rather than an apoptotic one. Back in 2006, it was still very strongly associated with apoptosis in people's minds. Guillaume Charras and I – who started our labs at the same time – along with biologists like Erik Sahai and Erez Raz, and even people working

in apoptosis, we all converged on the notion that blebs could be used by cells for all sorts of functions, such as bleb-driven migration. This is now in the textbooks, and Guillaume and I wrote one of the first reviews on the subject back in 2008, something I'm still very proud of. We became the bleb lab.

Q: Do you think the field still thinks of you that way?

A: Perhaps! At the moment, though, there's hardly anyone in the lab working on anything bleb-related. What we did move into, what I've always been interested in, is actin organisation in general – especially the cortex. I've always wanted to understand the control of cell shape, but now, more specifically, the coupling of shape and fate. This refocusing of our research direction has been inspired by our move to the LMCB, and being surrounded by a very broad spectrum of biology labs.

Q: In return, you've helped reshape the LMCB – bringing cellular biophysics to the foreground. You played a leading role in creating the Institute for the Physics of Living Systems (IPLS) here at UCL. Could you tell us a little bit about that?

A: The IPLS was born when the Deans of the Life Sciences and of the Mathematical and Physical Sciences Faculties at UCL asked me to coordinate a virtual institute to promote collaborations between physics and biology, a platform for people to meet and nucleate new ideas and new collaborations. I believe that for something like this to work well, you need a diverse team with different backgrounds. We have a steering committee with people like Buzz Baum, Guillaume Charras, Bart Hoogenboom, Karen Page, who already work at the interface of physics and biology – but the idea was to get new people to involved in interdisciplinary research. This was certainly inspired by similar successful platforms at Institute Curie and in Dresden – the two places I had worked at before. I learned that you cannot force interdisciplinary research, despite the fact that, on paper, everyone wants to do it. It has to happen somehow from the ground up. Students and postdocs and PIs must get to know each other, and organically discover that they are working on questions that naturally lend themselves to interdisciplinary collaborations. The IPLS aimed to do just that, across all of UCL's various departments. We organised meet-ups, retreats, and brainstorming sessions. We also identified a genuine shortage of theory groups at UCL, and we were able to get funds to hire two new Research Fellows, and create a virtual PhD programme. Now we have to wait and see! We also have a satellite at the Francis Crick Institute now, with theorists building new connections between UCL and the Crick.

Q: You were trained as a physicist, and of course now you work in biology. How do you bridge the two disciplines effectively?

A: I actually recently wrote a two-pager for *Trends in Cell Biology* that will answer your question in more detail than I could right now. It's difficult to work in both physics and biology and do meaningful science in both, especially because very few people have the right training and background. Honestly, I also don't think it's necessary to be a specialist in both subjects. It's way more fun to collaborate! Even through I'm a physicist I'm not a theorist, so collaborating with theorists is critical to us. For example, we have a close relationship with Guillaume Salbreux and his group. First key to success: you need the right collaborator. Often biologists have a fear of models; I'm not quite sure where it comes from - perhaps drawn from an older fear of math? It can also be tempting to delegate responsibility and say: "Oh, not my field, I don't need to understand the details". When we start a collaboration, we usually invite theorists to come spend a week in the lab, so they understand how much effort goes into collecting even a single quantitative data point, or how precise (or imprecise) a given measurement might be. Measurements in biology are not measurements in particle physics – we're not getting the same degree of precision! In the other direction, the biologist should really not delegate the responsibility of defining the model to a theorist alone. Both sides need to understand deeply what the model and experiments are about.

Q: Switching topics a bit: you're balancing running a lab with taking care of a young family. Any advice for young scientists hoping to follow in your shoes?

A: I guess what people always say is, there is no right time, or any time is the right time! It is somewhat easier once you're a PI, maybe, but I don't even know if that's true! Its hard but it is also really rewarding and motivating, and it's very important to have a partner that supports whatever you do and understand what motivates you.

Q: And I would imagine the institution plays a key role?

A: UCL has onsite day care, which is extremely helpful: that means your baby is across the street from you, so you can e.g. easily keep nursing for some time after coming back from maternity leave, and they also get sick a lot when they're young! It helps to have an institutional culture where this is taken into account, such as not having important meetings at 6 pm, for example! There are many many women in science – men too, but it is often in reality harder for the women – with children so go talk to them! I did my PhD in France, where no-one ever doubted that you could have both children and a career: my PI had 3 children and it was always inspiring to see that she had made it work; there was one very prominent physicist in that department who had 6 children! The tip is, do it in a way that feels right for you. In my own lab, I've tried to create an environment that is supportive in that sense, and quite a few lab members have had children in the last few years.

Q: Thank you Ewa! The BSCB is glad you chose to be a part of our community!

A: Likewise! I really enjoy the annual meeting – it's just the right size to have a big party but small enough that people actually know each other. The natural home for people like myself and the IPLS is the BSCB, as our questions come from biology more than physics. That's where I see my inspiration coming from.

Gautem Dey, BSCB Postdoc representative

Science Writing Prize Winner 2017 – Marcia Kishida

Breaking the unbreakable: Solving the problems of plastics and plants

Marcia is a final year PhD student at the University of Cambridge with Angeleen Fleming and Roger Keynes in the Department of Physiology, Development and Neuroscience. She is studying how the vertebral column develops using zebrafish as a model system and is broadly interested in evolution and development.

We are addicted to plastics. They are used for everything, from food packaging to smart phones. But when we are done with them, they hang around for a long time, taking decades to decompose.

These hardy plastics aren't just creating litter in cities and filling up landfills. They are harmful to wildlife, especially in the sea where animals can become entangled in the plastic or mistake it for food. The harm of a single piece of plastic can be long lasting since it takes so long to degrade. A striking example of this is the Great Pacific garbage patch which has formed from small bits of floating plastic that break into smaller and smaller pieces but haven't fully degraded. Researchers have described ocean water taken from there as looking like a "snow globe" of plastic chips (1). Though we are developing biodegradable plastics and recycling is on the rise, there is still the question of what to do with the built up waste.

One way to solve this problem is by taking a cue from nature. Plants also developed an incredibly sturdy material many hundreds of millions of years ago. When plants evolved from water-based organisms to living on land, they had many new problems to adapt to: drying out in the air, withstanding UV from sunlight, and counteracting gravity. To be able to grow upwards, they evolved a new material – lignin. Lignin becomes embedded in the wall that surrounds plant cells and gives it rigidity, and is held together by strong bonds so it resists degradation. At the time lignin evolved, no living thing could break it apart. So why aren't we surrounded by piles of un-decomposed trees?

We have bacteria and fungi to thank for that. Specifically, the kinds that have counter-evolved to break lignin apart. Mostly this job is done by the fungus, white rot. Cells make proteins called enzymes that can help bring molecules together or break them apart. For example, it is the enzyme lactase that breaks down the lactose in milk we drink into parts we can absorb for energy. Similarly, it was useful for fungi to be able to break lignin apart to get at the food stored in plants. Under this strong selection pressure, a fungus with an enzyme that could even partially break lignin apart would get more food and thrive. Every change that appeared that was a small step towards improving this enzyme would be an advantage for the fungus. Eventually, they evolved a special type of peroxidase enzymes that are particularly good at using reactive chemicals to attack the lignin structure.

So, plants invented an indestructible material and then fungi figured out how to digest it – can we do the same with plastics? Even though there is currently no known organism that can efficiently break down plastic, there are ways to search for ones that do. Scientists test already known bacteria and fungi for their ability to degrade plastic. They also try to find new candidates by sifting through organisms found around slowly degrading plastic to pinpoint which one is actually responsible for breaking the plastic apart.

There have been plastic-degrading bacteria and fungi found in this way, but they are nowhere near as efficient as the white-rot fungus is at breaking down lignin. This is probably because of the short amount of time organisms have had adapt to this new material, similar to how fungal enzymes had to evolve from less efficient enzymes. There was a lag of many millions of years between the evolution of lignin and the evolution of organisms able to degrade it thoroughly and quickly.

We do not have this kind of time. So, scientists can speed up the process by directed evolution. While natural evolution depends on random mutations popping up, in directed evolution we can actively create small differences in enzymes that could make them better, and then directly test these slightly different enzymes for their ability to degrade plastic.

With this type of biotechnology, we can use the cells of organisms around us as a resource and learn lessons from their evolutionary history. By harnessing the ingenuity of natural systems we can solve our plastic problem.

References:

1. Kaiser, J. "The Dirt on Ocean Garbage Patches." Science 328.5985 (2010): 1506. Web.

Women in Cell Biology Early Career Medal 2017 – Vicky Sanz Moreno

To celebrate her Women in Cell Biology award, Dr Victoria Sanz-Moreno was interviewd by BSCB Student rep Melanie Panagi.

We met at her scientific home of King's College London, in the heart of bustling London. London is a place very dear to Vicky's heart: she was born here, during her father's post-doc at Imperial College, and although the family returned to Spain, she was drawn back here, leading a very fruitful academic career of her own. Like many scientists, she is humble and considers herself "lucky" in her pursuits. But to me, Vicky seems very determined, resilient and curious: an ideal combination for being a successful scientist. She has also surrounded herself with great scientists and taken on their advice – quoting Chris Marshall, her post-doc' supervisor, and Anne Ridley, who recruited her to King's College as major sources of wisdom – helping her to define her own path.

Every major decision she has made felt natural to her. She said she never specifically felt prepared to move back to the UK or become a PI, it was simply an obvious progression. She admits becoming a group leader is a big change, suddenly being on your own, responsible for others. But like being a mother, she finds seeing her students' and post-docs' growth incredibly rewarding. She is also very open and values the interdisciplinary nature of science. She has loved the ability to collaborate and discuss scientific problems with people of all backgrounds. These collaborations are what keep her on her toes; there are so many points of view and ways to do things that you've never thought of that the world just becomes big and big with possibility.

Having a husband who is also in science has definitely helped; each understanding the pressures of the job. And having a son gave her great perspective. It was the beginning of two new chapters in her life – she gave birth on the Friday and her CRUK Career Development Fellowship grant was accepted on the Monday – but now she does not have enough time to worry anymore, she's now just very organised! And a happier person for being able to have both.

Resilience is her key message. Science can be hard: we are constantly under examination and rejection is common – be it papers or grants – but it makes us grow, and criticism is constructive. Science is exciting and you're never bored. If you believe in yourself, and you find somewhere where you feel appreciated, there is no reason not to be optimistic about the future!

Q: How would you describe your research?

A: The lab is fascinated by the cytoskeleton. In particular, how the actomyosin machinery is able to coordinate very many functions and how this is in part possible via communication with the transcriptional machinery. Such fine-tuned coordination is crucial for cancer cell migration and dissemination to distant sites. At present, we are starting to explore other areas of tumour biology in which we believe this coordination may also be essential, for example during tumour-promoting inflammatory responses or mechano-transduction responses.

Q: What are the major questions that still need answering in your field?

A: There are many! I think one key issue is that cancer cells are capable of sensing many inputs via their cytoskeleton. The genetic makeup of the cancer cell will determine how cells integrate and respond to those inputs. I feel that to really understand some of these responses in the context of cancer, we need to look into how a tumour, driven by a specific mutational processes, relies on cytoskeletal players to control different hallmarks. It is possible that another tumour, driven by a different mutational process, needs a different cytoskeletal configuration. Furthermore, even if tumours hijack developmental programs, they are rewired by such oncogenes, so these 'cancer programs' are not as ordered and predictable as developmental programs.

That complexity or 'disordered/chaotic' behaviour needs to be better understood and now biologists have tools to do it. Furthermore, the cytoskeleton in cancer cell integrates all this information – and how to use such knowledge to develop new cancer treatments is a key question in the field.

Q: How did you get to where you are today? Who or what first got you into science?

A: One obvious thing is that I am very curious. My father is a chemistry professor and my mother is an English teacher, so I grew up in an environment in which questioning things and learning was very much encouraged. While I was undertaking my University degree my grandmother died of cancer, and we were very close. I decided then that I wanted to understand what was different in cancer cells compared to normal cells. My PhD project in Piero Crespo's lab focused on understanding signals that control how cancer cells respond to stress to keep proliferating. I then decided to move abroad and was lucky enough to get a postdoctoral position in Chris Marshall's lab where I focused on understanding the signals controlling different modes of cancer migration during metastasis. After that I joined the Cell Motility and Cytoskeleton Section at the Randall, recruited by Anne Ridley and Gareth Jones. I managed to get a Career Development Fellowship from CRUK which gave me a lot of freedom to develop my ideas regarding how the cytoskeleton may be communicating with the transcriptional machinery while cells are migrating. This spring, I got a Senior Fellowship from CRUK, and this will lead to hopefully new venues of research beyond cancer cell migration. We want to understand in a holistic manner how the cytoskeleton regulates many cancer cell decisions via controlling gene expression and the cross-talk with the immune system.

Q: What is the best thing about being a scientist?

A: The freedom to discover and create new things on a daily basis. The best part of the job is that every day is different. You're constantly learning and renewing your skills. The scientific process is very exciting: designing a hypothesis, trying to prove it and finally finding out if it was correct (or not!). The whole exercise is quite challenging, but at the same time highly rewarding.

Q: What is the hardest thing about being a scientist?

A: You are being scrutinized, examined and judged regularly. That can be tough at times, but it also makes you grow as a scientist and as a person. That desire and need to become better and to improve your work is a powerful drive but also a tough one.

Q: How was the transition from Post-doc to PI? Is it what you expected?

A: For me it was a natural transition since it was something I really wanted and I had very clear that was my goal from the start of my career. It was what I expected in the sense that you still enjoy the beauty of scientific discovery, but in a more integrated manner since you are managing several projects at once.

The strongest challenge I may have felt is thinking that other people's careers depend partly on me – that is a big responsibility. If a project does not work, it will not only affect me; it will be very much someone else's future on the line. I probably had not thought about that enough as a student or a post-doc, and I value my mentors much more since I had to take that responsibility myself.

Q: If you weren't a scientist, what would you be?

A: That is a hard one, since I was very sure of what I wanted to do since early age. If I was not working on the biology of cancer I would have probably gone into either Neurobiology, Quantum Physics or Organic Chemistry. If not a scientist, I would have trained harder to be a dancer. I love music and art in all its forms. Science and art have a lot in common, they both rely on creativity and imagination.

Q: How do you relax and spend time out the lab?

A: I love spending time with my family, we try and go to London shows as often as possible: cinema, theatre or music. I love watching my son's reaction to all of these new experiences. I also love food, so trying new restaurants is one of our favourite activities! We also have a really nice set of friends outside science that we try and meet with the kids, they give me perspective.

Q: How do you balance your home life, parenthood and science?

A: I am not sure you achieve it ever! But at least you try. My husband is very supportive; he is also a scientist so we try and help each other as much as we can. We have no family here to help us with childcare so we try and alternate all tasks related to pick up duties or our son's care when he is sick. We try and make it fair for both of us. When we started a family (my son is 7) we felt like we had to do everything together all of the time; now we do somethings on our own. That gives us a few hours on weekends to do our own extra things, but also allows us to have quality time with him.

Q: Have you got any advice for young researchers out there?

A: Follow your passion and your heart, gut feelings are strong indicators of what you should do when taking important steps. Seek advice from more senior colleagues when needed, as most scientists are willing to help junior researchers on their way to succeed. I have had incredible mentors and I really hope I can be a good mentor for my junior colleagues too. Then probably one of the most important things you should develop in your career is resilience: you need to be ok with criticism otherwise you will suffer too much in this job! And, last, but not least, you need to believe in yourself and your work so when things get tough you can overcome failure with strength. Resilience is key!

Melanie Panagi

British Science week 2017 – 144 budding young cell biologists

British Science Week (BSW) is a ten-day celebration of science, technology, engineering and maths – featuring fascinating, entertaining and engaging events and activities across the UK for people of all ages. It provides a platform to stimulate and support teachers, STEM professionals and science communicators, and offers the general public an opportunity to produce and participate in STEM events

At Plymouth University Peninsula School of Medicine, we organised a science event to give local young people a chance to try out cell biology. Groups of 12 children from 12 local schools were invited into the lab and got to do some real hands-on experiments. Providing activities for 144 year 9 students (and their teachers) is a bit of a challenge but our undergraduate and PhD students were happy to help us out. This was motivating for the Year 9s as they were be able to talk to students a little older than them about career options and what it's really like to work in the lab day-to-day as a scientist

We offered the students three different activities togive them some hands on experience in science in the lab: DNA extraction from bananas; cell culture and a cell split; and a look at the lifecycle of the fruit fly and some GFP transgenic larvae. They really enjoyed it, getting hands-on in the lab has inspired the next generation of young cell biologists! We often have students returning for both Yr10 work experience and Nuffield Foundation Yr12 summer projects that have attended our Science Week event.

Anyone can organise an event or activity for British Science week. The British Science Association helps organisers plan by providing free activity and support resources. British Science Week 2017 saw over 5,000 events engage more than 1.6 million participants, with activities taking place across the UK.

If you would like to organise an event to encourage and inspire the next generation of BSCB members, you can apply for a grant from British Science week 2018 at: www.britishscienceweek.org/apply-for-a-grant

David Parkinson, Plymouth University Peninsula Schools of Medicine and Dentistry

'*My favourite activity was extracting DNA, because it was well cool! ALL AMAZE-BALLS*'
Lipson Cooperative Academy, Plymouth

'*The staff were exceptionally kind and supportive. They really helped us understand and we learnt a lot during the time we spent here.*'
Lipson Cooperative Academy, Plymouth

'*My favourite activity was DNA extraction because I found it fascinating and also the DNA was amazing to look at.*'
Launceston College

'*My favourite was the fruitflies, especially the glow in the dark ones.*'
Devonport High School for Girls, Plymouth.

'*It was really cool to see the internal workings of the larvae, I had a fantastic time.*'
Heles school, Plymouth

'*My favourite was the DNA extraction because the experiment was hands on and I could understand what was going on and why.*'
Ivybridge Community College.

The pregnant/new mum guide to science conferences

Pregnancy and new motherhood has brought a whole swathe of new experiences to my conference outings. This is my definitive guide to science conferences for the expecting/new Mum to help you decide where to expend your energy.

The big annual meeting

The combination of gigantic conference in an expensive city, means that the crappy hotel you can afford is miles away. Should you be foolish enough to attend such a meeting 7+ months pregnant, you can wave goodbye to your ankles, as you will be walking everywhere on tree trunks. It will also take forever to get anywhere because your walking pace has slowed to glacial, so halve the number of posters you plan on seeing, then halve it again. You will, for the first time, become acutely aware of the complete lack of adequate seating available in giant faceless conference centres and will be unable to focus on anything except finding somewhere comfortable to sit. To exacerbate the seating problem, your glacial walking pace means you will arrive late to every mini-sym session, so all seating is taken. You'll be forced to gingerly lower yourself to the floor to give your poor swollen feet a rest, knowing full well that you may never get up off the floor again – at least not in a way that might preserve your dignity. Your best strategy here is to stay seated until everyone else has left the room.

Pro tip: compression stockings

GRC/Keystone focused meeting.

These conferences have a huge positive over the annual meeting – the close proximity of the accommodation and seminar room. But two words make these conferences truly great for pregnant women: nap time. The timings are tricky, but if you can arrange to attend one of these during your first trimester you'll be rewarded with a 2 hour block in the early afternoon when you can nap/pass out. This is heaven to a woman experiencing the first wave of pregnancy symptoms, because all you want to do is sleep. Or throw up. Yes this afternoon break is for 'activities', but with any luck those on the hike will assume you're with those playing soccer and vice versa. With your new desire to sleep 18 hours a day, narcolepsy during after-dinner talks is a bit of an issue. And late nights in the bar are definitely out, but someone would only notice your sudden aversion to wine so that's probably for the best. The smell of coffee will make you want to vomit so you'll avoid the coffee breaks too. Uou can use this time to sit quietly in the seminar room with your head on the desk – most people will just assume you have a hangover. Then there's the emphasis on communal eating, which is a bit like Russian roulette when you're getting used to morning sickness and have no idea what foods will make you gag. Basically, socialising is almost impossible, but it's worth it for nap time.

Pro tip: keep a supply of ginger ale to sip during the poster session, it'll hold back the nausea. Just.

Super focused meeting in a fancy venue

Now this is the life! 50 metres between bed and seminar room! Plush rooms! Comfy chairs! Even better when you're nursing a new baby because the conference organisers will give you a giant, double-sized room to house the baby gear and partner/baby sitter. The down-side to this life of luxury is that every conversation will last 60 seconds and end with the words "I'm really sorry, I have to go and feed my baby". Yes, the half-hour coffee breaks should be plenty of time to sort any baby issues out, but we all know academics are pathologically incapable of sticking to a time limit so you'll get 10 minutes and have to miss the start of every session. But that's okay as no one says anything useful in the first 10 minutes of a talk anyway. There's a chance your offspring will get used to the cleanliness of these new surroundings and realise what a mess you usually force them to live in. They may or may not resent you for this. And you still can't enjoy the free beer while nursing, but you can sneak some back to your room to thank Dad for taking time off work to support your career. Thanks Dad! You're the best :)

Pro tip: Your baby will vomit on you the day you present. Pack accordingly.

Ali Twelvetrees, Sheffield University

DrosAfrica: Building labs with flies

Flies can do a lot for science, both inside and outside the lab. BSCB Ambassador Isabel Palacios explains how.

One of the problems for most regions in Africa is poor quality and quantity of research-based education, as well as low level of funding. Researchers based in Africa produce only around 1% of the world's research, but initiatives such as the South African Society for Biochemistry and Molecular Biology and the West Africa Centre for Cell Biology of Infectious Pathogens are seeking to change that. One problem is the sheer cost of equipment and infrastructure for basic research. And the humble fruit fly may be the answer. *Drosophila* can be used as a powerful and cost-effective model system to scale-up and improve research output.

With this in mind, Isabel Placious founded DrosAfrica. The project aims to teach scientists how to use the fly as a model system for studying human disease, ultimately creating an interconnected community of *Drosophila* researchers in Africa. This involves organising local workshops to train scientists, and providing basic equipment such as microscopes and antibodies.

"People who don't know about the fly ask: 'How could it help with African research?'" says Palacios. "But there are a lot of questions you can answer." *Drosophila* has long been used in genetic studies and allows researchers to gain insight into many types of human disease, including cancer, diabetes, and neurodegenerative disorders such as Alzheimer's or Parkinson's. Flies can also be used in the study of host–pathogen interactions, including infection by viruses or *Plasmodium* – the organism that causes malaria. They therefore have a broad range of uses in basic biomedical research.

The other thing about fruit flies – as some of us have had the misfortune to discover outside the lab – is that they reproduce rapidly, without human assistance. So you can produce adequate numbers at low cost, and little specialist equipment is required to look after them. There are also many companies and university departments offering gene editing services for *Drosophila*, so it's easy, fast, and inexpensive to obtain flies with the genes you want to study. Palacios points out that the community is very open and willing to share, so if there's a particular type of fly that you'd like to research, there will often be someone in another part of the world who can send it to you, and the cost of shipping is very low. All these make *Drosophila* an ideal organism to work with on a limited budget

Palacios explains that the idea for DrosAfrica came from a chance meeting between one of her colleagues, Lucia Prieto Godino, and Sadiq Yusuf, a professor from Kampala International University (KIU) in Uganda. Godino and Yusuf decided to organise a workshop at KIU that would teach Yusuf and his students the skills needed to work with *Drosophila*. Palacios was invited to lead some of the sessions at the workshop. "These scientists had a great desire for knowledge and wanted to do good research," she says, "but they didn't have the money or the facilities." *Drosophila* could help these researchers – and others in Africa – achieve their goals.

Since then, they've organised several workshops in Uganda and Kenya, and more are planned in Nigeria, South Africa, and Egypt. Three years into the project, they're seeing attendees from the workshops setting up fly labs at their own institutions. They've had master's students successfully defend their theses on *Drosophila* and there are PhD students who will soon be doing the same. A network of scientists from several African countries is also developing. They've started organising their own workshops, and Palacios hopes they'll soon be running their labs and applying for grants independently.

Another idea she's considering is the establishment of an institute for basic biomedical research in Uganda, so instead of arranging workshops in several countries, scientists could come to a central hub where they would develop the skills needed to work with inexpensive model systems like *Drosophila*. Over time, their research could expand to other model systems and a broader range of cell biological techniques. "But it has to be from the inside," she says, "with scientists talking to their governments and trying to get that kind of research institute going. Maybe one day we could even form an organisation of several African countries working together, similar to EMBL in Europe."

When I ask her about some of the difficulties she's faced with the project, she answers without hesitation. "The challenges are always time and funds. For most of us, this is not our main job and we also need to focus on the other aspects of being a scientist – publishing papers and getting grants," she explains. "But with DrosAfrica, what you put in and what you get out is a lot more balanced than it usually is in science. I find it the most satisfying project I have."

Edward Dadswell

Semin Cell Dev Biol. 2017 Aug 30. pii: S1084-9521(17)30489-5. doi: 10.1016/j.semcdb.2017.08.044. [Epub ahead of print]

A Bulldog for Cell Biology? The March for Science

Should science and scientists be politically active? On Earth Day, Saturday 22nd April, many members of the scientific community, including numerous cell biologists from around the UK, joined the March for Science in London.

The aim of the March was to promote the message that science is an excellent route to unbiased knowledge that can improve decisions on a vast range of issues facing the planet and its people. Prior to the March, some in the scientific community voiced misgivings about appearing politically-aligned or the wisdom of marching when the science budget was not particularly threatened. There were also worries that the March might be hijacked by special interest groups and lead to a negative impression in the eyes of the wider public. The British Science Association publicly questioned the wisdom of the March. In the event, the large turnout gave a majority message that 'Science is Good for Everyone', which came across in coverage on the BBC and broadsheet newspapers, despite the competition from the election campaigns in UK and France.

The event was peaceful, serious, appeared welcome to tourists and shoppers, and even attracted honking support from passing taxi drivers. Cell biology was particularly well represented by members of the LMCB at UCL; colleagues from Cambridge, Oxford, York and

elsewhere were also spotted in the crowd of some 10,000 people who marched from the Science Museum to Parliament Square via Trafalgar Square and Whitehall. It wasn't all professional scientists: schoolchildren, lawyers, philosopher AC Grayling, teachers, lay science enthusiasts, comedians, school lab technicians and journalists came together and had plenty of time to chat and exchange views over the three mile route.

The March originated in response to larger, and more overtly political, marches in the USA. But it was fortuitously timed to coincide with manifesto-writing by all political parties in the UK. Groups of Lib Dems and Greens joined the march, but kept a tastefully low profile. There was, however, one very big difference between the events in the USA and in London. While the 'People of Science' showed up en masse in both countries, the 'Establishment of Science' was essentially invisible in London. In the US, delegations from most major scientific societies flew to Washington to participate. The AAAS and many Universities sent representatives to march. But in London I saw no placards representing any scientific society, funding agency, University or charity. Given election purdah, the Research Councils are off the hook, but where was official representation of scientific societies large and small? Of the Wellcome Trust? Of all our Universities?

Do our Vice Chancellors, Provosts, Principals, Presidents and CEOs think it is inappropriate to support science and to speak out for intellectual rigour in public discourse? In my view, they should be asked to explain themselves. What do you think?

There are risks and benefits to taking a public stand. To me, the benefits are clear: engagement with the public, making a case members broadly agree upon, raised profile in the scientific community, and a feel-good factor that might increase membership. I would argue that those concerned about risks need to provide evidence of the harm taking a public position can do to an academic society. Even Darwin needed a Bulldog; Science does not always speak up for itself. Our BSCB is a small society with over-worked Officers and few funds; but I would ask the Committee to consider whether, next time there is a similar public event, the Society should stand up and encourage some enthusiastic students, postdocs and PIs to march in its name. (Ed, we did!)

Simon M. Hughes

If BSCB members are interested in becoming more politically active and lobbying for science the BSCB works closely with the Science is Vital Campaign.
http://scienceisvital.org.uk/
Our committee member Dr Jenny Rohn was a founder member and would be interested to hear your views.

Above, left to right: Patricia Salinas (Dept Cell and Developmental Biology, UCL), Pauline Bennett (Randall Division of Cell and Molecular Biophysics, KCL), Rosy Calvert (Randall Division of Cell and Molecular Biophysics, KCL) and Esperanza Hughes-Salinas (King's College School).

Meet the BSCB committee: Jennifer Rohn

Jenny Rohn is at University College London and joined the BSCB Committee in April 2017.

1) What's your role on the committee?
I am a regular member, but I have a special interest in science policy and science funding.

2) Over the next year, what will be you be up to for the BSCB?
We are currently living through very turbulent times here in the UK, and science funding – which is always precarious – is a luxury that we must never take for granted. As the founder of Science is Vital (www.scienceisvital.org.uk), the UK grassroots campaigning group (and now on its Executive Board), I believe very strongly that the learned societies must come together as one voice to speak out for science in this country. Politicians do listen to scientists, and learned societies have played a key role in protecting science against forecasted cuts in the past. There are also other issues important to scientists, including immigration, that we need to fight for. The BSCB has been active in this struggle, and I'm hoping that we will continue to do so.

3) Aspirations for the BSCB?
It would be wonderful if I could play a role in persuading a lot of BSCB members to become more politically active – especially the young generation, who will bear the brunt of any cuts to science funding. It doesn't take much: even writing a letter to your MP can make a big difference.

4) Could you describe your research in a nutshell?
Urinary tract infection is one of the most common infections diseases worldwide and wreaks an enormous economic and healthcare burden. My research team is interested in the host/pathogen interactions of urinary bacterial pathogens, which employ a number of tricks to subvert host cell pathways during chronic and recurrent infection. We work at the intersection between basic cell biology, microbiology, clinical medicine and engineering to try to come up with novel cures for treatment-resistant UTI.

5) What inspired you to come into cell biology?
I started out studying pathogens and cancer, using a lot of molecular biology and biochemical methodologies, but when I returned from a lengthy career break, I realized that I might get more traction on the problems I was interested in by studying them from the host cell's point of view. And I've always been a sucker for a beautiful image.

6) What's been your best moment as a cell biologist?
There is nothing more exciting than capturing the perfect moment as a compelling picture. In recent years my group has developed cutting-edge techniques to image the precise moment when bacterial pathogens invade bladder cells – and a (decent) picture really is worth a thousand words, even if you do have to quantify it afterwards to satisfy Referee 3!

7) What do you feel are the biggest challenges facing cell biology?
Live imaging is becoming increasingly important, but we need cleverer ways to film cells at the highest possible resolution without harming them or altering their processes. This will require better tech.

8) If you were to start your PhD now, which cell biology questions would you like to address?
I think the next big thing is finding human cell solutions to model systems. More and more it seems that rodents are too artificial, and the findings made in them often do not translate well to clinical cures. Lower organisms are obviously great but have their disadvantages when it comes to translation. Human organ culture, organoids and bioreactors are the next frontiers.

9) At the BSCB meeting where would we be most likely to see you?
Although I will attend all the talks diligently, you will definitely find me in the conference bar afterwards, ready to buy you a drink and discuss your favourite theory.

10) What's your favourite cell and why?
The apical umbrella cells of the human urothelium – because they have to take the piss! (Am I allowed to say that?)

Meet the BSCB committee: Vas Ponnambalam

Vas joined the BSCB Committee in 2015, is a Reader in Human Disease Biology and head of the Endothelial Cell Biology Unit (ECBU) at the University of Leeds.

1) What's your role on the committee?
I am the current Secretary of the BSCB, having been appointed to the role in November 2016. Previous to that, I was a BSCB Committee member, and shadowed the outgoing Secretary (Grant Wheeler, University of East Anglia, Norwich) for at least 6 months to 'learn the ropes' before stepping into the hot seat. My role is to support, facilitate and expedite discussions, decision-making and general BSCB operations. I try and provide the environment for stimulating discussions, help to identify clear action points to enable delivery of the BSCB mission statement of promoting cell biology for the benefits of BSCB members and UK society. I provide careful and critical analysis in all matters as needed in a constructive way, so that we can identify any issues and solve these in moving forward on our goals.

2) Over the next year what will be you be up to for the BSCB?
My aim is to provide efficient support to the BSCB President and the Committee in carrying out their different but specific roles. I will be organising 2 BSCB Committee meetings, one in late autumn of 2017 and another at the annual BSCB spring meeting in 2018. I will also run the BSCB Annual General Meeting at the spring meeting, usually held in early April. In the intervening period, I will support various initiatives from different BSCB officers, including ad hoc requests for UK cell biology meeting support. A current initiative as BSCB Secretary is to stimulate a closer relationship between the BSCB and the *Journal of Cell Science* (JCS), and I am pleased to report that JCS have agreed to highlight our annual BSCB medal winners. In this way, by working together we hope to have an increased impact of UK cell biology. Another ongoing issue is that we need applications from experienced cell biologists to join the the BSCB committee to ensure that we have a quorum for decision making: the BSCB statutes requires that decision-making needs 15–18 members including the various officers with specific roles.

3) What are your aspirations for the BSCB?
I would like the BSCB to promote cell biology by supporting the activities of our members such as high quality cell biology meetings and publicising the BSCB widely. Another important aim is to support cell biology teaching in primary and secondary schools and the general public through web-based tools, public lectures and general engagement. I also hope that the BSCB becomes more politically active through science advocacy to the government and civil service.

4) Could you describe your research in a nutshell?
My work is aimed at understanding how the interactions between cells and their environment (blood, cells, tissues, etc.) influence decisions in animal health and disease.

5) What inspired you to come into cell biology?
During a PhD in bacterial genetics and gene expression, I was influenced by reading about scientists such as Francis Crick, Jacques Monod, Sydney Brenner, Francois Jacob and Jean-Pierre Changeux who went from studying bacterial gene expression and enzymology to studying complex organisms, brain function and scientific philosophy. I wanted to understand how genes regulated brain function and undertook a postdoc at Stanford University; this lab had then just cloned the clathrin light chains, revealing brain-specific sequences suggesting brain-specific regulation of endocytosis. In the intervening 30 years, this question has still failed to be adequately answered! Nonetheless, I cloned adaptin (part of the endocytic adaptor protein 2 (AP2)

complex, which also revealed brain-specific inserts: this also one the most completely conserved large proteins (identical 937 residues) between human and rat species. From this initial encounter with cell biology, I have focused on integrating membrane traffic, signal transduction and cell function using different model systems.

6) What's been your best moment as a Cell Biologist?
Cloning of genes that have been essential for studying membrane traffic (adaptin, TGN46) and providing antibodies to TGN46 and TGN38 that have been widely used by the membrane traffic field. By distributing these antibodies widely to my fellow cell biologists, I have helped to establish TGN46/TGN38 as an essential intracellular marker, especially in human cells and tissues.

7) What do you feel are the biggest challenges facing Cell Biology?
The biggest challenge facing cell biology is to try and identify 'big questions' in a post-vesicle era that provide opportunities to do good science and develop long-term careers. Autophagy and ESCRT proteins continue to be hot topics, but many cell biologists have struggled in recent years with many fundamental or basic cell biology questions being deemed not 'competitive' with the tough funding climate. We need people to take risks and open up new areas of biology by adopting an integrative cell biology approach that brings in the physical sciences such as mathematics, physics and chemistry to study complex organisms.

8) If you were to start your PhD now which Cell Biology questions would you like to address?
I would do a PhD in structural biology focusing on using cryo-electron microscopy to understand how large macromolecular complexes work. This technique has been a fundamental breakthrough in helping to understand how large macromolecular assemblies regulate cell and animal function.

9) At the BSCB meeting where would we be most likely to see you?
Apart from breakfast, I use the lunch, tea, coffee and evening breaks to try to talk to people at their posters. I tend to wander between lecture sessions taking a quick dip into anything I find interesting from the programme.

10) What's your favourite cell and why?
My favourite is the endothelial cell which is highly fascinating as it integrates information from the blood (shear stress, growth factors, lipids and lipid particles, cells) and the vascular wall (extracellular matrix, lipid particles, tissue integrity/damage). This cell model offers much promise for understanding how molecular circuits control complex tissue function and animal physiology in health and disease.

Hooke Medal and WICB awards, and Summer studentships

The **Hooke Medal** is awarded every year by the BSCB and recognises an emerging leader in cell biology. It is given to an individual who has made an outstanding contribution to UK Cell Biology. This is usually been within the first 14 years of establishing their own lab. The medal is presented annually at the annual Spring Meeting, after which the winner delivers their research talk.

BSCB Women in Cell Biology Early Career Award Medal. This will be an annual honour awarded to an outstanding female cell biologist who has started her own research group in the UK within the last 6 years, with allowances for legitimate career breaks. Applicants must also have published at least one senior author paper from their own laboratory.

Candidates for both awards can be nominated at any time but must be nominated by at least one BSCB member, should provide a full CV and a recommendation letter with a short summary of the candidate's major contributions to cell biology. Submission should be sent to the BSCB Secretary.

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. Applications must be made by the prospective supervisor, on behalf of a named student. Supervisors must be a BSCB member for a minimum of one year before, or on the date of, the application. 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.

Exeter Living Systems Institute – Opening Symposium

This innovative world-class, research facility aims to generate new understanding of complex biological systems using an interdisciplinary approach.

The £52m facility represents the University's largest single investment in science to date – and part of an overall investment of £340m since 2008. The building has won both the RIBA South West Award 2017 and the Michelmores Building of the Year award 2017.The Institute brings together a cohort of talented young researchers with diverse scientific backgrounds from around the globe, to work alongside world-class scientists already established at the University of Exeter. The inaugural Director of the LSI, Professor Philip Ingham FRS, is internationally renowned for his contributions in the field of developmental biology, including the elucidation of the Hedgehog signalling pathway and the co-discovery of the 'Sonic Hedgehog' gene – recognised as one of 24 centennial milestones in the field of developmental biology by *Nature*. Research in the LSI will provide important insights into the molecular and cellular mechanisms underlying a range of chronic and infectious human diseases, leading to improved diagnosis, therapies and prevention.

The Living Systems Institute is designed to develop a completely new means of looking at Biological problems. The central mission is to focus on a multi-scale understanding of biological processes as complex systems. It brings together scientists from diverse backgrounds in the same purpose built space, facilitating seamless interactions between mathematics, biology, physics and engineering. The LSI builds on Exeter's significant, established research strengths in human, animal and plant biology. It deploys a range of cutting edge technologies together with powerful mathematical modelling capabilities to address fundamental problems. The LSI takes a holistic approach to the study of living systems, considering the aesthetic, ethical and sociological as well as economic impact of biological research. The LSI has already welcomed Dr Gemma Anderson as its first Artist in Residence.

"It's great to have a research artist on my floor #LSIExeter interdisciplinarity in action!" Dr John Terry

At the Opening Symposium on 5–6 July 2017, more than 400 people joined us for an exciting opportunity to hear from world-renowned scientists, including Nobel laureates (and BSCB member!) Sir Paul Nurse FRS and Professor Christiane Nüsslein-Volhard ForMemRS. Prof Dame Amanda Fisher opened the second day with a talk on visualising epigenetic changes during development. The symposium provided a unique opportunity to visit this magnificent new research facility and meet the outstanding scientists who have joined the Living Systems Institute from around the world.

"So exciting to have heard two Nobel laureates speak about their science in as many hours" Amy Royall (PhD Student)

Meeting Reports

3rd Autophagy UK Network Meeting

24–25 May 2017. London.

For the past three years, the nation's autophagy researchers have been congregating at the Autophagy U.K. Network Meeting to present their most recent data. In the wake of the Nobel Prize for Physiology or Medicine being awarded to Yoshinori Ohsumi last year, this year's meeting in London was set to be the most exciting yet.

Robin Ketteler and Michelangelo Campanella made a particular success of co-ordinating two jam-packed days of events hosted in the heart of the capital at University College London. As always, the meeting encouraged the open communication of new ideas and research between fledgling students and established scientists, and fostered a strong culture of collaboration. In addition to the usual structure of talks and posters, this year the organisers chose to include a 'flash poster presentation' session, where delegates had the opportunity to summarise their work with one Powerpoint slide and a one minute description. This brought fresh energy to the poster sessions and encouraged active participation of younger post-docs and PhD students, with most agreeing they would like to see it at more conferences in the future.

The topics of the talks ranged from investigation of the basic molecular mechanisms of autophagosome biogenesis to the generation of new disease models. One particularly striking model was the mito-QC mouse described by Ian Ganley (M.R.C. P.P.U. Dundee, U.K.), which illuminates the turnover of mitochondria by autophagy *in vivo* using pH-sensitive fluorophores. This mouse offers the prospect of being a valuable tool in investigating the importance of mitophagy in diseases such as Alzheimer's and Parkinson's.

The interplay of cellular signalling pathways and autophagic flux is also under detailed investigation in the autophagy community, with several groups suggesting reciprocal regulation between pathways that may have important consequences for cell biology. Stephanie Kermorgant's group (Barts Cancer Institute, Q.M.U.L., U.K.), for example, described how oncogenic c-Met receptor tyrosine kinase is able to signal from the surface of autophagy-related endomembranes to facilitate anchorage-independent growth.

Our three keynote speakers reflected the diversity of the biological contexts in which autophagy is influential. Felix Randow (University of Cambridge, U.K.) opened the talks by describing how cells utilise autophagy to neutralise hostile bacterial attack by recognising galactosides not just on the bacterium itself, but also on their coats. In this way, the cell can prevent the expansion of both Gram-positive and -negative invaders. Conversely, Beth Levine (U.T. Southwestern, U.S.A.) outlined her unsuspecting and fascinating journey in researching the autophagy regulator Beclin-1. Her pioneering work began in the infancy of the field and her group has since been able

to connect this key autophagy player, and many others, with a myriad of physiological processes including cancer, development, and ageing. On the second day of the meeting we switched topics once more; Marja Jäättelä (University of Copenhagen, Denmark) presented some surprising data on the strategic placement of lysosomes, the final destination of an autophagosome, along the mitotic axis of a prometaphase cell, which they found to be critical for accurate chromosomal segregation.

This meeting has highlighted progress in our appreciation of autophagy as a highly regulated, regulatory, and selective process. It is only by coming together and forging interdisciplinary collaborations that the community of U.K. autophagy researchers can build a comprehensive understanding of this intricate cellular process. We're all looking forward to next year!

If you are interested in information regarding the Autophagy U.K. Network, please visit our website (http://autophagy.uk/) and sign up to our newsletter. Alternatively, visit our Facebook page or Twitter account (both @autophagyuk).

Jane Fraser, University of Edinburgh

FEBS advanced course: Functional imaging of cellular signals

10–16 June 2017

During June 2017, I was able to spend one week in Amsterdam to attend the FEBS advance course on Imaging of cellular signals, thanks to the BSCB travel grant. As a first year PhD student who is hoping to use various microscopy techniques and build my own light sheet microscope to understand the mechanisms of ovarian cancer invasion, this course was a great introduction to the endless possibilities linked to microscopy.

The course was hosted by the van Leeuwenhoek centre for advanced microscopy (LCAM) and we had the opportunity to visit three of their centres. Throughout the mornings we had lectures on the science behind the microscopy techniques or lectures from scientist that are currently using these techniques to advance their research. In the afternoons we had the chance to use state of the art microscopes during practical sessions, where we learnt how we can incorporate the various techniques into our own research.

We had most of our lectures in the University of Amsterdam-Faculty of science buildings and also practicals on fluorescent lifetime imaging microscopy (FLIM), total internal reflection microscopy (TIRF), confocal and spinning disk microscopy and fluorescent fluctuation spectroscopy (FFS). We also visited the University of Amsterdam – Amsterdam medical centre to practice using Fluorescence recovery after photobleaching (FRAP). Finally, we visited the Netherlands cancer institute, Antoni van Leeuwenoek hospital to learn about Forster Resonance energy transfer (FRET).

We had lectures from world leading scientists such as Dr. Kees Jalink, and Dr. Drous Gadella, who carefully explained the complex physics and chemistry relating to the various microscopy techniques we were to use that afternoon in the practical sessions. As my PhD project is focusing on invasion mechanisms I was excited to be taught by Dr. Alessandra Cami, Dr. Oliver Pertz, and Dr.Paul Wiseman. We also had the opportunity to meet these scientists and ask them any questions during dinner in the evening making the awkward job of networking much less formal and more enjoyable.

Overall, the FEBS course was a fantastic experience, especially for an early PhD researcher looking to be inspired by the microscopy techniques available. I left the course with a notebook full of research ideas, new contacts and a whole new perspective on where my PhD could go to.

Amelia Hallas-Potts, OPTIMA CDT student, Edinburgh University.

18th International Congress for Developmental Biology

18 June 2017, Singapore

Full of anticipation for my first overseas conference, I left the UK for Singapore to attend the 18th International Congress for Developmental Biology. Travel was long and I arrived exhausted, but immediately got excited by the view of the city of Singapore that was presented to me.

Getting to the accommodation at University Town was straightforwards, both by taxi and public transport. As soon as I arrived I was able to register at the reception and was kindly escorted to my room by one of the helpers. Accommodation was at the students' residence, so the room was small and showers and toilets were communal. Luckily, I was able to book a room with air conditioning which allowed a European, unfamiliar with the climate, to survive more easily inside the room.

Next morning at breakfast, I met with a colleague and we were able to connect to some other scientists. We discussed about the upcoming talks of the conference and our first impressions of the accommodation and organisation of the conference. The food served was a somewhat unusual combination of sweet and savoury dishes, but it was plentiful. My favourite combination was the chicken Frankfurters with waffles and sweet syrup.

The lectures kicked off on Sunday afternoon at the National University of Singapore, which was a great venue for international conferences. Unfortunately, air conditioning in the auditorium was a bit too strong which distracted a little from the science. The talks started with a special series dedicated to D'Arcy Thompson. These lectures showed that many developmental processes can be described using mathematics and physics, which in turn can lead to new conclusions. The first day ended with a noble laureate lecture from Christiane Nüsslein-Volhard who nicely illustrated the beauty of patterning processes in zebrafish. In the evening, there was a reception with light snacks, nibbles and drinks, which unfortunately were limited and gone within five minutes. Nevertheless this caused some entertainment, as some of the Nobel laureates had to squabble over the remaining bits!

The following days were filled with many exciting talks that were split into two different sessions and poster presentations with five different themes. My own poster slot was at the very end of the conference, so I was able to meet other scientists first before presenting my own research. To my delight, I was able to meet quite a few researchers who were also investigating the development of the heart. Talking to people, I learned a lot about different aspects of heart development, got ideas for additional experiments and advice on how to improve my techniques. There were many interesting posters. Of particular interest to me was a very well documented set of experiments on the importance of the ECM in trabeculation. The involvement of the ECM in heart development and function is still poorly understood and I recently discovered that the ECM might play a bigger role in my own project so this information was of great use. Sadly, the poster boards were situated in a narrow hallway and food was served close by, which made it quite crowded and sometimes difficult to interact with others.

The week passed by very quickly and I listened to many

exceptional talks about various topics of development. The presented science was excellent and loads of exciting research stories where told! My favourite lecture was the Nobel laureate lecture given by Eric Betzig, who presented the advancements of microscopy, which was simply mind blowing. His story started by building a microscope in his living room with a fellow scientist and they both ended up with the incredible lattice light sheet microscope which easily outperforms commercially available tools from big companies like Zeiss and Nikon.

As the conference was coming to an end, the conference dinner was due. It was held at a suitably amazing venue - and it couldn't have been in a better place. Regrettably, the dinner felt rushed and it would have been nice to have more time to properly sum up the conference! The dinner lasted roughly 2.5h and because it did not include an evening program, we came up with our own: after dinner we went to the Marina Sans Bay and visited the Sky-Bar which offered an amazing view over Singapore at night.

Overall, the conference offered me excellent insight into cutting edge science. There were plenty of discussions with other likeminded scientists, sharing of new ideas and the opportunity to meet potential collaborators. I am glad that I had the chance to participate, I learned a lot and look forward to the next conference in 4 years time.

Johannes Wittig, PhD student at Kings College London.

Microtubule meeting

23 April 2017, University of Edinburgh.

{ This was our second year at the British Microtubule Meeting, and we're still surprised by how many people come together to share knowledge about all things microtubule. It makes for an interesting day to see the approach of different disciplines towards the common goal of understanding microtubule biology, and this is made all the better by the friendly manner of everyone at the meeting, making it easy for newcomers to engage with the field. }

The talks came from a mix of PhD students, post-docs and principal investigators, representing universities across the UK. The day kicked off with a session packed with research into dyneins, with Helen Foster (Carter lab, Cambridge) using the latest in single-particle cryo-electron microscopy to structurally characterise the auto-inhibited state of dynein – known as the phi particle. Katerina Toropova (Anthony Roberts lab, Birkbeck) also investigated this new phi particle phenomenon; focussing on its importance in dynein-2 for allowing bi-directional movement of intraflagellar transport trains in flagellar.

We then switched direction to the other microtubule motor, kinesin. A couple of talks focussed on the kinesin-8 family, with Toni McHugh (Welburn lab, Edinburgh) presenting new information on the controversial role of subfamily member KIF18B in the mitotic spindle. Interesting in vitro experiments pointed towards a tendency of KIF18B to localise at the plus-ends of astral microtubules. This coupled with observed low depolymerisation activity and co-dependence with MCAK, suggested a possible role for KIF18B in transporting MCAK to astral microtubules. Moving to a yeast system, Jonathan Miller (Warwick) gave a fascinating talk on the two S. pombe kinesin-8s Klp5 and Klp6, which form a functionally important heterodimer. This talk also explored the importance of a binding partner of Klp5/6, MCP1, showing how different kinesin-protein complexes can adapt kinesins to different roles in the cell.

A relaxing lunch break gave the chance to chat and network with fellow microtubule enthusiasts, and wander about the poster session, with around 30 posters from a range of research areas.

Several talks were remarkable for their insight into unusual properties of microtubules. Algis Toleikis (Cross lab, Warwick) used optical trapping to investigate stall force of kinesin-1, and saw changes in stall force depending on the use of pig brain microtubules with and without Paclitaxel, or *S. pombe* microtubules. This showed how subtle changes in microtubules may affect kinesin behaviour, and possibly that of other microtubule binding proteins. One simple but elegant idea came from

Nenad Pavin (Zagreb, Croatia) who visualised the mitotic spindle in cross-section, enabling a description of the torque in spindle microtubules. We also heard about how microtubule loops 1 [Symbol]m in diameter, may form and cause swellings in neuronal axons. Beatriz Costa Gomes (Prokop lab, Manchester) had invested effort in developing software called Alfred to track such microtubules and assess their curvature.

The day was rounded off by drinks and dinner in Edinburgh's Teviot hall, as well as a hilarious quiz hosted by Nicholas Clarke and Ellis Ryan from Steve Royle's lab in Warwick. This one-day meeting was an excellent opportunity to share research with a common interest, and highlights the breadth of current research into microtubule biology. A huge thanks must go to Julie Welburn, Stephen Royle, and Andrew Carter for organising the meeting, and to everyone who took part. We very much look forward to next year's meeting.

Alex Cook (Birkbeck College, University of London) and Fiona Shilliday (UCL, London)

European Cancer Stem Cell Research Institute symposium

12–13 Sept 2017. Cardiff University

This was the fifth annual European Cancer Stem Cell Research Institute symposium held at the Hadyn Ellis building, Cardiff University, on September 12th and 13th. The ECSCRI symposium was launched by the late Professor Alan Clarke, founding director of the research institute, in the summer of 2013, which coordinated with the opening of the institute.

As in previous years, the programme included a wide range of experts in cancer biology, cell biology, genomics as well as stem cell research. This year the focus was on 'Single cell analysis' and 'Pancreatic cancer' as themes.

The opening session focused on 'Single Cell Analysis'. Dr Walid Khaled from the University of Cambridge presented the first talk of the conference on single cell transcriptomics. His unbiased approach to mammary epithelial cell sequencing created a description of the differentiation dynamics of the mammary gland at different developmental stages, including nulliparous, gestation, lactation and post weaning/involution. An interesting finding from this study was that clusters of luminal progenitor cells in post involution glands share the luminal progenitor characteristics with their nulliparous counterparts, but expressed milk synthesis genes at higher levels, suggesting that these cells maintain a memory of having undergone a pregnancy cycle. These data also showed that only few clusters of cells could be fully characterized by a single marker gene, highlighting the plasticity of breast epithelial tissue. Dr Giusy Tornillo, a research associate in Matt Smalley's group at the European Cancer Stem cell research Institute, presented the final talk of the morning, on the role of Lyn Kinase in triple negative breast cancer. In an elegant set of experiments this work identified a role of the A isoform of Lyn kinase in mammary epithelial cell proliferation. With c-Kit positively regulating its activity and Pin-1 sustaining this activity.

I was delighted to chair an excellent afternoon session focused on 'Pancreatic cancer'. The session opened with Dr Rocio Sancho, a newly appointed group leader at the Centre for Stem Cells and Regenerative Medicine, King's College London. Dr Sancho presented her work on fbw7 (F-box and WD-40 domain protein 7) in the pancreas, which had started while she was a postdoc in Axel Behrens lab at CRUK LRI (now at Francis Crick Institute). Dr Jen Morton from the CRUK Beatson Institute of Cancer Research introduced us to a new genetically engineered mouse model of pancreatic cancer - the KPF mouse. Next, we heard a very personal story from Shân Cothi, a renowned Welsh classical singer, artist and presenter. Shân is also founding director of Amser Justin Time; a Welsh based charity that has supported pancreatic cancer research at the European Cancer Stem Cell Research Institute since 2014. Shân's husband, the legendary Justin Smith aka Pepsi Tate, bassist with the glam metal band Tigertailz, died of pancreatic cancer in 2007 at a young age of 42. To mark the 10 years of Amser Justin Time as a pancreatic cancer charity, it was fitting to invite Shân to present at this session. Shân told a wonderful, moving story of a loving life that had been cut short very quickly from a devastating pancreatic cancer. Her honest and personal account reminded us of the stark statistics on pancreatic cancer and the urgent need for basic research into the mechanisms underlying this disease.

Finally, Dr Peter Bailey from the Institute of Cancer Sciences, University of Glasgow closed the session with an overview of how genomic analyses has revealed distinct genetic signatures that correlate with four major histologically distinct subtypes of human pancreatic cancer. An intriguing discussion point that arose from Dr Bailey's talk was how different subtype arises: from a distinct cell of origin or whether each disease subtype reflects an alternate tumour evolution. It may have been an unusually (!) wet evening on the

streets of Cardiff that night, but this didn't dampen spirits and conversation around tables of a Spanish-themed dinner in the centre of town.

The next morning, we continued with single cell technology and cell plasticity. First speaker of the day was Dr Göran Karlsson from Lund University in Sweden who described their approach to define and prospectively isolate functionally distinct subpopulations of stem cells, by combining single cell gene expression signatures and cell surface marker expression. Next, we had an engaging talk by Professor Norman Maitland, University of York, a long-standing expert in prostate cancer and prostate cancer models. Professor Maitland reminded us that Waddington's epigenetic landscape highlights how changes in cell fate, either via dedifferentiation or transdifferentiation routes require energy. Interestingly, he showed that DNA CpG methylation signatures can differ between individual patients. By detailed sequencing of epithelial and stromal subpopulations he reinforced the importance of targeting not just the luminal cells but also the underlying quiescent stem cells. Dr Martin Jechlinger from EMBL at Heidelberg described a new model of breast cancer recurrence. Dr Jerlinger showed some great live cell imaging data of what happens to cells following doxycycline withdrawal, captured using 3D lightsheet imaging. The morning session closed with a presentation from Dr Maria DM Vivanco from CIC BioGUNE Center for Cooperative Research in Biosciences, Bilbao, Spain. Work from Dr Vivanco's lab describes a novel regulatory role for a Sox2-Sox9-Wnt axis that drives the self-renewal capacity of breast cancer stem cells. The final afternoon session followed tradition, as it was organised and presented by Early Career Researchers from the Institute and the UK. Dr Angélica Santiago-Gómez, from Manchester University, presented data to show that prolonged NOTCH activation reduces breast cancer stem cell activity in vitro using 3D heterotypic tumour spheroid models. Mehreen Ahmed, a PhD student at Nottingham University, talked about selective targeting of colorectal cancer (CRC) stem-like cells and a 3D screening system for differentiation therapy. Ana Padilha, a PhD student at European Cancer Stem Cell Research Institute of Cardiff University, presented her preliminary data regarding the molecular and functional characterization of the Foxp3+ regulatory T cells (Tregs) in the intestinal cancer development. Finally, Carlotta Olivero also a PhD student at the European Cancer Stem Cell Research Institute Cardiff University, explained how the viral infection of the mouse skin using HPV8 models leads to the expansion and maintenance of the Lrig1+ keratinocyte stem cell compartment, which may inform mechanisms of skin carcinogenesis. This closed a successful fifth European Cancer Stem Cell Research Institute symposium – see you all next year!

Dr Catherine Hogan, Resarch Fellow at ECSCRI and Dr Andreas Zaragkoulias (research associate in CH lab), William Hill (PhD student in CH lab).

North of England Cell Biology Forum

15 Sept 2017. Cardiff University

In September, the beautiful campus of the University of Hull was host to the North of England Cell Biology Forum (NECBF). This is an annual event that is an excellent introduction to conferencing for early career students and staff as all presenters fall into this category. We are very grateful to the British Society of Cell Biology and all the other sponsors for their generous support of this meeting, and the organisers Simon Calaminus, Francisco Rivero and Roger Sturmey for putting together an exceptional programme.

As a broad-based cell biology meeting, the programme was suitably diverse – talks encompassed all cell types ranging from those of the cardiovascular system to neuronal, skin and cancer cells, and all the way to yeast. There was something for everyone to enjoy, and all the presenters did a brilliant job of pitching their talk to be accessible to a wide audience.

The poster session was similarly heterogeneous and the presenters all did very well in describing their research to their peers. BioMed Central sponsored prizes for both the oral and poster presentations, so congratulations to Sviatlana Shashkova (York) and Holly Wilkinson (Hull) for the talks and Adam Movely (Hull) and Jessica Bithell (Liverpool) for the posters – this was well-deserved recognition for your hard work!

One of the speakers at the event, Mootaz Salman, had a very important message for all the students in the audience. He attended the NECBF a few years ago as his first ever conference, and gave his first presentation at it last year. This year, he gave an entertaining and educational talk and concluded by advising all PhD students to fully engage with the NECBF as it is such a good training ground, and will help them on their path to achieving all they want in their academic career. We look forward to all the future Nobel Prize-winners that this forum will inevitably produce, and will see you all in Huddersfield for the 2018 meeting!

Kirsten Riches-Suman, BSCB Ambassador, University of Bradford

Summer studentships

Harnessing Mitophagy in Order to Reduce Heteroplasmy Following Pronuclear Transfer

I have long aspired to work in research, however, as a first-year student studying Biomedical Sciences at Durham University, it is hard to comprehend the world of research without experience. I was lucky enough to be accepted onto the BSCB Summer Studentship Placement after completing my first year of university, whilst most places are offered to students who have just completed their second year. Due to this, I will be able to do further experience next year to ensure that I wish to pursue research as my objective career goal.

Mitophagy is a specialised form of autophagy that selectively degrades mitochondria that are damaged or in excess to maintain the cell's homeostatic state. I was working on a project that aimed to harness the power of mitophagy to minimise heteroplasmy due to co-transfer of mitochondria during PNT. It is hoped that this research will increase the efficacy of PNT in preventing transmission of mtDNA disease.

During my placement, I learned several laboratory techniques and practices, from simple procedures, such as making an agarose gel independently, to more elaborate procedures including micro-pipetting. When I arrived, I started to practice micro-pipetting, initially learning to transfer glass beads from droplet to droplet before advancing to transfer of oocytes from dish to dish. I was also taught how to harvest oocytes from mouse ovaries and I was also directed on how to correctly dissect and extract the ovaries for harvesting. I had the opportunity to practice microinjecting mRNA into oocytes and embryos and learned how to analyse them using a confocal microscope after being stained and fixed.

This experience has educated me in how to start a research project and develop the project based on my findings. It has been extremely beneficial to work in a research environment and I have gained skills that will equip me for when I begin my own career in research.

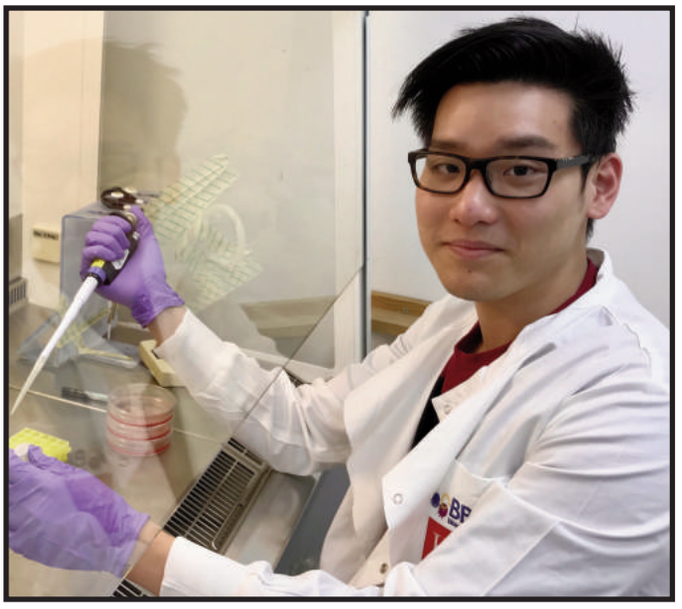
Gabrielle Oxley

1. Richardson, J. et al. (2015) Concise Reviews: Assisted reproductive technologies to prevent transmission of mitochondrial DNA disease. Figure 2A. Stem Cells. Vol 33; No 3. Pp 639-645.
2. Hyslop, L.A. et al. (2016) Towards clinical application of pronuclear transfer to prevent mitochondrial DNA disease. Nature. Vol 534; No 7607. Pp 383-386.

The RhoD to perfecting protein purification

As an undergraduate biochemistry student, I have studied many biological topics ranging from cellular biology to molecular genetics throughout my two years at King's College London. The excellent academic staff and curriculum have helped me navigate through my academic journey and inspired me to pursue a career in research. Nevertheless, like any neophyte in the research field, I was thoroughly briefed about the importance of having lab experience (beyond that provided in the course) to gain greater insight into the inner-workings of scientific research. It was not until the end of this summer however, that I can truly appreciate the advice.

I had the invaluable opportunity to spend 6 weeks in Prof. Anne Ridley's lab at King's this summer, funded by a BSCB summer studentship. Under the guidance of a postdoctoral researcher, Dr. Campbell Lawson, I carried out a project to investigate how RhoD is regulated in cells. Overall, the project ended on a positive note - though I faced some challenges on the way. One example is when I tried to purify different mutants of GST-fusion RhoD proteins using Glutathione-Sepharose beads. The protein yield was initially very low when analysed by Coomassie Blue staining of protein gels. Subsequent investigations showed that the BL21-DE3 E. coli cells used were not suitable for this purpose, as the GST-RhoD protein



produced was mostly insoluble.

Fortunately, a research associate (Dr. Elena Rostkova) in a neighbouring lab provided an excellent solution to the problem. She suggested using a different strain of *E. coli* called ArcticExpress, which co-express Cpn10 and Cpn60, chaperonins adapted to work at temperatures as low as 4˚C, to overcome the solubility conundrum. She also let me use their low-temperature shaking incubator to grow the bacteria at 13˚C. Sure enough, the protein yields were significantly higher, and production of the appropriate protein was validated using western blotting.

Throughout my project, I was very lucky to receive a myriad of help from Ridley lab members, especially from Dr. Lawson, that has markedly improved my scientific approach. This was reflected near the end of my project with some interesting results showing evidence of an interaction between RhoD and its possible GTPase-activating protein. However, my limited time in the lab means that many aspects of this interaction are still to be studied.

This summer, though spent under the gloomy and inclement English weather, was perhaps the most illuminating and warming one for me. Not only did I learn many different lab techniques, but I also learnt how to interpret results and critically analyse existing literature in the context of my own experiments. The positive effects of this studentship on both my academic and personal development are ineffable. Therefore, I would like to especially thank Prof. Ridley for the amazing opportunity, Dr. Lawson for his inspired guidance, everyone in the Ridley Lab for their generous assistance and hospitality and the British Society of Cell Biology for making this whole experience possible.

Kenrick Dennis

Single Cell analysis of Hes1 and RunX1 in Breast Cancer

I had just entered into my fourth and final year of studying towards my BSc Biological Sciences (Development, Regeneration and Stem Cells) honours degree at the University of Edinburgh. I have thoroughly enjoyed my undergraduate experience so far and have been able to satisfy my curiosity for developmental biology through the various learning experiences available to me provided by the university. A large part of my final year will consist of a lab based dissertation and although I have had some basic laboratory experience on my course, I did not feel I was sufficiently prepared to tackle this honours project head on with the experience I currently possessed. In light of this, I decided to aim to acquire some extra laboratory research experience during the summer between third year and fourth year to both further equip me with laboratory skills but also to get a feel for what working in a research laboratory would be like.

I was very lucky to be able to spend 8 weeks with Dr. Nancy Papalopulu and the rest of her laboratory colleagues at the Papalopulu Lab at the University of Manchester. Under the supervision of Dr. Nitin Sabherwal (my daily supervisor) I began to look at the differential expression of Hes1 and RunX1 mRNA in breast cancer and non-breast cancer cell lines. The techniques required to work on this were varied and enabled assessment of mRNA expression in different ways to gain both qualitative and quantitative results. The chance for me to be a part of this project and have access to these techniques was invaluable and I gained a lot from this experience!

Project details: To use single cell analysis, smFISH and immunohistochemistry to assess whether changes in gene expression dynamics are associated with cell state transitions in human breast carcinomas.

The aim of my project was to first culture cells of three different cell lines and cells from human patients and then fix and stain the cells on glass coverslips with fluorescently tagged probes for Hes1 or RunX1 mRNA. Cells were also stained with DAPI in order to be able to visualise the nucleus. The individual fluorescently labelled mRNA transcripts could then be viewed and imaged using a confocal fluorescence microscope and the images run through computational analysis in order to determine the number of transcripts per cell and the percentage of these which were present in the nucleus.

Results from my project were mixed in terms of their success. Despite this we were able to see that Hes1 gene expression in the breast cancer cell line used appeared to be oscillatory and that the relative frequency of mRNA transcripts in cancer vs non-cancer cells was significantly different. This suggests that this is a region of research worth pursuing with many further experiments to determine whether the properties seen translate to other types of breast cancer cells and whether disruption of the oscillatory patterns of mRNA expression are correlated in anyway with cell state changes observed during the progression of breast carcinomas.

I learnt an incredible amount from this wonderful experience from writing research proposals to many laboratory based skills and I know that the knowledge I gained during this project will be invaluable to me both during my final year at university and also for my future. Although I am still undecided as to whether a career in research is for me, being given the opportunity to work alongside professional researchers gave me an insight into a real working laboratory environment and I am thoroughly grateful to have been able to do this. It also allowed me to appreciate and truly be inspired by just how much work, time and dedication researchers give in order to advance human medicine and I know it is an experience I for which I am truly grateful and one I will never forget.

I again just want to say thank you to Dr Nancy Papalopulu, Dr Nitin Sabherwal and everyone at the BSCB for awarding me the studentship which allowed me to undertake this project and for all the support and guidance they provided throughout the 8 weeks. I am very lucky to be one of the few able to participate in such a project and I hope that many more future students are inspired by what they read here and continue to benefit from the support the BSCB provide.

Laura Hannet

Tangoing to beautiful images, visualisation of Pro-collagen ER export

This summer I was lucky enough to secure funding from BSCB for a 5 week placement in the Stephens lab at the University of Bristol. I am going into my final year of studying Biochemistry at Bristol am aiming towards a career in Biomedical research. However, I had no comprehensive experience of research work outside of undergraduate teaching labs before this summer. This placement offered a valuable insight into life in academic research and will assist me in making decisions about my future career.

During the 5 weeks working with Professor Stephens and his team in the lab I looked at imaging ER export of procollagen in order to gain insights into the components of this pathway. The first couple of weeks were steep learning curves for me as I worked to become confident in techniques such as cell culture, immunofluorescence labelling and fixed cell imaging. I was amazed at how quickly I was able to work independently and would like to thank the team for their dedication and help with this. I was expected to produce my own data and work self-sufficiently as much as possible. This was a great experience as I felt ownership over the project and was proud of the final data I collected. Presenting my work at the end of the project gave me a real sense of achievement and accomplishment.

Overall I have learnt a lot of new skills from my 5 weeks in the lab. As well as experimental techniques, I also feel more confident in planning and carrying out research, reading papers to enhance my understanding, organising my time around experiments, and collecting, editing, organising and presenting data. This will help me enormously during my final year at Bristol, and undoubtedly in applying for future opportunities and positions. I am excited to pursue a career in research and looking forward to finding out what options are open to me this year.

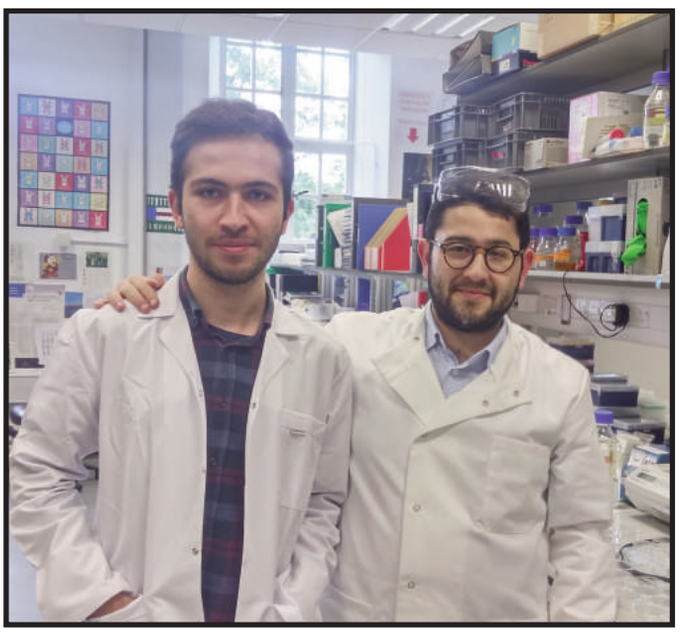
Many thanks to Professor Stephens and everyone in the lab for supporting and inspiring me during my placement. Thank you also to the British Society of Cell Biology for awarding me the scholarship which allowed me to take up this amazing opportunity.

Laura Harrison

Does Polo-like kinase 4 (Plk4) moonlight?

I am a second-year medical student at Istanbul University, Turkey. One of the reasons I chose medicine was to be able to become both a physician and a research scientist, who could participate in a project where basic research could be translated into medicine. This summer, I carried out an internship at Prof Jordan Raff's laboratory at Sir William Dunn School of Pathology, University of Oxford. Prof Raff and his group currently focus on centriole and centrosome assembly pathways, using Drosophila as a model system. I participated in a project where several members of Raff Lab worked on centriole size control mechanisms.

Centrioles are structures that form centrosomes and cilia. Every cell cycle they duplicate once and only once, and this duplication process is master regulated by the centriolar kinase Plk4 (Conduit et al., 2015). Mustafa Aydogan (Fig. 1 – Oguz Kaan Yılmaz and Mustafa Aydogan), a PhD student in the lab, had recently observed in his experiments that genetic dosage of Plk4 seemed to affect not only the duplication pathway, but also the duration of S-phase in these embryos. Specifically, when he halved the genetic dosage of Plk4 (Plk41/2 – using a deletion allele), S-phase seemed to be shorter than in wild-type (WT) embryos. However, these results remained as observations and thus required a careful experimental analysis.



"Moonlighting" is a phenomenon where a protein can perform more than one function that are independent from each other. My project for this summer was to compare the developmental progress in WT and half dose Plk41/2 early fly embryos, and find out whether Plk4 has a role in (directly or indirectly) controlling cell-cycle timings, beyond its role in centriole biogenesis. To test whether Plk4 affects the timings of nuclear cycles in early embryo, I recorded 2.5 hour-long movies of WT and Plk41/2 early embryo development at 10x magnification, using Differential Interference Contrast (DIC) microscopy. Our blind analysis showed that Plk41/2 embryos have delayed development (Fig. 2).

Mustafa had previously predicted that S-phase in Plk41/2 embryos seems to be shorter than in WT embryos. Early nuclear cycles in flies are composed only of S-phases and mitoses (without intervening gap phases) and my results suggested that the overall development is delayed in Plk41/2 embryos. Therefore, I hypothesized that the mitotic period must get longer in Plk41/2 nuclear cycles. In order to test that, I used flies expressing Jupiter-mCherry (a microtubule

binding protein helping to monitor cell cycle stages) in WT and Plk41/2 genetic backgrounds. Statistical comparison between the duration of cell-cycle stages in WT and Plk41/2 embryos showed that lower Plk4 levels lead to shorter S-phases (Fig. 3) followed by elongated mitoses (Fig. 4).

This is an important finding, because it might indicate that Plk4 may cause these changes via affecting non-centrosomal proteins/pathways. Hypotheses include that Plk4 may crosstalk with a protein that is involved in cell cycle regulation. Recently, Cyclin-dependent Kinase 1 (Cdk1), a key regulator of cell cycle regulation, has been shown to block Plk4 activity at the centriole by sequestering away its phosphorylation substrate (Zitouni et al., 2016). Thus, it is plausible that Plk4 may also have a reciprocal role in controlling the Cdk1 activity in cell cycle regulation. This might explain the results we obtained in our experiments.

During my 6 weeks long internship, I used different research techniques, including complex imaging methods, and most importantly I started learning how to conduct proper scientific research. This summer internship had a great positive impact on me and gave me new perspectives for my scientific endeavors. Now I feel much more positive that my desire of trying to become a physician-scientist is the right path.

For such a short period of internship, with the help of my supervisors and other lab members, I had the chance to find a potentially important extra role for Plk4 – I hope the researchers after me will continue from where I left and enlighten us with regards to the amazing nature of the master centriolar kinase – Plk4!

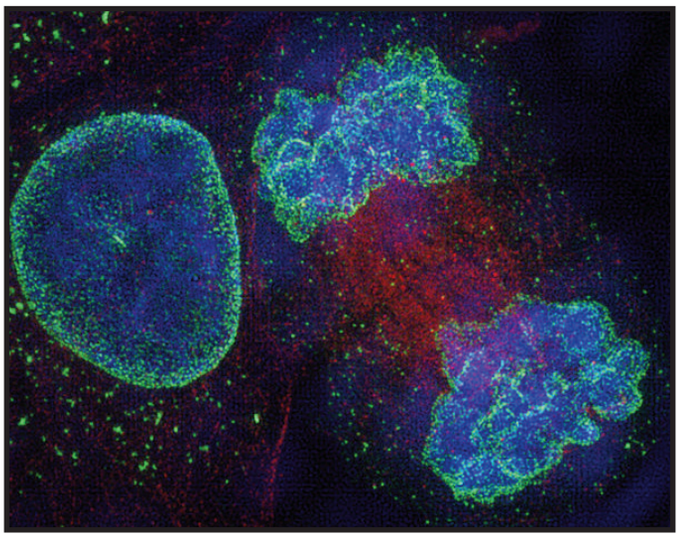
I would like to thank Prof Jordan Raff for giving me this opportunity, Mustafa Aydogan for his supervision, Dr Alan Wainmann for his help with microscopy, our lab manager Saroj Saurya for her support and all the other lab members for providing me company. Finally, my warmest thanks go to BSCB for supporting me throughout my whole journey!

Oguz Kaan Yilmaz, Istanbul

Up close and personal with Nup107

I'm currently a student at Durham University, about to start my fourth year of an integrated Masters degree. My final year will involve working on a research project, which, coming straight from the traditional lecture based teaching years, is a daunting prospect. I was eager to get more experience in a realistic research setting - short classes and work experience placements during my school years had given me a taste of life in the lab, but I wanted the opportunity to have my own input.

Dr Martin Goldberg at the University of Durham was kind enough to let me loose in his lab for 8 weeks over the summer. With his guidance and the help of the excellent Advanced Light Microscopy and Electron Microscopy technicians, I began researching the interactions of the nuclear pore complex and microtubules, and the potential role of microtubules in NPC distribution. Microtubules have been imaged in close proximity to nuclear pores using EM techniques and interaction has been shown to be with Nup358 (RanBP2) via BicD2, a dynein adaptor protein (Splinter et al., 2010). It is thought that this interaction may be cell cycle dependent (Hu et al., 2013). Double and triple immunofluorescence was used with eGFP Nup107 HeLa cells in order to assess localisation and potentially interaction of the key components being investigated - Nup358, Tubulin, and BicD2. Co-localisation of these proteins was of particular note as it is as yet unclear if Nup358 or BicD2 are found at every pore. I was able to use a wide array of techniques to investigate the proposed interaction, including live imaging of the eGFP-Nup107 HeLa cell line using conventional wide field microscopy with deconvolution, spinning disc microscopy, and confocal microscopy with Airyscan. This allowed identification of partially formed nuclear envelopes and the tracking of the NPCs through the late stages of cytokinesis and early G1 phase. Deconvolution and Airyscan techniques allowed identification of specific punctate Nup107 proteins, rather than a simple fluorescent nuclear envelope as seen using conventional fluorescence microscopy and the spinning disc. This cell line was also used in immunofluorescence experiments using a super resolution technique, 3D-SIM, to try and resolve interactions between the cytoskeleton and the nuclear pore. While this created some spectacular visuals (which I excitedly emailed home to slightly bemused parents!) and permitted the imaging of fixed cells in various stages of the cell cycle, it also showed me how research is a



constantly evolving process. Pushing the limits of the imaging system meant trying new approaches, like expansion microscopy, to better resolve the interactions.

I have spent 8 weeks building up data and refining techniques to allow me to gain a better understanding of this interaction, and there are still so many more things that could be changed or tried. This project has truly opened my eyes to the breadth of possibilities in a research setting, and I'm really looking forward to spending my next year applying all the techniques I have learnt. While my project has resulted in some answers, it has opened many more avenues for investigation. This summer has also cemented my desire to study for a PhD. Being in the lab has allowed me to see that research isn't some terrifying monolith, but something gradual and incremental, contributed to by the ideas of thoughtful and curious people.

I am enormously grateful to Dr Goldberg for his patience and guidance through these 8 weeks. I would also like to express my sincere gratitude to the BSCB for making it possible for me to undertake this project.

Evelyn Garlick

Application for Honor Fell / Company of Biologists Travel Award

Please complete, print out and send to Julie Welburn at the address below 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. Note we expect you to not claim the expenses twice from different sources.

Bank details
Sortcode:
Account number:
Bank:

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. Also, the student is not receiving the same reimbursement from another source.

Signature:

Name:

Applicant's Signature:

Name:

Have you included all the necessary information/documentation in support of your application?
All Applications must contain:
- A copy of the abstract being presented
- A copy of the completed meeting registration form

Send to: Dr Julie Welburn, Wellcome Trust Centre for Cell Biology
University of Edinburgh, Mayfield Road, Edinburgh EH9 3BF

- 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 funds will be sent when BSCB have received the receipts.
- Incomplete applications will not be considered.

The British Society for Cell Biology

Statement of Financial Activities for the year to 31 December 2016

	Unrestricted Funds	Restricted Funds	Total 2016	Unrestricted Funds	Restricted Funds	Total 2015
	£	£	£	£	£	£
Income from:						
Grants	35,000	60,000	95,000	35,000	45,000	80,000
Investments	1,322			2,017	–	2,017
Charitable activities						
Meetings	–	–	–	–	–	–
Subscriptions	33,439	–	33,439	29,029	-	29.029
Total income	**69,761**	**60,000**	**129,761**	**66,046**	**45,000**	**111,046**
Expenditure on:						
Charitable activities						
Grants payable:						
CoB/Honor Fell travel awards	–	45,083	45,083	–	37,417	37,417
Other grants	1,165	500	1,665	2,929	400	3,329
Studentships	15,140	–	15,140	15,172	–	15,172
Costs of meetings	19,356	–	19,356	24,391	–	24,391
Website expenses	798	–	798	354	–	354
Newsletter costs	2,768	–	2,768	3,000	–	3,000
Membership fulfilment services	12,108	–	12,108	16,443	–	16,443
Executive Committee expenses	1,235	–	1,235	2,656	–	2,656
Examiner's remuneration	2,447	–	2,447	2,788	–	2,788
Subscriptions	2,221	–	2,221-	-	–	
Insurance	1,080	–	1,080	1,039	–	1,039
Total expenditure	**58,318**	**45,583**	**103,901**	**67.733**	**37,817**	**105.550**
Net gains/(losses) on foreign exchange rates	–	–	–	19	–	19
Net (expenditure)lincome	**11,443**	**14,417**	**25,860**	**(1,668)**	**7,183**	**5,515**
Transfer between funds	–	–	–	–	–	–
Net movement in funds	**11,443**	**14,417**	**25,860**	**(1,668)**	**7,183**	**5,515**
Funds brought forward at 1 January 2016	186,754	14,507	201,261	188,422	7,324	195,746
Funds carried forward at 31 December 2016	**198,197**	**28,924**	**227,121**	**186 754**	**14,507**	**201 261**

BSCB Committee Members 2016/17

Committee
The Society is run by a Committee of unpaid volunteers elected by the Members. The Officers of the Society, who are all members of the Committee, are directly elected by the Members. The BSCB Committee is comprised of eight office-holders (President, Secretary, Treasurer, Meetings Secretary, Membership Secretary, Newsletter Editor and Web Co-ordinator) and up to 12 other ordinary members, including one PhD student representative and one Postdoc representative.

The committee is always interested in hearing from cell biologists who wish to contribute to the Society's activities. Members of the Society are encouraged to nominate candidates for the Committee or Officers positions at any time. Formal nominations should be seconded by another member of the Society. The Committee is also happy to receive un-seconded informal nominations. Nominations should be sent to the Secretary.

The Committee generally meets twice a year, at the Spring Meeting and in the Autumn in London. Additional meetings are arranged from time to time. Items for consideration by the Committee should be submitted to the Secretary .

The BSCB has charitable status (registered charity no. 265816) and has a constitution. The BSCB AGM is held every year at the Spring Meeting and all BSCB members are invited to attend.

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BSCB Ambassadors 2017

Ambassadors are BSCB members who represent the society at their institution. Their role is to promote the society to the UK Cell Biology community and to provide a route by which members can communicate with the BSCB Committee. This year Ann Wheeler and Andrew Carter updated our list of Ambassadors and recruited some new ones for institutions that were not previously represented. Andrew will keep in contact with the Ambassadors in his role as Membership secretary. We would like to thank the ambassadors who have stepped down for their several years of service to the society.

We also extend a warm welcome to our new Ambassadors. We will look forwards to hearing more about what the BSCB has been doing locally.

If you have any questions about the society or ideas about what the BSCB can do for UK Cell Biology then please contact your Ambassador. If your university does not have an Ambassador and you would like to volunteer please also write to our membership secretary Andrew Carter. (cartera@mrc-lmb.cam.ac.uk).

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Submission
If you have an idea for an article please e-mail the editor a brief outline first.It is preferable to send all articles, reports and images by e-mail (though alternatives can be arranged after contacting the editor).

Attachments for text can be in txt, rtf or doc format. Please send images as 300dpi JPEG, TIFF or PSD files.

Submission of articles and images should be made to

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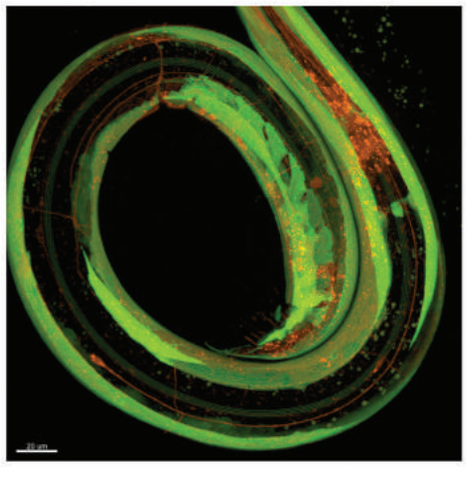

Image of *C. elegans* stained for muscle (green) and mitochondria (red).

Courtesy of Dr. Laura Mellor and Dr. Alan Whitmarsh, School of Biological Sciences, University of Manchester, UK.

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