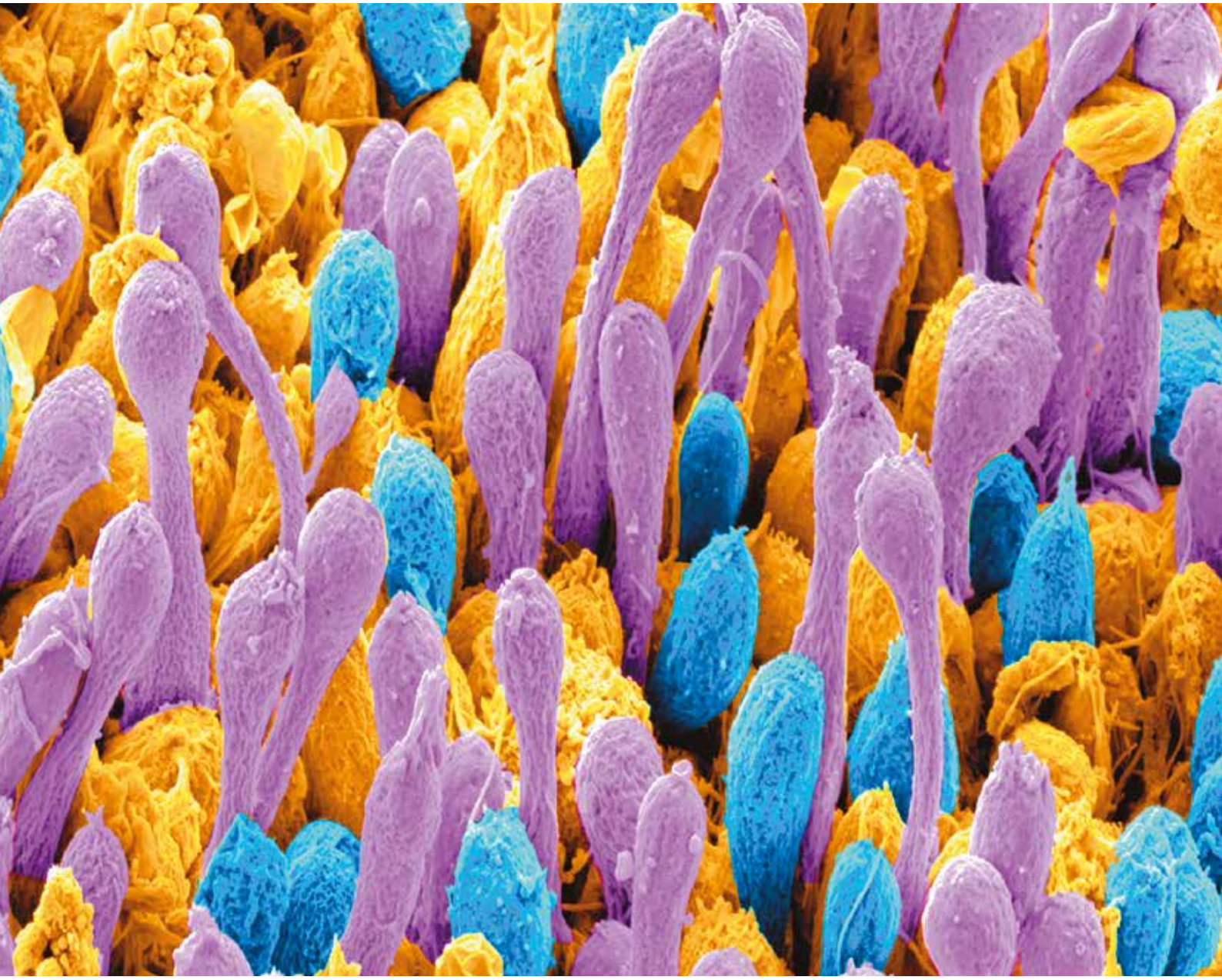
2020

# BSCB Magazine

BRITISH SOCIETY FOR CELL BIOLOGY



BSCB

1st joint meeting of the French and British societies for cell biology

# Cell la vie !

**23-25 September 2020**
**Institut Pasteur, Paris**

Images: Ghirmoba Leterrier, NeuroCyto Lab, Marseille & Benoit Vianay, CytoMorpho Lab, Paris

## Keynote speakers

Julie THERIOT
Pere ROCA-CUSACHS

## Invited speakers

Simon BULLOCK
Christoph DANELON
Guillaume DUMENIL
Julien DUMONT
Annika GUSE
Jennifer LIPPINCOTT-SCHWARTZ
Roberto MAYOR
Stephanie MISEREY-LENKEI
Inke NATHKE
Jordan RAFF
Anne-Cecile REYMANN
Maria-Elena TORRES-PADILLA
Sara WICKSTROM

BSCB
British Society for Cell Biology

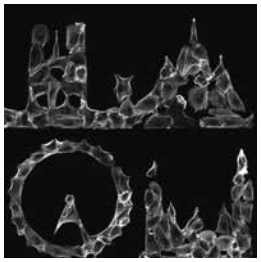
sbcf
French Society for Cell Biology

information and registration:
www.atoutcom.com/Cell_la_vie_2020

**33 selected talks from abstracts**

Organisers: Jennifer Rohn, Anne Straube, Julie Welburn (BSCB), Christophe Lamaze, Nathalie Sauvonnet, Manuel Théry, Marie-Hélène Verlhac (SBCF)

# BSCB Magazine 2020






## Editorial

In this issue of the BSCB magazine we are looking both backwards and forwards, like Janus. We have had a lot of celebrate over the past year, particularly due to the hard work of our PhD and Postdoctoral representatives. We are very excited to launch two new BSCB awards, the Martin Raff award for the best PhD project and the Postdoctoral award to recognise excellence in our early career members. Please see pages 4 and 5 for more information about this and how to apply.

Reaching our 55th anniversary as a society this year some of our committee members have carried out an extensive research project looking into our history as a society. This has been quite important as some of our founding members are now entering their 90's but due to the unstinting work of David Archer and Andrew Carter we have been able to interview them to find out more about what motivated the foundation of the BSCB and what our first meetings were like. Please read more on pages. As part of this we have been eager to get copies of early newsletters, if you have newsletters from 1995 or earlier please get in touch!

Last year we had an excellent meeting with the BSDB in Warwick which took place between the 7th and 10th of April. The meeting had a particular focus on Cancer Cell biology and mechanosensing and was organised by Susana Godhino and our previous WICB prize winner Vicky Sanz Moreno. We again commend Anne Straube our meetings secretary for doing a professional job of coordinating the meeting. Denise Montell gave the opening plenary lecture on collective cell migration of the Neural Crest. A topic which appealed to both BSCB and DB members. We were delighted to award Pleasantine Mill the Women in Cell Biology Prize and Eugina Piddinia the Hooke medal. If you haven't heard their talks please head over to our website www.bscb.org as they are well worth hearing about. Interviews with Pleasantine and Euginia are on pages 14–19. We would also congratulate the winners of the UK Young Cell Biologist of the Year: Laura Hankins, Raff lab, Oxford. The Postdoc poster prize went to our own: Gautam Dey, Buzz lab, London. Our Early career symposium was very well received, judging by all of the tweets and feedback.

In 2020 we will be having one of our first overseas meetings in Paris with the French Society for Cell Biology. This means our usual Spring meeting will move to the late summer, we are looking forwards to seeing you there. For more information please see our website, we will be opening registration after Easter.

We continued with our series of excellent meetings, including the microtubule meeting, The North of England Cell Biology forum, the Actin meeting and UK membrane trafficking meeting. If you have an idea for a meeting please get in touch with our meetings secretary as we have funding available for one day focussed meetings. We consider applications in our Spring and Autumn committee meetings. To find out what we are upto and for news updates please do follow along on twitter @official_BSCB

Its important to us as a society that we reflect our members' needs and interests, so we are launching a membership survey in January. The survey is still open at www.quicksurveys.com/s/f4Y7D so if you haven't responded please do so here. I'll look forwards to putting the feedback for you in the 2021 edition.

It's great to be back editing the Magazine, I'd like to thank Susana and Stephen for their hard work on the last edition, and Giles Newton who does our production. I hope you enjoy our 2020 edition and look forwards to seeing you in Paris.

*Ann*

Front cover: Scanning electron microscopy image of a 16-week-old human retinal organoid generated from pluripotent stem cells using bioreactor technology. Image has been pseudo-coloured to highlight rod (Purple) and cone (Cyan) photoreceptor outer-segments, the cell structures of the retina capable of capturing light and transforming it into vision. The image, by Patrick Ovando Roche at UCL, was the 1st Prize winner of the BSCB Image Competition 2019.


**Magazine Editor:** Ann Wheeler **Production:** Giles Newton, Deadlift Media **Printer:** Hobbs
**BSCB website:** www.bscb.org

# Society News

## BSCB President's Report 2019

I hope you enjoy this year's BSCB Magazine, which is full of information about your Society. Here I describe a few highlights of 2019 and look forward to 2020.

Our 2019 annual meeting at Warwick University was full of exciting science, with a special focus on cancer cell biology. We shared the April meeting with the British Society for Developmental Biology (BSDB) at Warwick University. We are really grateful to Vicky Sanz-Moreno and Susana Godinho who worked with the two BSDB co-organisers to put the programme together and manage last-minute changes during the meeting. It is always a pleasure to award our two BSCB medals and hear the Lectures from the winners. The 2019 BSCB Hooke Medal winner Eugenia Piddini (University of Bristol) gave a movie-filled talk describing her latest innovative research on cell competition, using both Drosophila and mammalian cells in culture. If you missed her talk, you can watch it on our BSCB YouTube channel linked to our website (https://bscb.org/)/ The 2019 BSCB Women in Cell Biology Early Career Award Medal winner Pleasantine Mill (University of Edinburgh) spoke about her latest work on how cilia form and how this process is defective in patients with inherited ciliopathies.

Our 2020 annual meeting will be a special event in Paris, shared with our fellow French Society for Cell Biology (SBCF), and entitled Cell la Vie (a French pun...). Unusually for the BSCB, this will be held in September (23rd to 25th) rather than our usual Spring Meeting. This Paris meeting has nine sessions on cell biology topics ranging from Cytoskeleton to Synthetic Biology, and includes a session on New Methods for Cell Biology. The two 2020 Medal winners will also present their Lectures. One of the highlights will be the conference dinner, which is an evening cruise on the River Seine.

The meeting will include many opportunities for PhD students and postdocs to present their work. First, 33 talks will be selected from abstracts that you submit. There is also a Graduate Symposium at the beginning of the meeting, organised and run by PhD students and postdocs with all speakers selected from PhD and postdoc abstracts. In addition, prizes for the best posters by BSCB PhD students and postdocs will be awarded at the end of the meeting. There will also be a PhD student and postdoc evening social event. We hope that many UK PhD students and postdocs will join us at this unique event to share their results and experiences with their French counterparts.

This year the BSCB committee welcomed Ciaran Morrison (National University of Ireland Galway), who joined us in April. This is the first time the committee has had a non-UK committee member. This reflects the fact that Ireland does not have its own Cell Biology Society, and hence several Irish cell biologists are members of the BSCB and regularly attend BSCB meetings. We contacted our BSCB members in Ireland to find out who would be interested in being on the committee. We have also decided to make our two medals, the Hooke Medal and the Women in Cell Biology Early Career Award Medal, open to scientists who work in either the UK or Ireland.

As a BSCB member, you have many benefits in addition to a discount on the annual BSCB meeting. If you are a PhD student or postdoc, you can apply for an Honor Fell travel award to help fund your travel and registration costs for any meeting or workshop relevant to cell biology, including a BSCB meeting. Group leaders who do not currently have any travel funds in their grants are eligible to apply. BSCB members can also sponsor an undergraduate to carry out a 6-8 week summer studentship in your laboratory. In addition, you can apply to the BSCB for funding to help run a one-day meeting on a cell biology topic. For more information about this please see the Awards and Grants section of our website. Finally, you can become a BSCB Ambassador, acting locally within your Institute/ University to promote the BSCB, BSCB meetings, and the values of BSCB membership. If you are interested in being a BSCB Ambassador, please contact our Membership Secretary Andrew Carter and he will send you information. All details are also available on our website.

I look forward to meeting many BSCB members in 2020 at our annual meeting in Paris next September and/or at one of our sponsored meetings. Please look out for our stands at these meetings to talk to committee members and ambassadors and find out more about the BSCB.

*Anne Ridley*
*BSCB President*

# Science Advocacy Report

Politics remains extremely volatile at the moment. I attended the Christmas Parliamentary Reception on 5 Dec 2018, a networking event bringing together representatives of groups under the Royal Society of Biology, our parent organisation. It was useful to hear from the Labour MP for Newcastle, Chi Onwurah, who has a science background. She mentioned that everything is being overshadowed by Brexit, including anything to do with science and its funding.

As a reflection of this chaos, in the past year, we have had no fewer than four Science Minister shuffles. Sam Gyimah served until resigning in November 2018. From December 2018 to July 2019 it was Chris Skidmore; from July to September 2019 it was Jo Johnson; and then Skidmore took over again. The dust will have to settle on the General Election and Brexit before the Government starts putting its mind to domestic policy again, including science. We are very much looking forward to science in general, and cell biology research in particular, becoming part of the agenda once more.

Meanwhile the BSCB have developed more resources for engagement with policy. This year an email list of BSCB members interested in receiving policy updates and contributing to relevant Consultations was set up. The first policy newsletter was sent out in August 2019.

If you would like more information or to join the policy group please contact me.

*Jennifer Rohn*

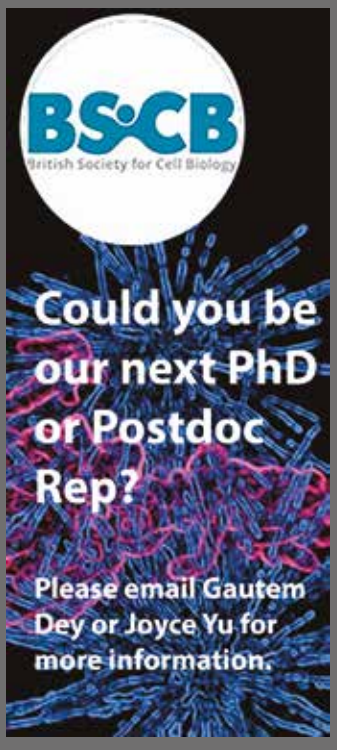
# Wanted! New PhD and Postdoc Reps

After several years and a lot of hard work on the committee, both Joyce Yu and Gautem Dey will be looking to step down as PhD and Postdoc reps of the BSCB. While we will be sorry to say goodbye we need to look for new recruits.

Do you have a passion for Cell Biology, want an opportunity to meet and mingle with leading Cell Biologists and contribute to shaping the BSCB for the 2020s?

A key aspect of the role involves organise postdoc/student-focused events in the annual BSCB meetings. This can include the early career researchers symposium, career workshops, social and networking events. The handover period will be around the BSCB annual meeting in September 2020. Ideally the student will be in their second year of PhD by the time of the handover.

If this sounds like you, please email Joyce or Gautem.




# In brief...

### FROM THE MEMBERSHIP SECRETARY

A new fee structure was introduced in January 2019 in which direct debit payers pay less (£35) compared to people paying by credit card (£45). Several of you have already switched over to direct debit. If you would like to do this now please log into the BSCB members area on the website (https://hg3.co.uk/bscb/members.aspx), fill in and return the direct debit mandate form.

We value your feedback and we have opened a survey of all BSCB members so you can let us know what is important to you and how the BSCB as a Society can be more useful to its members. We will already have emailed you about the survey which opened in early February 2020 and will close on 1 April 2020. Please fill in the survey here: https://www.quicksurveys.com/s/f4Y7D

### DO YOU HAVE ANY OLD BSCB NEWSLETTERS?

Following the in-depth research on the roots of the BSCB on page 6 we would ask our more time-served members if they have copies of the BSCB newsletter from before 1994. If so please can you contact Andrew Carter (cartera@mrc-lmb.cam.ac.uk)

We are also looking to recruit an undergraduate student or current member who could assist with the generation of an online repository of the original Society documents, newsletters and meetings that would reflect the proud history of British Cell Biology in the 20th Century. If you know of someone interested please contact the Editor.

### POSTDOC REP IS TOP PRELIGHTS REVIEWER!

On 24 September 2019, the Company of Biologists celebrated 500 preLights posts. Prelights are preprint highlights selected by postdoctoral researchers across the life science community. A big round of applause to Gautem Dey our postdoc rep who, having contributed 16 posts, is one of the top reviewers! prelights.biologists.com

### SCHOOLS UPDATE

In entries for the 2019 A-level examinations in science subjects, the number of entries for girls exceeded those for boys for the first time ever.

The material I have been producing with Professor Sir Mel Greaves on Cancer Biology has been selected for inclusion in recommended resources for a training course for young oncologists in India. This material contains many diagrams in PowerPoint and links to selected YouTube presentations.

The material is also being uploaded to the BSCB website: bscb.org/learning-resources/softcell-e-learning/cancer-biology/

*David Archer*

### JORDAN RAFF JOINS THE ASCB COMMITTEE

Congratulations to our ex-president Jordan Raff on his election to the ASCB committee.

# BSCB Funding News

## BSCB PhD Award - Raff Medal

We are delighted to launch a new BSCB award, The Raff Medal. The medal was developed to recognise BSCB PhD students who have made outstanding contributions to UK/Ireland cell biology. The medal was developed by our own BSCB PhD rep Joyce Yu and was unanimously approved in our 2019 autumn committee meeting.

The Raff Medal has been named after Professor Martin Raff, who was the president of the BSCB from 1992 – 1995. With MRC support, Martin was instrumental in setting up and running the first 4-year PhD graduate programme in Molecular Cell Biology at the MRC Laboratory for Molecular Cell Biology (LMCB) at UCL. When started in 1993, this was a unique programme: It offered students the opportunity to rotate through labs, receive expert tutorials and, importantly, attend the annual BSCB meeting. It still continues today having trained over 100 career cell biologists. Martin has been a great mentor and supporter of many PhD students both from the LMCB programme and more widely in the UK.

Candidates for the Raff Medal will be assessed on their research excellence, based on a project summary, and community engagement such as conferences, public engagement, community outreach or scientific advocacy. A publication is not required for the award, but work should be close to completion.

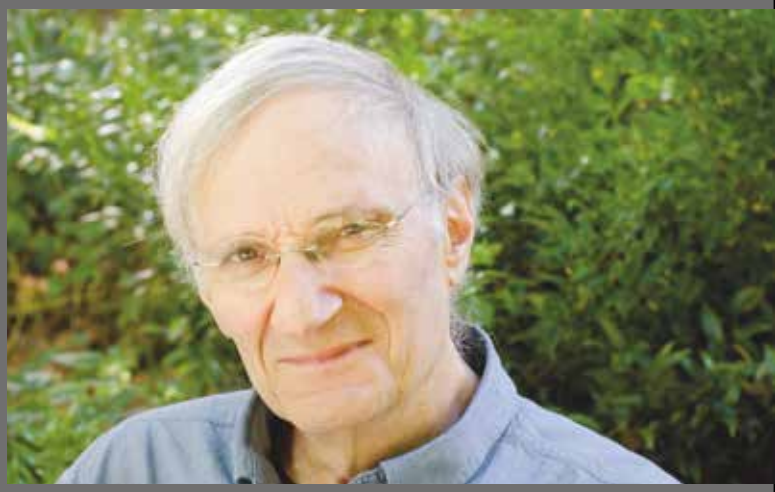
The awardee will receive free registration, accommodation and UK/Ireland travel for the upcoming BSCB annual meeting at which s/he will be presented with a medal and will give a short talk. The scheme is open to all BSCB PhD student members who have submitted their thesis in the previous 12 months. Candidates must be nominated by one of their PhD supervisors or a collaborator. The nominator does not have to be a BSCB member.

Nomination: Deadline is 1st October each year

The nomination should contain:

- 1-page cover letter
- Supporting 1-page letter from a PhD supervisor or collaborator (must include the date of thesis submission)
- 2-page project summary (including figures but excluding references)
- CV including list of publications, abstracts, posters and meetings attended

Nominations and supporting letters should be sent to the BSCB Secretary, and will be judged by the BSCB committee. Results will be announced after the autumn committee meeting in time for the awardee to register for BSCB annual meeting the following spring.



Martin Raff has been a major driving force in the development of the LMCB four-year PhD programme. Among a number of innovations, Martin championed the introduction of rotations that facilitated the integration of students from diverse scientific backgrounds into a molecular cell biology training programme. The four-year format has now been widely adopted elsewhere and offers some of the best graduate training opportunities in the UK. Martin has continued to lobby for the implementation of new approaches and the importance of outstanding graduate training, this award is a wonderful acknowledgement of his advocacy.

## BSCB meeting funding for regional career development meetings for PhD students and postdocs

Following our PhD and Postdoc survey and feedback from students and early career researchers at the BSCB annual meetings we have developed a new funding stream specifically targeted for our early career members. As of April 2019 our PhD and Postdoc reps have launched a funding stream for a new type of regional meeting run by PhD students and postdocs on careers and networking

The primary theme of these short meetings should be career development and it is preferable if BSCB members from more than 1 university are involved in running each meeting. Since we want the meetings to be of benefit to all our PhD and postdoc members we ask that the meeting is open to all PhD and Postdocs, particularly BSCB members. We are willing to consider scientific discussions can be part of the programme.

We can offer grants of up to £500 for ~0.5 day activity

Prior to applying, we encourage potential applicants to contact the BSCB student and postdoc representatives (Joyce Yu, joyce.yu@crick.ac.uk and Gautam Dey, g.dey@ucl.ac.uk to discuss their proposal.)

# BSCB Postdoctoral Award

Our postdoc rep Gautem Dey has developed the BSCB postdoc award. This award is for early career researchers who do not or have their own funding.

The BSCB Postdoctoral Award recognises early career researchers who have made a major contribution to UK/Ireland Cell Biology during their postdoctoral training. As well as scientific excellence the committee will consider the applicant's independence, contribution to the scientific community and outreach through public engagement and other activities. In the BSCB postdoc award we are looking for the next generation of inspirational scientific leaders. The awardee receives free registration and UK/Ireland travel to the next annual meeting where they will be expected to give a short talk. The awardee will be presented with a Medal and certificate in recognition of their achievements.

**Eligibility**

- Open to all BSCB members who are currently postdocs
- At the time of application, the applicant must not hold a group leader position (including through a Career Development Award) or a permanent academic position at a university or research institute.
- Nominator (postdoctoral advisor or collaborator) does not have to be a BSCB member.
- Applicants must have a first-author publication (biorxiv pre-prints are acceptable) from their postdoctoral lab.

**Application**

- The application deadline is 1st October each year. Applications should be sent to the BSCB Secretary and will be judged by the BSCB committee. Results are announced after the Autumn Committee meeting.
- The application should contain:
- 1-page cover letter outlining the applicants' contributions to UK/Ireland Cell Biology
- CV including list of publications, abstracts, posters and meetings attended
- Supporting 1-page letter from postdoctoral advisor or collaborator.

# Honor Fell Travel award update

We welcome Folma Buss and Sharon Tooze (right) who have taken over administration of the BSCB's Award schemes from Julie Welburn. We want to thank Julie for her work over the past 5 years. The Honor Fell Travel award has been more popular than ever this year with our members, and to streamline and better manage the awarding we have created a new email address for applications **travelgrants@bscb.org**. Between the Honor Fell award, C.O.B. Support Grants (PI travel awards) and Childcare awards the BSCB has funded over travel applications from over 100 of our members. This includes enabling several members to attend the BSCB spring meeting. We hope this was an enjoyable and productive experience for the award recipients.

We manage a high volume of applications, particularly around the time of registration for the BSCB spring meeting and the ASCB meeting. We ask that you have your full funding application submitted at least 6 weeks prior to travel. This allows us to assess the applications appropriately and ensure the successful applicants have the award monies in good time for the trip. We include some meeting reports from our Honor Fell Travel award in 2019 on page 25.

The Honor Fell criteria are:

- Applications from BSCB members are considered for any meeting or course relevant to cell biology.
- The amount of the award depends on the location of the meeting or course. Please see our website: www.bscb.org for more information.

**How to apply:**

1 Register with the BSCB online application portal from the BSCB website.

2 Download the full application form, complete and save as a single pdf.

3 Complete your details in the online application portal and upload the full application form.

The following rules usually apply (at the discretion of the Committee):

- Awards are normally made to those in the early stages of their careers
- Applicants must have been a member for at least a year (or be a PhD student in their first year of study).
- Applications must be made at least one month in advance of the meeting for which support is requested.
- Group leaders who have no current funding available for travel are eligible for our COB Support Grants.
- No applicant will receive more than one award per annum. However, an award to attend the BSCB spring meeting does not preclude getting another travel award in the same year.
- The applicant must be contributing a poster or a talk.

- Any one lab may receive up to three awards per calendar year, not counting awards to participate in the spring BSCB meeting. Awards are discretionary and subject to available funds.
- Incomplete applications will not be considered.
- When presenting a poster or talk, an acknowledgement of BSCB funding should be displayed, which can be downloaded from our website.

# The beginnings of the British Society for Cell Biology (BSCB)

It is with some irony that we find ourselves writing this article at a time when the United Kingdom is trying to extricate itself from the EU, and the words 'take control' ring in the ears of some people. The irony being that the BSCB had its origins in similar circumstances and with similar thoughts. But enough of 'now politics', let's go back in history to the early beginnings of the BSCB.

**The European Tissue Culture Club (ETCC)**

The time is the early 1930s and 'hot topic' dances were the Rumba and the Samba. In biology the 'hot topic' was tissue culture, in the USA, in Europe and in the United Kingdom. The leading investigator in this field was Honor Fell, who had become director of the Strangeways Laboratory in Cambridge in 1929 at the age of 29. Her 'organ culture method' allowed cells to be cultured by surrounding them with fragments of other tissues. In 1931 a 24-year-old from the Netherlands, Pieter Gaillard, arrived at the Strangeways lab which he described as an 'old villa' at the top of Hills Road, Cambridge. He was shown in and made to wait in the library until a 'mystery lady' arrived and offered to show him the garden. Eventually, as she probed his scientific interests, he began to realise that he was talking to the director herself. Honor Fell, later told him how much she enjoyed his embarrassment as the realisation dawned. So began a lifelong friendship, which in 1947 led them to co-found the European Tissue Culture Club together. In April 1967, as Gaillard stood down from active involvement in the club, it changed its name to the European Tissue Culture Society. Both he and Honor fell remained involved with the ETCS, Honor Fell helping to draft its new constitution.

**The British Tissue Culture Association**

Biologists from the UK attended meetings of the European Tissue Culture Club but around 1950 a group of scientists in the UK with an interest in tissue culture, decided to form their own British Tissue Culture Association (BTCA). There were five members of the group: [1] Honor Fell herself, who was a world-renowned figure in tissue culture with interests also in cell biology and radiobiology. Honor Fell had skills in administration and networking and these contributed greatly to the success of the Strangeways Laboratory and the BTCA. [2] Michael Abercrombie, a cell biologist and embryologist who did doctoral research in the Strangeways Laboratory. After several moves Abercrombie came back as its Director in 1970, following Honor Fell's retirement. [3] Leonard Franks, known as 'Sam' or 'Sammy', qualified in medicine and spent some time working in the laboratory of Honor Fell. He became an authority on tumour biology especially that of prostate tissue. [4] John Paul. Paul initially qualified as a physician in 1944 but then obtained a degree in biochemistry. In 1953 he was appointed Director of the Tissue Culture Laboratory at Glasgow University and in 1970 founded and directed the Beatson Institute for Cancer Research. In 1976 'The Beatson' moved to a purpose built laboratory, the ergonomic design of which was largely determined by John Paul. [5] Neville Willmer obtained a B.A. from Oxford University in 1924 and became a Demonstrator at the University of Manchester. From 1966 to1969 he held the post of Professor of Histology at the University of Cambridge. Willmer's biological field of interest was tissue culture about which he wrote a three-volume treatise.

**Metamorphosis**

In the USA a Tissue Culture Commission (later Tissue Culture Association) was founded after a meeting in Hershey, Pennsylvania in 1946. Honor Fell was part of the founding Executive Committee, holding the position of "European Member at Large". The TCA developed standardised culture media, arranged teaching workshops and held meetings. By 1958 however, as tissue culture became an established technique, there was discussion about the wisdom of having an association based on a technique. The subject was discussed and debated and needless to say there were some who wished to retain the established structures. In 1960 however a group led by Keith Porter broke away and formed the American Society for Cell Biology (ASCB). In the UK a similar debate was held but rather than form a break-away group, members

of The British Tissue Culture Association, in a spirit of British compromise, simply decided on a name change. Thus, in April 1965 at the AGM in Aberystwyth the British Society for Cell Biology (BSCB) was born. A notice reporting the name change was placed in Nature and an advertisement asking for new members was included in the first issue of the Journal of Cell Science.

**The British Society for Cell Biology (BSCB)**

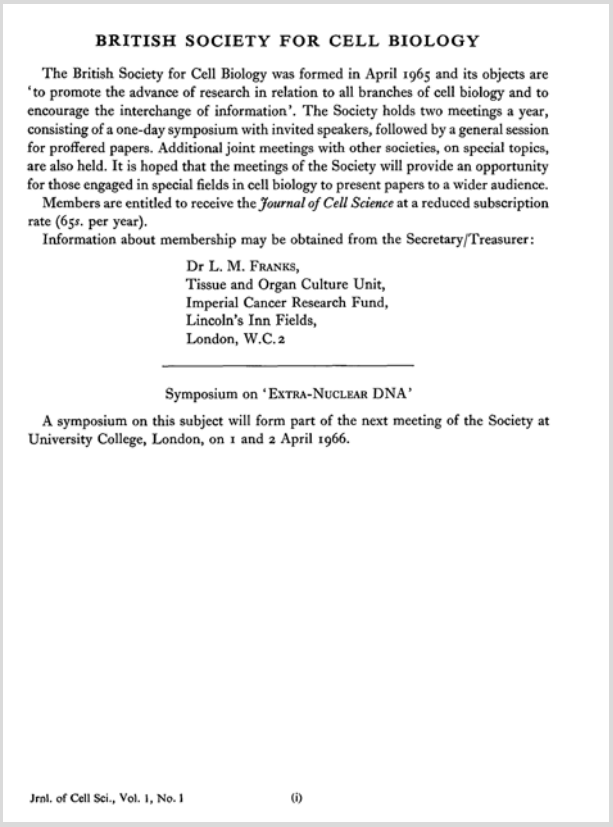
The BSCB constitution dictated that there were three Officers. The President (officially Honorary President) and a Meetings Convenor served for 3 years. The Secretary/Treasurer served for 5 years. John Paul was President of the British Tissue Culture Association in 1965 and so became the first BSCB President. Sammy Franks took on the role of Secretary/Treasurer. The constitution also specified 6 additional committee members and up to 10 Honorary Members. The first Honorary member was Honor Fell herself who by this time had become a Dame Commander of the Order of the British Empire.

The founding goal of the BSCB was "to promote the advance of research in relation to all branches of cell biology and to encourage the interchange of information". In 1965 they planned to hold "two meetings a year, consisting of a one-day symposium with invited speakers, followed by a general session for proffered papers." It is not clear whether this schedule was adhered to. The 1966 meeting was held on 1st-2nd April at UCL on the subject of extra-nuclear DNA. The meetings continued and over time other activities were added. In 1973 the BSCB published a Laboratory Manual for Cell Biology to aid teaching of Cell Biology. It was assembled by David Hall and Shirley Hawkins from contributions submitted by the Society's members. The contributions were lightly edited with the aim of including "too much rather than too little information".

In 1975 the BSCB Committee accepted a donation of £3000 that came from the profits of an International Society for Cell Biology Congress held at Sussex. They decided to use it to provide funds for members to travel to the Society's meetings. On 12th Feb 1974 Brian Richards (BSCB Treasurer/Secretary) and Michael Balls (the Meeting Convenor) travelled to Cambridge to meet with Honor Fell and ask if they could name these awards after her. She agreed and gave them a "splendid lunch". The first awards were presented at the 1975 BSCB spring meeting at the University of East Anglia. The meeting topic was "Organ cultures in biomedical research" and resulted in the publication of a Festschrift (a collection of writings published in honour of a scholar) for Honor Fell to celebrate her 75th birthday.

By the early 1980s the role of Secretary/Treasurer was split into two, with Nancy Lane becoming Secretary and John Pitts taking on the role of Treasurer. John Gurdon took over from the Hungarian born Laszlo Lajtha as President. Colin Hopkins was meeting secretary and the driving force behind an expansion in the number and size of meetings. The BSCB started to hold major international

**1965**



BRITISH SOCIETY FOR CELL BIOLOGY

The British Society for Cell Biology was formed in April 1965 and its objects are 'to promote the advance of research in relation to all branches of cell biology and to encourage the interchange of information'. The Society holds two meetings a year, consisting of a one-day symposium with invited speakers, followed by a general session for proffered papers. Additional joint meetings with other societies, on special topics, are also held. It is hoped that the meetings of the Society will provide an opportunity for those engaged in special fields in cell biology to present papers to a wider audience.

Members are entitled to receive the *Journal of Cell Science* at a reduced subscription rate (65*s.* per year).

Information about membership may be obtained from the Secretary/Treasurer:

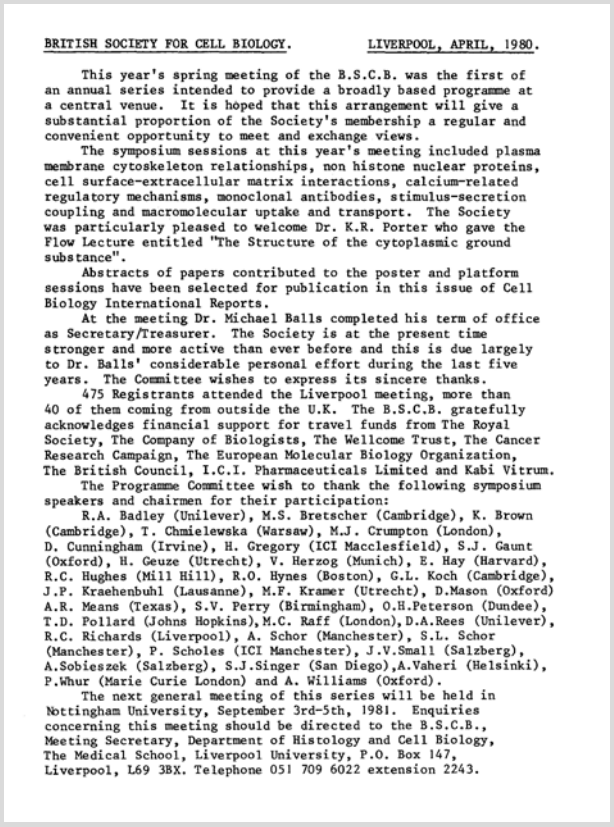
Dr L. M. Franks,
Tissue and Organ Culture Unit,
Imperial Cancer Research Fund,
Lincoln's Inn Fields,
London, W.C.2

Symposium on 'Extra-Nuclear DNA'

A symposium on this subject will form part of the next meeting of the Society at University College, London, on 1 and 2 April 1966.

Jrnl. of Cell Sci., Vol. 1, No. 1 (i)

**1980**



BRITISH SOCIETY FOR CELL BIOLOGY. LIVERPOOL, APRIL, 1980.

This year's spring meeting of the B.S.C.B. was the first of an annual series intended to provide a broadly based programme at a central venue. It is hoped that this arrangement will give a substantial proportion of the Society's membership a regular and convenient opportunity to meet and exchange views.

The symposium sessions at this year's meeting included plasma membrane cytoskeleton relationships, non histone nuclear proteins, cell surface-extracellular matrix interactions, calcium-related regulatory mechanisms, monoclonal antibodies, stimulus-secretion coupling and macromolecular uptake and transport. The Society was particularly pleased to welcome Dr. K.R. Porter who gave the Flow Lecture entitled "The Structure of the cytoplasmic ground substance".

Abstracts of papers contributed to the poster and platform sessions have been selected for publication in this issue of Cell Biology International Reports.

At the meeting Dr. Michael Balls completed his term of office as Secretary/Treasurer. The Society is at the present time stronger and more active than ever before and this is due largely to Dr. Balls' considerable personal effort during the last five years. The Committee wishes to express its sincere thanks.

475 Registrants attended the Liverpool meeting, more than 40 of them coming from outside the U.K. The B.S.C.B. gratefully acknowledges financial support for travel funds from The Royal Society, The Company of Biologists, The Wellcome Trust, The Cancer Research Campaign, The European Molecular Biology Organization, The British Council, I.C.I. Pharmaceuticals Limited and Kabi Vitrum.

The Programme Committee wish to thank the following symposium speakers and chairmen for their participation:

R.A. Badley (Unilever), M.S. Bretscher (Cambridge), K. Brown (Cambridge), T. Chmielewska (Warsaw), M.J. Crumpton (London), D. Cunningham (Irvine), H. Gregory (ICI Macclesfield), S.J. Gaunt (Oxford), H. Geuze (Utrecht), V. Herzog (Munich), E. Hay (Harvard), R.C. Hughes (Mill Hill), R.O. Hynes (Boston), G.L. Koch (Cambridge), J.P. Kraehenbuhl (Lausanne), M.F. Kramer (Utrecht), D.Mason (Oxford) A.R. Means (Texas), S.V. Perry (Birmingham), O.H.Peterson (Dundee), T.D. Pollard (Johns Hopkins), M.C. Raff (London), D.A.Rees (Unilever), R.C. Richards (Liverpool), A. Schor (Manchester), S.L. Schor (Manchester), P. Scholes (ICI Manchester), J.V.Small (Salzberg), A.Sobieszek (Salzberg), S.J.Singer (San Diego), A.Vaheri (Helsinki), P.Whur (Marie Curie London) and A. Williams (Oxford).

The next general meeting of this series will be held in Nottingham University, September 3rd-5th, 1981. Enquiries concerning this meeting should be directed to the B.S.C.B., Meeting Secretary, Department of Histology and Cell Biology, The Medical School, Liverpool University, P.O. Box 147, Liverpool, L69 3BX. Telephone 051 709 6022 extension 2243.

Left: Nancy Lane and John Gurdon

symposia covering multiple topics along the lines of the ASCB meetings in the USA. These were profitable and reported to be the best cell biology meetings in Europe. The BSCB had a long history of holding meetings jointly with other Societies. In 1984 the Committee agreed to combine forces on a regular basis with the British Society for Developmental Biology. The goal was to hold even larger Spring meetings with more overseas invited speakers. The first of these was in Glasgow in 1985 and included sessions on early amphibian development (BSDB), growth factors (BSCB), modelling morphogenesis and invasiveness in vitro (joint BSCB/BSDB) and eukaryote genes (BSCB).

John Gurdon was on the Board of the Company of Biologists (CoB), publisher of the Journal of Cell Science which had had links to the BSCB from its earliest days. In the early 1980s the CoB had spare funds, was looking to support cell biology in the UK and generously agreed to provide support for the BSCB. John Pitts recalls meeting the CoB Secretary in Cambridge to discuss how the funding might be set up and how the BSCB would use it to help expand the Honor Fell awards.

Since the 1980s the BSCB has continued to innovate new ways to support Cell Biology. The Hooke medal, "to recognise an emerging leader in the field of cell biology", was launched in 2000. The first awardee was Anne Ridley, who is now our president. In 2008 the BSCB summer studentship scheme was launched. Our Women in Cell Biology Early Career medal was first awarded in 2016. This year our Student and Postdoc representatives led the development of a new scheme to fund career events and networking opportunities. There will be more to come!

*David Archer and Andrew Carter. October 2019.*

*We would like to thank Michael Balls, John Pitts, Colin Hopkins, John Gurdon and Nancy Lane for their correspondence regarding the BSCB. Other sources include the biography of Honor Fell by Dame Janet Vaughan, Honor Fell's papers in the Wellcome collection, records in Cell Biology International Reports and the ASCB/TCC/TCA archives at the University of Maryland, Baltimore County (with thanks to librarian Robin Martin for sending copies of documents related to the BSCB). Thanks also to Ann Wheeler and Sharon Tooze for pointing us in the right direction.*

*Following the extensive research for this project we intend to upload the records to an online repository. If you would be interested in assisting with scanning old newsletters – or know of a History of Science student who may be interested in this please get in touch with Andrew Carter – our Membership secretary. We are missing some information about who served as Meetings Secretary and which meetings the BSCB held between 1965 and 1973. We are also missing the newsletters between 1980 and 1995. If anyone has any information or records please contact us.*

## BSCB Officers

**Presidents**

| | |
|---|---|
| John Paul (Glasgow) | 1965–1968 |
| Michael Abercrombie (UCL) | 1969–1971 |
| Michael Stoker (ICRF) | 1971–1973 |
| Murdoch Mitchison (Edinburgh) | 1974–1977 |
| Laszlo Lajtha (Manchester) | 1977–1981 |
| John Gurdon (Cambridge) | 1981–1985 |
| Lewis Wolpert (UCL) | 1985–1992 |
| Martin Raff (MRC-LMCB) | 1992–1995 |
| Ron Laskey (Cambridge) | 1996–1998 |
| Fiona Watt (ICRF) | 1999–2006 |
| Clare Isacke (ICR) | 2007–-2010 |
| Jordan Raff (Oxford) | 2011–2016 |
| Anne Ridley (Bristol) | 2017–- |

**Secretary/Treasurers**

| | |
|---|---|
| Sammy Franks (ICRF) | 1965–1970 |
| Brian Richards (Searle Labs) | 1970–1975 |
| Michael Balls (Nottingham) | 1975–1980 |
| John D Pitts (Glasgow) | 1980–1981 |

**Secretary**

| | |
|---|---|
| Paul Whur (MCRI, Oxted) | 1982 |
| Nancy Lane (Cambridge) | 1982–1990 |
| Robert Johnson (Cambridge) | 1991–1995 |
| Birgitte Lane (Dundee) | 1995–1999 |
| Michael Whitaker (Newcastle) | 2000–2005 |
| Elizabeth Smythe (Sheffield) | 2006–2010 |
| Grant Wheeler (UEA) | 2011–2016 |
| Vas Ponnamalam (Leeds) | 2016– |

**Treasurer**

| | |
|---|---|
| John D Pitts (Glasgow) | 1982–1985 |
| Fiona Watt (ICRF) | 1986–1990 |
| Martin Humphries (Manchester) | 1991–1995 |
| Stuart Kellie (Oxford) | 1995–2000 |
| Jo Adams (MRC-LMCB) | 2000 |
| Mark Marsh (MRC – LMCB) | 2001–2006 |
| Adrian Harwood (Cardiff) | 2007–2012 |
| Caroline Austin (Newcastle) | 2012–2017 |
| David Elliot (Newcastle) | 2017– |

# The LMCB's 25th Anniversary

In 1993, the Laboratory for Molecular Cell Biology (LMCB) opened its doors as one of the first centres in the UK dedicated to studying cells at the molecular level.

Before the LMBC opened, cell biology in the UK was fragmented; while there were excellent scientists in the field, there was no central hub focusing on this fundamental area of biomedical research. Dai Rees, then director of the Medical Research Council (MRC), recognised a need for a research institute dedicated to molecular cell biology, and asked Colin Hopkins, from Imperial College London, to make this happen. A new laboratory was built at UCL's Bloomsbury campus and a number of cell biologists, including Martin Raff, Alan Hall, Mark Marsh, Anne Mudge, Dan Cutler, Bill Richardson and Jo Adams, were recruited to establish the new institute. Since then, the LMCB has been dedicated to pushing the boundaries of innovation, developing new molecular understandings of cell function through discovery-based research supported by state-of-the-art technologies.

2018 offered the opportunity for a celebration and on July 13th current LMCB members, alumni and key stake holders gathered at UCL for the LMCB's 25th Anniversary Symposium and Celebration to celebrate our people and achievements. The symposium opened with remarks from Mark Marsh, the current director, and Colin Hopkins, the founding director. Presentations from current LMCB members and alumni followed, spanning topics in cell biology such as cancer immunology, host-pathogen interactions and neuroscience. State-of-the-art innovation and technology developments at the LMCB were showcased with an introduction to the High Content Biology Laboratory by Robin Ketteler and a presentation on the future of microscopy by Ricardo Henriques. Early career researchers were also given the opportunity to present their research in 3-minute flash talks. In closing, Martin Raff gave an overview of life at the LMCB during the last 25 years, recounting his role in establishing the UK's first 4-year PhD programme. Following the symposium, attendees gathered to celebrate with drinks and cake.

Below: The LMCB's 25th Anniversary Symposium and Celebration

Through the years, LMCB researchers have received prestigious awards including, most recently, the Hooke Medal and Leverhulme Prize to Ewa Paluch, a Lister Institute Prize Fellowship to Yanlan Mao, and L'Oréal UNESCO For Women in Science Fellowships to Yanlan Mao and Sophie Acton. But success can also be seen through the numbers of LMCB alumni who have not only garnered accolades, but gone on to prestigious appointments and highly successful careers in research, industry and research-associated activities. Together these achievements highlight the value and regard in which the LMCB is held across the research community.

From the outset, the LMCB has been committed to fostering a supportive and inclusive work environment, an ethos that continues and was recognised in 2016 by an Athena SWAN Gold Award. Currently, the LMCB is entering an exciting new phase of its life and in the coming months will be welcoming a new director and a new cohort of junior group leaders, for which a programme of recruitment will be announced shortly.

Over these 25 years, BSCB and LMCB have a strong and long-standing association. In the 1980s, Colin Hopkins was BSCB Secretary, while Martin Raff was BSCB President from 1992 to 1995. More recently, Dan Cutler, Mark Marsh, Kate Nobes, and Buzz Baum have all held BSCB committee positions. We hope these good relations will endure and that the LMCB will continue to contribute to BSCB's ongoing success.

*Giorgia Siriaco*

# The London Cell Motility Club – Relaunched

The London Cell Motility Club has been relaunched as a CRICK HEI network mini symposium series.

Above: A still from a film made by Joan E. M. Heaysman, C. A, Middleton, Susan M. Pegrum, and Michael Abercrombie, The Cell Group, Department of Zoology, University College, London.

Almost 60 years ago, the London Cell Motility Club was initiated by the then Professor of Zoology at University College, Michael Abercrombie. His pioneering work with Joan Heaysman in the 1950s had developed the concept of contact inhibition of locomotion and made significant contributions to many other aspects of cell migration. Michael Abercrombie's seminal contribution to cell migration ("Michael Abercrombie: the pioneer ethologist of cells" Trends in Cell Biol. 8; 124-126) was also recognised a posteriori when following his death in 1979 a conference fund was established to support a quinquennial symposium.

The origins of the club in the early 1960s rest with Michael. He established it as a common meeting ground for informal discussions on cell behaviour at a time when there was considerable discord between Michael Stoker of ICRF and Jack Ambrose of Chester Beatty Research Institute at Fulham Road. Michael, ever the conciliator, invited both groups to his laboratory meetings on neutral ground. Along with these two influential groups, scientists with similar interests, amongst them Lewis Wolpert (Middlesex Hospital Medical School), Ruth Bellairs (Anatomy UCL) and Charles Vernon (Chemistry UCL) were also part of this initial club.

Such was the success of the meetings, it was decided to continue the club after Abercrombie left to become Director of the Strangeways Research Laboratory in 1970. The organisation of 4 meetings per year passed to the sturdy hands of Conrad King, a young lecturer at the time, who introduced a wine and snacks reception as part of the format, along with an invitation to join the chosen speaker for dinner. These traditions happily continue to this day.

Years passed by, with a host of contributors from the increasing number of London-based laboratories joining the club. The discoveries of the Rho proteins and their roles in migration served to enlarge the gatherings into a major meeting place for free exchange of unpublished information. Upon the retirement of Conrad in 2001 - after some 30-plus years of steadfast service - the successful organisation of the club passed to a past student of Abercrombie, Gareth Jones (King's College London). During Gareth's tenure the club was somewhat reorganised, soliciting sponsorship from Andor Technologies and the MRC (through the LMCB) and more latterly the which for the first time allowed the club to invite speakers working outside London and the UK. In 2012, after 11 fruitful years Gareth stood down as organiser and Michael Way (CRICK, London) took over the organising role of the Club for the next 5 years. In February 2017, Michael handed over this role to Ferran Valderrama (St George's, University of London) and Matthias Krause (King's College London).

Recently, the London Cell Motility Club was relaunched as a CRICK HEI network mini symposium series. There are two mini symposia a year in a very open and interactive format. The first meeting, held in May 2019, had Klemens Rottner as keynote speaker and four short talks were given by early career researchers. The event was very well attended, and there were lively discussions over drinks and a light food reception, keeping the interactive nature of the event originally set by Abercrombie. The keynote speakers for the next two CRICK-London Cell Motility Club mini-symposia will be Erez Raz (17th of October 2019) and Xavier Trepat (21st of May 2020).

The organisers hope that this new format encourages networking and helps fostering interactions and collaborations that promote research in cell motility, which is at the interface between developmental biology, cell biology, the cross-disciplinary mechanobiology field and requires state-of-the-art computer modelling and microscopy techniques. Thus, if your lab is interested in cell motility please consider joining the London Cell Motility Club. You can sign up to the mailing list (https://mailman.kcl.ac.uk/mailman/listinfo/londoncellmotilityclub), to keep up-to-date about the forthcoming symposia.

For more information about the network please see https://cytoskeleton.wixsite.com/londoncell-motility.

*Gareth E Jones, Ferran Valderrama and Matthias Krause.*

**The CRICK-London Cell Motility Club is organised by: Ferran Valderrama (St George's, University of London) and Matthias Krause (King's College London)**

# The Genetics Society is 100

Our sister society, the Genetics Society, celebrated its centenary this year.

This occasion has been marked by a wide range of events. The Genetics Society teamed up with the Mendelanium, a museum dedicated to the work of "the father of genetics", Mendel, to host the International Mendel Day at the Royal Institution in London on Friday 8th March. Since Friday 8th March is also International Women's Day a programme dedicated to Mendel and women in Genetics was presented. Following this on 25th June 2019, 100 years to the day since the first meeting of the then named "Genetical Society", a birthday get-together of past presidents, medal winners and committee members was held at the John Innes Centre (JIC).Two blue plaques were unveiled by ex Society President Sir Paul Nurse, one dedicated to each of these remarkable scientists, and will be erected in Cambridge at a later date. Sir Paul was presented with the Genetics Society Centenary Medal by president Laurence Hurst, and then gave a talk about his work with yeast, peppered with plenty of interesting and entertaining anecdotes.

In its centenary year, the Genetics Society viewed the world-renowned Royal Horticultural Society Chelsea flower show as on opportunity to create a garden showcasing plants which have been studied by geneticists throughout history. Led by Professor Bickmore, the exhibit showcased plants such as peas, snapdragons, petunias, lilies and strawberries, telling the story of genetics and why its study is fundamental to our understanding of health and disease. This event was a remarkable success with the garden being awarded the Royal Horticultural societies' silver medal.

To round off the year of celebrations a meeting celebrating 100 years of genetics will be held in Edinburgh. The centenary garden is expected to be opened in its' permanent home at the Royal Botanical Gardens, Edinburgh during this event.

Professor Wendy Bickmore (former President of the Genetics Society,Director of the MRC Human Genetics Unit and BSCB member!) and fellow members of the society have brought home a prestigious award by taking genetics to the general public at this year's RHS Chelsea Flower Show.

*Ann Wheeler, with thanks to Wendy Bickmore*

# Science Writing Prize Winner 2019 – Laura Hankins

Keeping Everything in Proportion: why cell size must be kept under control.

Our bodies contain around 37 trillion cells that come in all shapes and sizes, from rotund fat cells to the cells that line our organs and resemble microscopic paving slabs. However, if you focus on one particular cell type, cell size is remarkably consistent across the population. This narrow distribution suggests that it is important to control the size of our cells, just as it is crucial to regulate our internal body temperature. Now, a study published in Cell may provide insights into why size seems to matter so much.

The range of sizes exhibited in a healthy population of one specific cell type is generally narrow. If, like me, you've ever wondered why you can't quite reach the top shelf of the cupboard whilst others can access the biscuit stash with ease, it's generally because those taller office mates have produced more cells, rather than grown larger ones like some

human Michelin man. In fact, changes to cell size are associated with several diseases; cancer cells may be smaller than their peers. Maintaining a consistent cell size therefore seems to be important, although it is unclear why.

In the lab, it is possible to perturb cell size by preventing cells from dividing. Cell division is the process of one cell splitting to produce two daughter cells, thus allowing the population of cells to proliferate. This proliferation is the main reason that co-worker Geoff developed long enough arms to consistently swipe the custard creams. Cells usually increase in size before dividing, to ensure the two new cells inherit the sufficient cellular machinery to survive. It's rather like lovingly preparing a toolkit for your kids when they leave home, readying them to face their first leaking roof. If you block division, either by applying drugs or by mutating proteins involved in cell cycle progression, cells may grow without being able to split in two.

A recent report published in Cell has taken advantage of this approach to investigate why regulating cell size is important [1]. Researchers prevented yeast cells from dividing by mutating a key cell cycle protein. With the brakes on cell division applied, the cells started to swell, but were unable to divide or to initiate DNA replication. This erroneous growth led to problems; the scientists found that, once the brake was released, the now engorged cells progressed through the cell cycle slower than their smaller counterparts.

To explore why this might be happening, the team measured how the cell volume and the total protein content of these arrested cells changed as they grew. They found that, initially, protein levels increased at the same rate that cell volume did – the two processes were neck-and-neck. However, there came a point where the cells became so large that their volume was increasing faster than their protein levels. Somehow, protein production became unable to keep pace with the ballooning cell size. This could result in the dilution of the cell's proteins, presumably affecting reaction rates. Imagine you and your friends are placed in a room, blindfolded, and have to walk silently until you find each other. You would locate each other faster in a cupboard than you would in a sports hall. Similarly, diluting proteins out in a larger cell makes them less likely to interact with their reaction partners, perhaps explaining the larger cells' slower pace of life.

But what caused protein production rates to fall behind cell growth rate in the first place? Primarily, it was somehow due to DNA levels becoming limiting as cell volume increased. When the researchers doubled the yeast cells' DNA content, the cells managed to grow to a larger size before the onset of protein dilution; in other words, their protein production rate was able to scale with their growth rate for a longer period of time.

This issue of scaling has been considered before. Cells are composed of several subunits called 'organelles', all performing different roles, including protein production. Some of these organelles are able to 'scale' to the size of the cell; that is, as the cell grows, the organelles also grow at a similar rate. Like the popular children's toys that expand evenly when immersed in water, multiple parts of the cell may therefore grow proportionately. This type of growth is known as 'isometric'. One famous example of an organelle that grows isometrically with the cell is the nucleus.

However, an increase in organelle size does not always correspond to an increase in organelle performance. Mitochondria are, of course, the organelle that launched a thousand memes, with most students knowing them as 'the powerhouse of the cell'. There is a good reason for this accolade; mitochondria produce ATP, a molecule used as an energy source to drive many of the cell's chemical reactions. It has been shown that the number of mitochondria increases with cell volume. However, their optimum rate of activity is only achieved in cells of an intermediate size. Similarly, this latest study has demonstrated that rate of protein production does not scale with cell size once the DNA to cytoplasm ratio becomes too low. Ultimately, there might be an optimal cell size at which this ratio is appropriate to support adequate protein production.

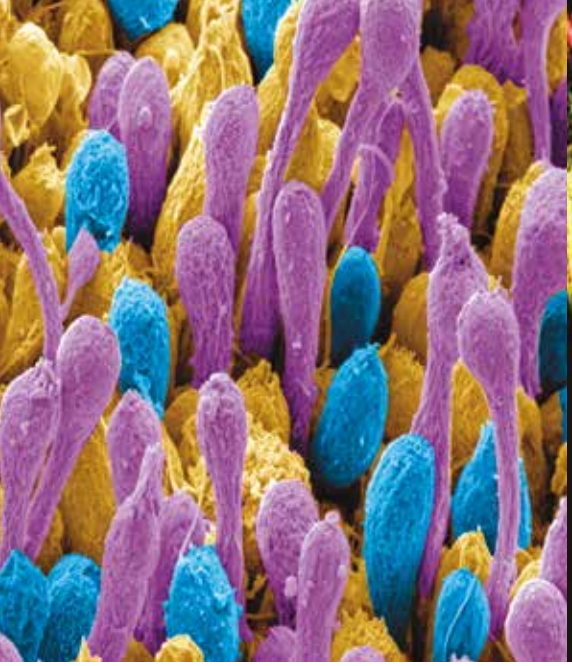
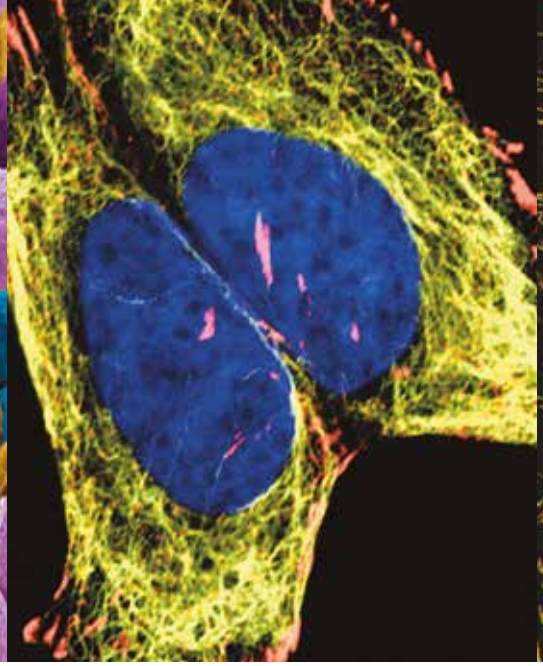
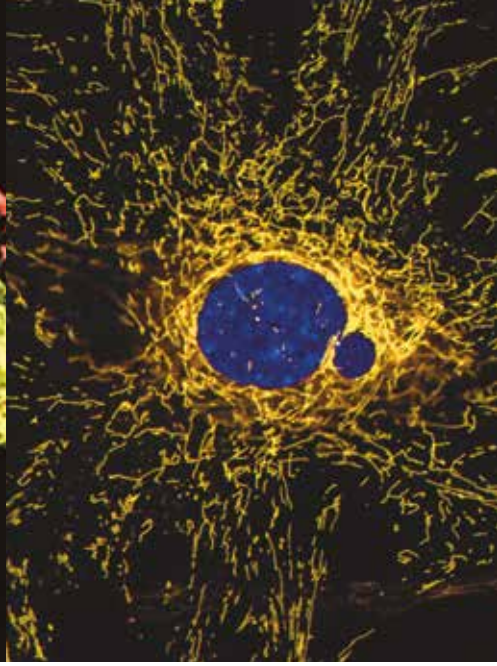
This optimal size may explain why cells become senescent (a state reached when older cells become unable to continue dividing as normal). These ageing cells are larger than their younger neighbours, due to accumulated errors from past cell divisions. The researchers found that old yeast cells behaved like the large ones they had artificially created. They even showed that enlarging human fibroblast cells made them more likely to become senescent and stop dividing. This raises the possibility that cells enter senescence once their size increases to suboptimal levels.

In beginning to uncover why cell size control is so important, this study raises implications for our health when this regulation goes wrong. But the key take-home? Well, always remember to keep things in proportion.

[1] Neurohr, Gabriel E., et al. "Excessive Cell Growth Causes Cytoplasm Dilution and Contributes to Senescence." Cell (2019).

**About the author:**
Having completed a BA in Biological Sciences at the University of Oxford, Laura Hankins stayed on in the city to take up a place on the Wellcome Trust's Chromosome and Developmental Biology DPhil programme. A graduate student at Merton College, she is now in the third year of her PhD in Jordan Raff's lab, where she is studying the process of centriole biogenesis as a model to understand how organelle growth is regulated.

**Comments from our judge, Dr Jennifer Rohn (@JennyRohn) on the winner of the 2019 competition:** The topic was a very abstract, hard-to-describe bit of science that was brought to life and made relevant with some beautiful writing.

# Image Competition 2019

**1st Prize winner: Patrick Ovando Roche, UCL**
Scanning electron microscopy image of a 16-week-old human retinal organoid generated from pluripotent stem cells using bioreactor technology. Image has been pseudo-coloured to highlight rod (Purple) and cone (Cyan) photoreceptor outer-segments, the cell structures of the retina capable of capturing light and transforming it into vision.

I started my training in the Stem Cell field back in 2008 thanks to a generous BBSRC Doctoral Training Grant to do a MRes/PhD in Human Embryonic Stem Cell Biology at Imperial College London under the supervision of Dr Wei Cui. Following completion of my PhD in 2014, I carried out Postdoctoral research at University College London under the supervision of Professor Robin Ali, and at BWH/Harvard Medical School under the supervision of Dr Vikram Khurana. During my time at both institutions I trained in genetic engineering of pluripotent stem cells at the Sanger Institute and established gene editing and organoid differentiation approaches for in vitro disease modeling of retinal dystrophies and neurodegenerative diseases. Currently I work as a Stem Cell Scientist for CRISPR Therapeutics in Cambridge Massachusetts, USA.

**2nd Prize: Lisa Romano, Barts and the London School of Medicine**
The confocal image shows neuroblastoma cells cultured in a fibronectin coated coverslip, which allowed the formation of focal adhesion structure required during cell migration. The labelling is for vimentin in yellow (cytoskeleton), red for focal adhesion marker vinculin and blue staining for nuclei (DAPI).

I graduated with a BSc in Biological Sciences from the University of Florence in 2013. I then undertook an MSc in Molecular and Cellular Biology in Florence. This included an Erasmus Placement in the laboratory of Professor Paul Chapple at Barts and the London School of Medicine, Queen Mary University (QMUL). During the 8 months of my Erasmus placement I was studied the neurodegeneration linked protein sacsin, which is mutated in Autosomal Recessive Spastic Ataxia of Charlevoix-Saguenay. After completing my MSc at University of Florence in 2016 I moved to the UK, where I started my PhD under the supervision of Prof Chapple. I am currently in the third year of my PhD My project, which is funded by ATAXIA UK and ARSACS Foundation, focuses on understanding the molecular function of sacsin. I use a range of different cellular models, including genome edited neuroblastoma cells, human dermal fibroblasts and induced pluripotent stem cells.

**3rd Prize Winner: Alan Prescott, University of Dundee**
Confocal image of a cultured mouse embryo fibroblast from the mito-QC mouse. Mitochondria express both eGFP and mCherry but in lysosomes the eGFP, green fluorescence is quenched. Bright red dots are mitolysosomes. The nucleus is DAPI stained, 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 2019 – Eugenia Piddini

Eugenia Piddini received the 2019 Hooke Medal, established to recognise an emerging leader in cell biology. The Hooke Medal is awarded at the annual spring meeting of the British Society for Cell Biology.

Eugenia Piddini studied at the University of Palermo, Italy, before moving to the European Molecular Biology Laboratory (EMBL) in Heidelberg, Germany, for her PhD on the role of motor proteins in cell shape changes under the supervision of Carlos Dotti. Her postdoctoral work was carried out with Jean-Paul Vincent at the National Institute for Medical Research (now part of the Crick Institute, London). There, Eugenia worked on morphogen gradients during *Drosophila* development and later turned to understanding the mechanisms of cell competition. She became a group leader at the Gurdon Institute, Cambridge, UK, in 2010, to investigate the mechanisms of cell competition in homeostasis and in a tumour–host-cell context. In 2016, Eugenia moved to the University of Bristol, UK, as a Senior Research Fellow and was appointed Professor one year later.

**What inspired you to become a scientist?**
As a child, I was fascinated by different things, many science- related. I dreamt of being an archaeologist because I liked the discovery aspect. But when I was in high school, I became passionate about genetic engineering – or the bits I could understand about it at that time. I was amazed by the idea of making square tomatoes so they would fit better in boxes, things like that. This led me to wanting to understand of how cells work and how we can use that for health and societal benefits. Sicily is a good place to grow up if you're interested in archaeology In fact, my parents had a summer house right by the sea on top of a hill, which was formed of sandstone. Embedded in the sandstone, when you started digging, there were these very beautiful marine creatures, shells and other hidden things. I enjoyed going there as a child to dig and find these fossils and remains.

**How did you decide to do your PhD at the EMBL in Heidelberg?**
I had a really strong desire to leave Italy and experience science abroad, and the EMBL was one of those locations that I dreamt of because it looked fantastic and I wanted to be there. My training was in cell biology and I travelled across certain organelles, so to speak – from mitochondria via the ER to the cytoskeleton; a good voyage inside the cell. At the end of my PhD and for my postdoc, it became central to me to address how the inner workings of a cell become important for the surrounding cells, or cells within a community.

**The beginning of your passion for cell competition and its mechanisms?**
Yes and I think the field of cell competition is really at its prime today. It has only been a few years since it was established and accepted that cell competition is happening across species – for a long time, it was considered a *Drosophila*-only phenomenon – and across tissues as well, from development to adulthood. So it is becoming increasingly clear that it is a fundamental biological phenomenon that can have massive implications for health and disease.

**What questions related to cell competition are you trying to answer in your research group?**
We try to understand the role that cell competition plays in cancer, and for that we use both *Drosophila* and mammalian cell culture models. We are also interested in the physiological contexts in which cell competition may be happening. As an example, in a recent project, we are investigating whether cell competition plays a role in wound closure, and we have evidence that indeed some cells that are involved in wound healing are cleared at the end of the process by cell competition, using pathways that we have previously identified in the lab. In general, the broad question we are trying to address is what is it that is different about the cells that are eliminated by competition when they are no longer so fit? We are looking at cellular defects and trying to understand which of these defects turns them into, so to speak, 'losers'. 'Loser' is the definition we give to cells which are eliminated when a fitter cell population is present.

The cell competition choice to lose a cell can be beneficial or deleterious to the organism – how does this come about? It is a great example of a biological process that has evolved to the benefit of the organism but that can be exploited in pathological conditions like cancer. A tissue that is made of a multitude of cells, which need to live as a community for quite a long time, benefits from quality control; if cells accumulate damage or start behaving aberrantly, it is beneficial in some ways if you have a sentient mechanism that recognises these cells and cleans the tissue of them. This would

therefore be one of the main functions of cell competition – to remove compromised or mis-specified cells. Furthermore, in adult tissues, the first cells that accumulate neoplastic mutations may be recognised and eliminated by competition. This happens in a number of contexts and you can see how this mechanism might be hijacked by a cell when it manages to persuade their neighbours that they're fitter and how this might become a problem for the organism.

**What would be an example of this hijacking?**
One observation goes back to my postdoc in Jean-Paul's lab; during fly development, cells with reduced Wnt pathway signalling activity are eliminated through cell competition as a means to clear mis- specified cells. At the time we also showed that overactivation of the Wnt pathway can result in these cells killing cells that are wild type. The Wnt pathway is overactivated in a number of cancers, particularly in intestinal tumours where a mutation in the adenomatous polyposis coli (APC) gene – a negative regulator of the Wnt pathway – is an early event in tumorigenesis. This led us to hypothesize that cell competition might play a role in the establishment of these tumours. More recently in my group, using an APC-driven Drosophila intestinal cancer model, we have shown that tumour cells with mutations in APC kill surrounding host cells and, if we prevent their ability to kill, they can no longer expand and form intestinal tumours. Thus, in this context, cell competition is hijacked by cancer cells and becomes a driver of tumorigenesis.

**How are these processes controlled through mechanical interactions and their influence on cellular signalling?**
There is accepted evidence now that cells have multiple ways to compete. They may do so through specific ligand–receptor interactions or differences in sensitivity to their mechanical environment. We were able to identify the tumour suppressor p53 as a key sensor for cell competition and mechanical stress. Every cell finds itself in a physical environment and needs to integrate physical information with (bio)chemical information. Therefore, having a general pathway like p53 that is also a node for stress signalling convergence, seems to me like a very evolved, adaptive way to be able to translate stress signalling into mechanical sensitivity. It allows cells that are stressed to be eliminated if they are surrounded by non-stressed neighbours.

**You mentioned that you see the cell competition field is at its prime. Did you anticipate this earlier in your career?**
No, I didn't. It is true that we are not trained to think that way; once you have more experience and a better appreciation for what happens in science around us, it is clear that there are questions that come of age or will be in demand. I was just very lucky; it was a bit serendipitous that I became interested in competition, because it was not something my postdoc lab was working on and we stumbled over it. I was absolutely fascinated by it so I decided to continue working on it and it was a phenomenon that we knew relatively little about, so it was a perfect fertile ground that you want to start on for your independence, and it turned out to be the right strategic decision.

Having a strategy is therefore important advice you would give to someone seeking independence? Senior researchers may have a bit of perspective on the fields and can advise you on what would be a good or a bad choice for an area to be working in. I believe there are three things that are really important in helping to make a scientist successful. One is the research area, but there are also the model system that one uses and technologies and method development that are really transformative. The combination of a good question, a powerful model system and a transformative technology is an ideal recipe to start an independent career.

**Regarding the model system – research in *Drosophila* has, again, proven how powerful 'classic' model systems are.**
This is a really important point, also in terms of thinking strategically: how does one go about answering scientific questions? For me, it is about finding the best system to address a question – if you do that, then it takes care of whether a model system is 'hot' or not. It is unjustified to shut down a model system because of its age, much as it is unjustified to stick to one system because your career was built on that and you're trying to answer any and all questions on that system. Try to be smart about which model system is best suited to answer a specific question. We started as a Drosophila and mammalian cell culture lab; my first postdoc was experienced with flies and the second and third were trained in mammalian cell culture. I thought this was going to be important to allow us to progress and it turned out we were possibly the first lab to combine both systems to work on cell competition.

**What characteristics do you look for when recruiting new group members?**
Who you recruit for your lab absolutely defines how successful you will be. I believe that you can only be as good as the people that you have in your group and I find it essential to recruit scientists that are very excited and driven by the discovery process and are in it because they really enjoy research. Then, working in the lab becomes a blast and having motivated people helps to form a community within your group – it becomes an exciting environment that makes things happen. Unfortunately, when it comes to recruitment, I and many colleagues are currently experiencing the 'Brexit effect', which is not sending a very positive, friendly and welcoming message to international applicants from Europe and all around the world. This is something that comes up all the time when I am at conferences talking to students and postdocs.

**Do you discuss careers outside academia with your students?**
Yes, because I think that we shouldn't be training a generation of unemployed people. Only a few percent of PhD students will go on to become a group leader. What are we going to do, be oblivious to this? Academic research is but one of many career prospects and many are just as exciting. After my PhD, I seriously considered going into consulting. I wanted to do an MBA and move into consulting for venture capitals and I found that incredibly exciting. Had I embraced a career in consulting, I am sure I would have been just as fulfilled and excited as I am now. With that in mind, to me it has never been about 'alternative' careers; it's been about you and your vocation and where your interests take you once you've done a PhD.

**Is this part of your advice to students and postdocs working with you?**
I first want to know what they want to do in their career. Then, I want to make sure they made that decision because they think it is best for them and not because they think that this is all they can achieve. Two of my postdoc alumni have stayed in academia and two left academia to go into the private sector. They were both convinced that this is what they wanted and they are satisfied with their decision.

**How do you get the most out of the meetings you attend, particularly in the early stages of your career?**
Conferences are one of the most exciting things we get to do as scientists. I like to combine the unmissable, topical conferences with the ones that have a much bigger breadth and areas that are not exactly spot on with what one does. For the latter, I just sit back and enjoy the show having all these talks parading and enjoy being impressed by the next discovery I wasn't expecting. I find it very inspiring. With regards to presenting your data, especially early in your career, I feel that what makes a talk successful is disclosing unpublished information because this is what will open up the possibility of collaborations, or someone will come to see you and tell you 'I think you should be looking at x because this is what we have seen etc.'. It is from these interactions that progress sparks.

**Could you tell us an interesting fact about yourself that people would like to find out about you?**
We talked about Sicily at the beginning and that's where I also would like to finish! I'd like to highlight that I am a proud Sicilian. Even though I left home 21 years ago, I still feel every bit Sicilian as I did then and I am very proud of my origins and my heritage. It has shaped who I am in countless ways – the warmth of the people, their passion for life, family values and their communication. I think this all permeates who I am, as well as how I do science.

*Eugenia Piddini was interviewed by Manuel Breuer, Features & Reviews Editor at Journal of Cell Science. This piece has been edited and condensed with approval from the interviewee.*

# Meetings Calendar 2020

## January

**RNA UK**
24–26 January 2020. Windermere, UK

## March

**The Astbury Conversation: Seeing into Cells**
23–24 March. University of Leeds

## April

**British Microtubule meeting**
27 April 2020. Edinburgh

**UK Cilia Network**
28 April 2020. Edinburgh

**Autophagy UK network meeting**
29–30 April 2020. Avon Gorge Hotel, Clifton, Bristol

## May

**Cell Dynamics: Host-Pathogen Interface**
17–20. May 2020. Wotton House, Surrey

## September

**BSCB Annual Meeting 2020**
23–25 September 2020. Institut Pasteur, Paris.

**North of England Cell Biology forum**
Sheffield University

## December

**Actin 2020.** Bristol University

**UK Membrane Traffic meeting.** UCL

**American Society of Cell Biology.** Philadephia PA, USA

# Women in Cell Biology Early Career Award Medal 2019 – Pleasantine Mill

Pleasantine Mill was awarded the Women in Cell Biology Early Career Award Medal 2019. This annual honour is awarded to an outstanding female cell biologist who has started her own group in the UK within the last 6 years.

Pleasantine Mill graduated in microbiology and immunology from McGill University, Montréal, Canada, and completed her PhD in medical and molecular genetics at the University of Toron to, Canada. There, under the supervision of Chi-chung Hui, she studied Hedgehog signalling pathways in skin development and tumorigenesis. For her postdoctoral research, Pleasantine moved to Ian Jackson's laboratory at the MRC Human Genetics Unit, Edinburgh, UK, with a Natural Sciences and Engineering Research Council of Canada (NSERC) fellowship, followed by a Caledonian Research fellowship. Initially focusing on neural crest development, she identified and studied several mouse mutants that displayed defects in ciliogenesis and cilia structure that went on to be implicated in human disease. Pleasantine established her own research program at the MRC in 2014. Her group investigates the genetic programme for cilia structure and function and the links to human ciliopathies.

**What inspired you to become a scientist?**
Both my parents are architects, so I grew up in a very creative and intellectual environment. We drew on the back of napkins at the dinner table, we were always building or creating things, always problem solving with lots of discussions. We travelled lots and visited many museums and galleries. It was a very privileged environment to grow up in. I knew that I didn't want to be an architect – I can't draw a straight line with a ruler! Rather, I wanted to be an astronaut and do space medicine. Then, through phenomenal science teachers at high school and after my first lab experience doing actual research, it really struck me that basic discovery research was what I wanted to do.

**A big aspect in architecture is the beauty of form, shape and pattern. Do you think that sparked your interest in developmental and cell biology?**
Yes. I'm a very visual person and there is something very aesthetic about the type of research we do – symmetries, pattern formation and so on. Dry datasets don't do much for me. They might have a lot of information in them but it is often lost without understanding the context of cellular time and space. Imaging is my secret passion – well, it's not such a secret, is it!

**What questions are your lab trying to answer just now?**
We are interested in the cell biology of cilia. Why are cilia different on different cell types? We think it informs on human disease – patients can have similar mutations in the same gene but very different phenotypes. Studying cilia in cell lines only captures an iota of what's really going on in our bodies during development and during homeostasis in adulthood. Thus, we try to understand the differences between the cilia types that we find in our bodies and what they do in terms of physiology. Ultimately, we're also looking at how these mechanisms can inform on new therapeutics, which is exciting. What we do is cross-disciplinary, maybe multi-disciplinary cell biology on an organismal scale, informed by genetics.

**What has been the most influential publication or work in your field recently?**
What has been most exciting and influential for our field is the movement towards preprint servers like BioRxiv, and the early and interactive discussions amongst the community it has been stirring. It is also immensely empowering for early-career researchers to get DOIs for their work in order to secure funding or get citations while they are in formal review. It makes the system much more dynamic and allows you to adapt some new data or develop new hypotheses early for guiding your own research. A specific example I can think about is a great paper from John Wallingford's and Steven Brody's groups on the discovery of dynein axonemal assembly particles, which are these intriguing phase-separated organelles where dynein subunits dynamically associate with their assembly factors. Genetics had told us that these things were interacting and now there's spatial and temporal information in the cell on how this assembly might

occur. A year later when it was published, the paper had improved with peer review, but had not significantly changed and we had been able to use it early to shape what we're doing, what questions we're asking, where we need to move in the space. Our lab reads a lot, and we read broadly; sometimes, to focus is more difficult for us. [laughs]

**Are there any new techniques that you're adapting for your research right now?**
Cell biology sometimes uses a very heavy-handed sledge hammer approach to look at things; you grossly overexpress proteins and look at their localisation in a cell line. What we've been doing recently is to engineer endogenously tagged reporter mice for key genes of interest, which lets us look at changes in protein composition specifically and dynamically in cilia in an inducible fashion. It allows us to capture a particular snapshot of development or disease process, and to ask what in this population of cilia in this particular region of the brain informs on physiology. It's a very nuanced application of tools that people have developed, but applying it in what we think is an elegant and powerful way to get at disease mechanism with organelle resolution.

**Research communities often distinguish curiosity- and hypothesis-driven research. Would you place yourself in the former?**
I am definitely curiosity driven. You need to really understand the system to be able to ask the right questions. I struggle a little bit with the concept of hypothesis-driven research because it sometimes seems premature; a hypothesis represents the curiosity at later stages well into some of our projects and can drive us to keep going in a particular direction, but it's not the space that we often start with. Being creative is where science makes the leaps and bounds. The language that goes with a hypothesis-driven question and the structure that comes with it in a research proposal is often easier for people to gauge and may be why funding bodies seem to prefer hypotheses-driven applications. But science needs both types – even though I'm certainly curiosity driven!

**What challenges did you face when starting your own lab that you didn't expect?**
From my postdoctoral time with Ian onwards, I always had some independence, especially regarding the setup of a cilia-centered research focus. At the same time, I didn't have to move city or country again to start a new group, and that is something that people often struggle with. I also didn't have to re-establish myself as a group leader, which I think was very helpful and I didn't lose momentum. Moving wasn't really an easy option since I had a complicated mouse colony at the institute and also family engagements, including three young kids and a partner who is also a research group leader. The downside of it, which I think may have been held over me, is that people question your independence because you have stayed in the same environment. I feel it's an unfortunate trend that people feel you have to move to prove yourself. I would argue that – particularly for scientists with children or other familial commitments – this view still represents a handicap for some. I don't think moving is necessarily a good measure of how productive you are as a scientist, nor the most efficient way of doing great science.

*"Being creative is where science makes the leaps and bounds."*

**How are the challenges that you're facing now different?**
It's always about funding and doing more science. On a personal level, you have always got to be thinking two steps ahead with your research to keep your people on, to hire new people, to get new equipment. It doesn't stop. If anything, it starts to ramp up because you realise your productivity has to be more to meet your growing responsibilities. Also, as part of the research community, I have definitely become much more active in outreach and advisory roles. Now more than ever, we need to keep telling the public and funders how important supporting our basic research is.

**How do you go about recruiting group members?**
We've had great luck with people. I'm a big believer in developing people being the most valuable part of what we do in research. The training of students is incredibly important – let different skill sets come forward over time. I have a phenomenal team of people and we are lucky that the MRC unit has an excellent rotation-based PhD programme. The students often come through the lab because they are attracted to the projects and are constantly in exchange with the people who are already in place. I think having a healthy happy lab to start off with always brings more of the same spirit in and encourages creative science.

**What is the best science-related advice you ever received?**
A very helpful piece of advice I got was 'there is no such thing as a dead end in science', which means that there is nothing that you choose that you can't come back from. It came at a time I was slightly frozen in what to do, how to make the right choice between career and balancing the rest of my life. In the end, there is no right answer and nothing that you can't come back from. It helped me to make that decision and continues to help me today – there may be easier ways to do research, but there's never a dead end.

**What advice or guidance do you pass on to your students?**
It's about the individuals going through the lab. We're not just concerned about getting data for our papers when we have PhD students. When

mentoring students, you are building skill sets that are going to allow them to apply this knowledge for whatever they end up doing. I also want to make sure people are happy and grounded to be able to ask the right questions, think critically about their data and where they need to be next. And to be excited about their research! I try to spend time with them trying to make sure it is all coming together somehow and they're not just stalled – that it's not just about the data for a thesis but about a bigger picture and the training too!

**How do you achieve a work–life balance when you're trying to establish yourself as an independent investigator?**
The difficult thing with science is that you always think there is going to be a better time – you are going to get that paper and you are going to get that grant, it's all going to be sorted and that will be the time. The thing is: life is short. You do not know what is going to lie ahead tomorrow, next week, a year away, so you need to make sure you are happy with where you are at each moment. Of course, it's never perfectly balanced – I like to say we are always one step ahead of total chaos – but the kids are happy, we're happy and we seem to be doing okay. I'm not sure it is a balance, but it has worked so far.

**How do you get the most out of the meetings you attend, particularly in the early stages of your career?**
Conferences are absolutely key; by meeting people from your field, you get conference 'buddies' who will follow you throughout your career and that you will become close to, and they will be future reviewers for grants, for papers and everything else. It is about establishing a diverse network of contacts in terms of fields, nationalities and career stages. At the same time, you also meet a lot of people who are in a similar situation of starting their own group, and any exchange of thoughts and experiences provides help. Of course, when you have kids, your ability to travel goes down and it is hard to balance those things, but if you can do it and find ways to do it with childcare, it is definitely worth it.

**Could you tell us an interesting fact about yourself that people wouldn't know by looking at your CV?**
I'm Pleasantine the 6th. My mother is Pleasantine, my grandmother is Pleasantine and so on...It is a name that goes via the eldest daughter in a family. Luckily, I have all boys so the onus of tradition wasn't on me! [laughs].

*Pleasantine Mill was interviewed by Manuel Breuer, Features & Reviews Editor at Journal of Cell Science. This piece has been edited and condensed with approval from the interviewee.*

# Most-read JCS articles (October 2018–September 2019)

**Research Articles:**

1. Actin cytoskeleton self-organization in single epithelial cells and fibroblasts under isotropic confinement
Salma Jalal, Shidong Shi, Vidhyalakshmi Acharya, Ruby Yun-Ju Huang, Virgile Viasnoff, Alexander D. Bershadsky, Yee Han Tee; Journal of Cell Science 2019 132: jcs220780 doi: 10.1242/jcs.220780
https://jcs.biologists.org/content/132/5/jcs220780

2.The ER membrane protein complex promotes biogenesis of sterol-related enzymes maintaining cholesterol homeostasis
Norbert Volkmar, Maria-Laetitia Thezenas, Sharon M. Louie, Szymon Juszkiewicz, Daniel K. Nomura, Ramanujan S. Hegde, Benedikt M. Kessler, John C. Christianson; Journal of Cell Science 2019 132: jcs223453 doi: 10.1242/jcs.223453
https://jcs.biologists.org/content/132/2/jcs223453

3. Nuclear envelope localization of PIG-B is essential for GPI-anchor synthesis in Drosophila
Miki Yamamoto-Hino, Eri Katsumata, Emiko Suzuki, Yusuke Maeda, Taroh Kinoshita, Satoshi Goto; Journal of Cell Science 2018 131: jcs218024 doi: 10.1242/jcs.218024
https://jcs.biologists.org/content/131/20/jcs218024

**Reviews:**

1. p62/SQSTM1 – steering the cell through health and disease
Pablo Sánchez-Martín, Masaaki Komatsu; Journal of Cell Science 2018 131: jcs222836 doi: 10.1242/jcs.222836
https://jcs.biologists.org/content/131/21/jcs222836

2. p62-mediated phase separation at the intersection of the ubiquitin-proteasome system and autophagy Alberto Danieli, Sascha Martens; Journal of Cell Science 2018 131: jcs214304 doi: 10.1242/jcs.214304
https://jcs.biologists.org/content/131/19/jcs214304

3. Reconstituting the reticular ER network – mechanistic implications and open questions Ning Wang, Tom A. Rapoport
Journal of Cell Science 2019 132: jcs227611 doi: 10.1242/jcs.227611
https://jcs.biologists.org/content/132/4/jcs227611

**Features:**

1. Cell scientists to watch – Gloria Brar and Elçin Ünal; Journal of Cell Science 2019 132: jcs229260 doi: 10.1242/jcs.229260
https://jcs.biologists.org/content/132/2/jcs229260

2. Cell scientist to watch – Siobhan Braybrook; Journal of Cell Science 2018 131: jcs225607 doi: 10.1242/jcs.225607
https://jcs.biologists.org/content/131/20/jcs225607

3. Cell scientist to watch – Vaishnavi Ananthanarayanan; Journal of Cell Science 2019 132: jcs234088 doi: 10.1242/jcs.234088
https://jcs.biologists.org/content/132/11/jcs234088

*Manuel Breuer*

# A Day in the Life of a Science Journalist

The BSCB postodoc and PhD reps organised an excellent careers round-table as part of the BSCB annual meeting this year. As part of this we are featuring a day in the life of a science journalist, *Journal of Cell Science* Executive Editor Sharon Ahmad.

**05:30**
My husband takes our children to school in the morning and I pick them up in the evening, so I have an early start and early finish. I'd prefer not to get up this early every morning, but it's the only time I have to fit in some exercise; with a job that involves a lot of desk time, I think it's important. I head to my gym class.

**07:30**
Arrive at the office. I work a compressed week – full-time hours over four days – which means I need to be in quite early. I start up my computer and look through any emails that might have come in overnight. There is nothing urgent I need to respond to right away, so I pull up my to-do list and organise what I need to get done today.

**08:00**
I start by replying to emails – I go for the easy wins to get them out of my inbox. I then tackle some of the more complicated ones, such as adding my thoughts on an email string about possible options for a cross-journal project we are working on (The Company of Biologists publishes five journals). I also narrow down which papers from our most recent issue I plan to write research highlights on and let the copy editors know. The Editor-in-Chief is preparing an editorial about some recent changes we have made on Journal of Cell Science and would like my input on it, so my next task is to go through it and suggest some edits.

09:00
We have a meeting with all the journal managing editors and the Publisher on alternate Tuesdays, and this is one of those Tuesdays. To prepare, I look over the agenda, print out the papers I'll need and go through them all, making notes on things I want to bring up in the discussions.

10:00
Managers' meeting. This meeting is key to ensuring that all of us are on the same page about projects, and gives us the chance to update each other on journal-specific issues and get feedback where necessary. Today, one of our main agenda items is a discussion on what we need to prepare for the upcoming annual strategy session with the Board of Directors. The Publisher also reminds us that we need to start thinking about setting our budgets for next year. We have a few staff updates, and for AOBs today, we discuss the date for the next pot-luck lunch – a fairly regular, and popular, occurrence in the Company. That takes us to noon, and as we set a time limit of two hours for the managers' meeting, we hold over additional items for next time.

**12:00**
I catch up on emails that have come in during the time I've been away from my desk. There is a request from the Publication Ethics Coordinator to meet later this afternoon to discuss a tricky case involving the figures in one our papers, so I set a time with her for that and put a reminder in my calendar.

**12:30**
We often have 10-minute talks in the Company, when different people talk about the specifics of their role, or the Publisher gives updates on Company-wide initiatives. They are casual and informal, and people bring their lunch along. Today the Publisher is talking about our charitable grants, which include small and large meeting grants, grants to scientific societies (like the BSCB) and travelling fellowships for collaborative visits to other labs. It's really useful information for new starters, but a good reminder for me that our charitable giving is just one of the reasons I'm proud to work for The Company of Biologists.

**13:00**
Journal of Cell Science front-section-team meeting. I have a regular catch-up meeting once a month with my whole team, which includes Editorial Administrators, Copy Editors and Reviews Editors, but today it's just with my Reviews Editors. We discuss commissioning ideas for reviews for what we call the 'front section' of the journal. Many of the ideas come out of a conference from which the Senior Editor has just returned. We discuss these ideas in the context of our 'pipeline' of articles, to ensure we're covering the right areas. We discuss the conference as well, and where each of us is going next. Finally, we run through our list of whom

we want to include in our 'Cell Scientist to Watch' interview series in upcoming issues. It's a quick meeting today, which is great, because I still have a lot of work to do.

**13:45**
I can finally settle down to the big chunk of work I want to tackle today: preparing my annual journal report to the Board. The Editor-in-Chief writes about the health of the journal and strategies for the future in this report, but before we can have our discussions about what strategic direction we want to take, I have to pull together all the statistics for the previous year. I enjoy doing this as it gives me a good overview of the journal but, as usual, I don't have a huge amount of time to spend on it. I get stuck in, and before I know it, my calendar reminder pops up, prompting me to attend my meeting about the ethics case.

**15:00**
The ethics case is indeed complicated. We go through all of the data together and agree on a decision. The Publication Ethics Coordinator will email the Editor-in-Chief a summary and, if he agrees, we can hopefully close the case.

**15:30**
Back to my desk. I now have a long string of emails I need to deal with. As usual, I do the easy wins first, then the ones that require more thought. A few will need to wait until later, and I flag them so I'll be able to identify them quickly. I then look at all the manuscripts that have come in since yesterday and assign them to the different Editors based on the topic – all of our research papers are handled by academic Editors. I pop in to the Production Manager's office for a quick chat about a new website project I'm about to start managing, and he offers to run through a project-management presentation with me that he has prepared. I gratefully accept and we set up a date to do that.

**16:30**
Time to go. I pack up my laptop and head off to pick up my children. The next four hours are an exhausting whirlwind of dinner, homework, activity drop-offs and pick-ups, preparing lunches and school bags for the next day, and bath-and-bedtime routines. Sometimes I find it more relaxing being in the office.

**20:15**
It's finally quiet again, so I open my laptop to check my emails again. Because I leave the office relatively early, I like to catch up on a few things now rather than having to add them to the list in the morning.


And so to bed. Early rising means an early bedtime, but I'm a morning person, so it works well for me. I even have a bit of time to read more of my book-club book. It has been a full day, but I feel lucky to have a job that I love – challenging, busy and always interesting!

# The implications of 'Plan S'

Laura Bellingan examines a new push by funders to make all the research they support open access by January 2020.

The ambition to make the output of publicly funded research and scholarship freely available to all crystallised at the beginning of the century. It has since been adopted by a significant number of private and charitable funders of research, while academic publishers, particularly learned society journals, have developed mechanisms to support greater public accessibility. This has been mainly online in the form of open access (OA) publishing. Here, typically the cost of publishing a paper is borne by the author or research funder (via an 'article processing charge'). This means the publisher can make that paper available for free rather than selling access to it via a journal subscription.

If this sounds easy, it hasn't been – especially for the learned societies building and running international journals. Progress towards an OA world has been most rapid in the biomedical sciences, but despite significant growth in the number of journal articles freely available, and indeed the number of full OA journals where all content is freely accessible, progress still feels slow for those enthusiastic for change.

Towards the end of last year a new initiative emerged called 'Plan S', led by a coalition of more than a dozen research funders and international charities based mainly in Europe (known as 'cOAlition S'). They have mandated that all outputs of their funded research programmes, from January 2020 onwards, be published via an immediate and

fully OA route.

In other words, any researcher receiving funding from this coalition of funding bodies must publish in a fully open access journal. This excludes hybrid journals – traditional subscription-based journals that offer the option of publishing via OA.

While greater accessibility to scholarly output is supported across our sector, there are aspects of Plan S that raise concern with learned communities in particular.

"The main concern of the BSCB and BSDB is that it will hurt not-for-profit publishing such as COB and Portland Press that supports BSCB, BSDB and Biochemical Society through block grants for many activities. In our joint officers meeting the BSCB and BSDB have suggested that the societies had to take a stance through RSoB."

It is likely that the Plan S ambition will hinge on whether other big research blocks – China, the US and so on – join cOAlition S. The majority of authors will need to balance their journal choice (made for a variety of reasons of reputation, visibility and community) with accessibility policies and available funding.

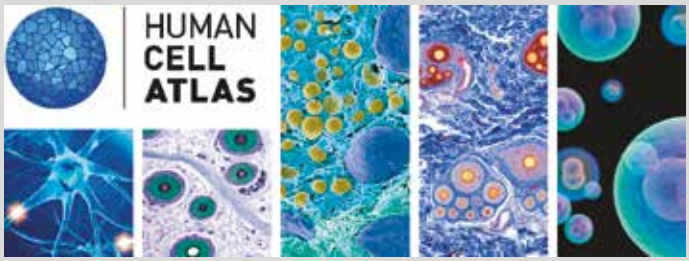
It has certainly rebooted the debate. The Royal Society of Biology is gathering views from across the sector and will be keeping abreast of developments throughout the year.

*Laura Bellingan FRSB is Director of Policy and Public Affairs at the RSB.*

*First published in The Biologist 66(1) p9*

# The Human Cell Atlas

The Human Cell Atlas aims to transform biological research by creating a comprehensive atlas of all human cells as a basis for both understanding human health and diagnosing, monitoring, and treating disease.




Using multiple ' omics approaches' and cutting edge bioinformatics to chart the types and properties of all human cells, across all tissues and organs, the Human Cell Atlas Project aims to efine the exact characteristics of every single cell type in the human. It has been compared to the Human Genome Project in its scale and ambition.

The current aims of the Human Cell Atlas in engaged in tackling these major challenges:

- Understanding human development, by creating a pilot atlas of selected developing human tissues. This work has been developed in a collaborative consortium between Newcastle University and the Wellcome Sanger Centre, and is termed HDCA
- Creating a highly detailed atlas of the skin.
- A spotlight on immune-related diseases such as Inflammatory Bowel Disease and coeliac disease.

The Human Cell Atlas (HCA) is an international collaborative consortium, steered and governed by an Organizing Committee, spanning 27 scientists from 10 countries and diverse areas of expertise. The HCA Organizing Committee is currently co-chaired by Dr. Aviv Regev of the Broad Institute of MIT and Harvard (USA) and Dr. Sarah Teichmann of the Wellcome Sanger Institute (UK). The HCA is a foundational, open resource charting cells, tissues, organs and systems throughout the body. By making the Atlas freely available to scientists all over the world, scientists hope to transform r esearch into our understanding of human development and the progression of diseases such as asthma, Alzheimer's disease and cancer. In the future, the reference map could also point the way to new diagnostic tools and treatments.

For more information about The Human Cell Atlas, visit https://www.humancellatlas.org.

A recent overview of the Human Cell Atlas is published in eLife: Aviv Regev, Sarah A. Teichmann, Eric S. Lander (2017) Science Forum: The Human Cell Atlas. eLife 2017;6:e27041 DOI: 10.7554/eLife.27041

A review of the aims of the HDCA is published in Development: Sam Behjati, Susan Lindsay, Sarah A. Teichmann, Muzlifah Haniffa (2018) Mapping human development at single cell resolution. Development doi: 10.1242/dev.152561

# Meeting reports

## Joint BSCB–BSDB 2019 Spring Meeting Report

From April 7th to April 10th 2019, the two societies have joined hands again to organise a fantastic meeting at the University of Warwick. As student and postdoc reps, we had the opportunity to organize scientific and social events for the early career scientists.

### Career Workshop - Sunday afternoon

The meeting started off with a career workshop, which was held in a 'roundtable' format, where participants can pick three tables to talk to table leaders working in various science-related careers. As the organisers, we wanted to present a wide-range of career options, therefore for non-academia careers, we tried our best to find alumni of BSCB and BSDB who had the experience of doing a PhD or postdoc. We ended up with a great line-up of table leaders, who work in fields ranging from industry, communications, publishing, patent law, and funding and science policy.

Even though the career workshop was the first event on the Sunday of the meeting, there was still a great turnout of over 80 participants! The workshop began with each table leader giving a short introduction of themselves. Then the three rounds of 25-min discussion time started, and immediately the room settled into deep conversation. The two-hour workshop passed by very quickly, and at the end, we asked all the table leaders to stand in a line and give one piece of advice. As the organisers, even though we did not join in the roundtable discussions, just by listening to what the table leaders said at the end, we felt like we have also benefited from the workshop! The invaluable take-home messages include: join the committee of a society to gain experience, a career in industry does not equal job security, and on the flip side, a position in academia can be competitive, but there are still various opportunities available. The general advice is that no matter what career one pursuits after a PhD/ postdoc, the transferable skills you gained during a research-based experience will always benefit you in one way or another.


The feedback we had from the participants were very positive. They said the format of roundtable gave them a chance to talk to more people from different careers, and the table leaders gave very insightful details about their jobs, and most of all, they were very honest about the pros and cons of their chosen career. We were very grateful to all eleven table leaders who were willing to sacrifice a Sunday afternoon to come and talk to our participants!

### Student/postdoc evening - Sunday evening

The first evening of the conference is traditionally the time we reserve for a relaxed social event – a way for students and postdocs to meet each other, and ease into what will invariably be a hectic whirlwind of science and networking over the next two and a half days.

This year, we hosted a traditional pub quiz – that culminated in a rather active group challenge, building a tower of balloons with just a roll of adhesive tape. Scientists always love a competition, and it didn't take long for people to join a table, develop strong loyalties for their new friends, and start frantically scribbling down their answers! Looking back, we think it's fair to deem the event a success – people kept chatting long after we started scouring the room for balloon fragments, and had to eventually be gently nudged towards the bar downstairs.


## Graduate Symposium - Monday afternoon

The graduate symposium was dedicated to give early career researchers the opportunity to speak. The format was six 3-min flash talks, sandwiched by four 15-min long talks. The speakers selected from abstracts had a good balance of subject area, gender and nationality. The Graduate Symposium started with Nestor Saiz (Sloan Kettering Institute), who talked about his work on investigating the robustness in mouse blastocyst patterning, through modelling and manipulating tissue size and cell number. Next up was Laura Hankins (Dunn School of Pathology), who discussed her fascinating work on how two coupled cell-cycle-autonomous oscillators can ensure centriole growth is coordinated during biogenesis. Laura went on to win the BSCB poster prize later in the conference!

The two long talks were followed by a series of six 3-min flash talks. The idea of a flash talk is to allow speakers to briefly introduce their work, and encourage interested audiences to go visit their posters. Even though there was limited time, every flash talk speaker managed to convey the main idea of their projects in a concise and clear manner. We as organisers were very impressed and grateful with their abilities to stick to the 3-min time limit!

Across the six flash talks, we heard Silas Boye Nissen (Niels Bohr Institute) telling us about how four simple rules are sufficient to reproduce mammalian blastocyst dynamics in silico. This was followed by our only bacteria-related talk of the symposium, where Camilla Godlee (Imperial College London) talked about using systematic mutagenesis to investigate the membrane integration and trafficking of the Salmonella virulence protein SteD. We then switched gears to learn about how a two-pronged mechanism generate non-centrosomal microtubule arrays from Ghislain Gillard (MRC LMB). Susana Ponte (CEDOC/NOVA) then talked about the role of mitochondrial dynamics during wound closure in Drosophila embryo epidermis. William Hill (Cardiff University) then discussed his work on how cell-cell interactions and EphA2-depending signalling are required to eliminate Ras-transformed cells from the pancreas. The final flash talk speaker was Henry De Belly (MRC LMCB), who talked about the cross-talk among membrane mechanics, cell shape and fate decisions in mouse ESCs.

After the flash talks, the symposium continued on with a 15-min talk given by Daniel Toddie-Moore (University of Helsinki). He told us about how in the Drosophila pupal wing, cell shapes changes and upstream BMP signalling are coupled to refine signalling range and determine cell fate of the crossveins. The final talk of the symposium was given by Sabrina Ghadaouia (University of Manchester), who discussed her work on blood vessel formation in zebrafish embryos, specifically how endothelial cells integrates collective cell migration and cell division control. Overall, the talks at the Graduate Symposium had a good balance of developmental biology and cell biology areas.

## Meet the Speakers- Monday night

At a large society meeting, it's always tricky for the organisers to ensure that all the attendees have a chance to meet and chat with their favourite speakers. This year, we devised a new twist on the traditional "meet the speakers" networking event. Attendees were given a "passport", and, each time a bell was rung, had to find somebody new to talk to and collect a sticker. Of course, it wouldn't work to simply chat with your friends – only the speakers had stickers to give out! Filling out your passport would qualify you to enter a prize lottery. Although it took a couple of rounds for everybody to get the hang of the system, the event really hit its stride about 30 minutes in. People said they spoke to far more people than they would have ordinarily – though they did wish individual conversations could have been a bit longer!

*Joyce Yu and Gautem Day*

# 11th Telomere and Telomerase meeting

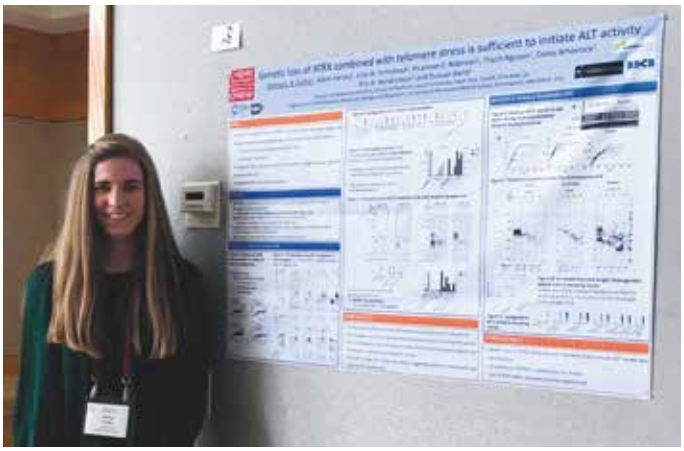
30 April – 4 May 2019. Cold Spring Harbor laboratories

This meeting is the biggest international conference on telomere biology. It covers a wide range of topics, from replication at telomeres to the alternative lengthening of telomeres, which is a pathway utilised in 10–15% of cancers and is the basis of my PhD project. This was the reason I most wanted to go to this conference as there were ten talks and numberous on the subject, and I I knew I would learn a lot by interacting with people with similar interests.

Meetings at CSHL are always organised in the same way: the first set of talks started at 7.30pm on the first day. The remaining days started at 9am with talks on a different topic each time followed by a poster session in the afternoon and finally more talks at 7.30pm. All talks were sorted by theme but there was inevitably some cross-over between each of those which meant that each session contained relevant research to my project. I also learned a lot of new aspects of telomere biology I was unfamiliar with.

I was given the opportunity to present my work as a poster which I did on the second day. About 60 posters were up at one time and the session started at 2pm. I was extremely encouraged and happy that fellow scientists were interested in my research and there was a constant flow of people until 4.30pm. I found the experience very formative and valuable as I explained my research to people at various stages in their career that were experts in ALT or simply had an interest in it. It was also a great platform to discuss other aspects of telomere biology and potential ideas for future research. I also found the second poster session informative as I was not presenting and I was able to talk to many presenters and able to ask a lot of questions which gave me a lot of ideas for future work.

On the last evening a piano concert was organised followed by a banquet and being on the East coast lobster was an option, which I gladly accepted! This last dinner was another great way to socialise and interact with more people. This was my first international conference and overall, I really enjoyed attending this meeting and have gained a lot from it and it has further fuelled my desire to pursue a career in research. I found this conference stimulated the exchange of ideas in a friendly environment and I felt encouraged to ask questions. I am very grateful to the British Society for Cell Biology for awarding me the Honor Fell travel award to attend the meeting which made my presence at this meeting possible.



*Helene Geiller*

# 4th British Microtubule Meeting

13th May 2019, Edinburgh

As a researcher in the microtubule field I always look forward to the British Microtubule Meeting, set in the gorgeous city of Edinburgh with its fantastic architecture and vibrant culture.

Being on a Monday, many attendees take the opportunity to spend the preceding weekend exploring Edinburgh, and its hidden gems including whisky houses, late night Scottish folk music and Haggis Cigars (subject to personal preference). The meeting itself gives the British research community working on all aspects of microtubule biology an opportunity to discuss their work and network in a friendly and relaxed atmosphere. The meeting includes talks and poster presentations from a diverse

array of microtubule researchers, including structural, cell and molecular biologists.

This year, session one, chaired by Pleasantine Mill, began with Stephen Royle of Warwick asking how microtubules are stabilised in mitotic spindles. He described a mesh-like network bridging kinetochore fibres composed chiefly of clathrin, TACC3 and ch-TOG is under the regulation of Aurora-A kinase. The work included an exciting new ferritin-tag based approach to locating intra-cellular targets by correlative light and electron microscopy. Elena Poser from the Barr Lab in Warwick then showed their work on Kif4A regulation in mitotic spindle alignment including how condensin and PRC1 interact with its tail domain. Vicente Jose Planelles-Herrero from the Derivery Lab at the MRC-LMB then shared their work in on how mitotic asymmetry in Drosophila is regulated by Elongator complex interactions with spindle microtubules. Next up, Sarah Trinclin from the Thèry-Blanchoin lab in Grenoble presented fascinating work suggesting that the force of walking motor proteins can remove tubulin subunits from microtubules, creating defects that can be repaired by addition of new tubulin dimers. The session was wrapped up with James Bancroft from the Gruneberg Lab in Oxford discussing how Protein Phosphatase-1 promotes metaphase to anaphase cell cycle transition.

Following a short break of networking over caffeine and sucrose, the 2nd session was chaired by Simon Bullock. Firstly, Alex Fellows from the MRC-LMB Carter lab introduced how disease-linked endosome axonal transport deficits are modulated by insulin-like growth factor 1 receptor signalling, possibly via altering BICD-1 dynein adaptor levels. Next up, Katerina Toropova from the Roberts Lab at Birkbeck College presented beautiful cryo-EM work on the dynein-2 complex and its assembly and arrangement within intraflagellar trains. Maximilian Jakobs from the Franze Lab in Cambridge then showed how dynactin localisation at axonal tips works to uniformly organise microtubules and further introduced useful automated microtubule kymograph analysis software (KymoButler). Finally, the EMBO YIP lecture was given Minhaj Sirajuddin from Bangalore, deviating from his original title to introduce exciting novel fluorescent live cell markers recognising post-translationally modified tubulin.

After a break for some lunch and a wonderful poster session, a meiosis-themed 3rd session kicked off, chaired by Binyam Mogessie. Kayoko Tanaka from Leicester spoke about the molecular organisation behind microtubule anchoring in the peri-centriolar matrix during fission yeast meiosis. Mariana Costa from the Ohkura lab in Edinburgh shared their work on the remodelling of the spindle molecular architecture, including microtubule-associated proteins, that occurs during fly oocyte meiotic metaphase arrest. Completing the session was Kirsten Garner from the Allan Lab in Manchester describing a new adaptor protein, KASH5, and its structural elements responsible for recruiting dynein/dynactin to the meiotic nuclear envelope.

After another comfort break, Jacqui Bond introduced the final session. Daniel Dodd from the Mill lab in Edinburgh shared their studies of axonemal dynein post-transcriptional regulation in a primary ciliary dyskinesia mouse model. Alex Zwetsloot from Anne Straube's lab in Warwick then presented their investigations of bidirectional transport driven by the cooperative interactions of dynein and kinesin-3. The final talk of the day was Alex Cook from the Moores group at Birkbeck describing the unique structural and functional features of a malarial kinesin-5 and their tantalising implications for targeted pharmacology.

As is tradition, drinks, an informal dinner and a good-humoured but hotly contested quiz on the Edinburgh campus followed the meeting, giving attendees a great opportunity to better acquaint themselves with fellow UK-based microtubule researchers. Suiting 3D-printed microtubule models were presented to quiz and poster prize winners. Another great year was concluded, with much learnt and shared and many new friends and colleagues made.

*Joe Atherton (Birkbeck College, London)*

# Cell Dynamics: Organelle–Cytoskeleton Interface

19–22 May 2019. Lisbon, Portugal

Following a hugely successful inaugural *Journal of Cell Science* Cell Dynamics meeting in May 2017 on the membrane–cytoskeleton interface, we held our second Cell Dynamics meeting in May 2019, this time focusing on the topic of Cell Dynamics: Organelle–Cytoskeleton Interface.

We had 130 delegates come together in beautiful Lisbon, Portugal to talk science, network and make new connections and collaborations. We opened the meeting with our two EMBO-sponsored Keynote Speakers: Pietro de Camilli (Yale University & HHMI, USA) and Jennifer Lippincott-Schwartz (HHMI Janelia Research Campus, USA), who is also an Editor on *Journal of Cell Science*.

The 'speed dating' ice-breaker event on the first evening, during which early-career and senior researchers had blocks of 5 minutes to speak to people they didn't know, set the tone for the meeting perfectly. The sun was shining and feedback from all who attended was fantastic – many commented that they would like to see this event at every meeting.

Early-career scientists had lots of time for interactions with more senior researchers at the breaks and poster sessions and were able to showcase their work during the poster flash talks.

We also had some career talks from both an academic and an editorial perspective.

We heard exciting talks on a range of topics, including neurodegeneration, imaging, mitochondrial dynamics, septins, actin and the nucleus. There were lots of unpublished data presented, and lively question periods. This meeting promoted open discussion and the exchange of ideas in a friendly and welcoming environment, and we have had some fantastic feedback from attendees:

*"Respect to Journal of Cell Science for putting together such a celebration of science."*
Irina Kaverina, Vanderbilt University, USA

*"It was a wonderful, first-class meeting. I greatly enjoyed it."*
Daniel Starr, University of California, USA

We are already looking forward to the next *Journal of Cell Science* Cell Dynamics meeting at Wotton House, Surrey, from 17–20 May 2020 on the topic of Cell Dynamics: Host-Pathogen Interface. We have an outstanding group of speakers who study a diverse range of pathogens and cellular processes, as well as how hosts respond to infection. As in previous years, we plan to include a large number of talks picked from submitted abstracts, and will provide lots of time and opportunities for early-career researchers to highlight themselves and their work. We hope that you will join us!

*Manuel Breuer*

# The Invadosome consortium: 7th meeting

## 19–22 June 2019. University of Roehampton

The 7th meeting of the Invadosome consortium, entitled Integrated mechano-chemical signals in invasion, was organised in collaboration with the University of Roehampton in London.

The meeting included non-overlapping sessions addressing various aspects of the regulation of invasive migration including cell adhesion, cytoskeletal remodelling, mechanobiology and genomic regulation of invasion. During the sessions, the main speakers and those selected from the submitted abstracts presented current data regarding different mechanisms of invasion in a great variety of cell systems, from neurons to haematopoietic cells to aggressive cancer cells. The participants generated an excellent atmosphere for open and constructive discussions during the talks and the lively poster sessions.

The work presented at the meeting addressed the signalling pathways that regulate those better known mechanisms of cell

migration such as filopodia, lamellipodia and invadosome (invadopodia and podosomes)-mediated as well as new mechanisms such as tumour invasion facilitated by "strangulation of tumours" by fibroblasts or passive dissemination of cancer cells via the interstitium. The first 3 days highlighted the latest findings on the critical roles of actin filaments and microtubules in cell migration. Additionally, other components of the cytoskeletal system such as septins, were introduced as new key players in regulating formation of classical invasive adhesions such as invadopodia.

New high resolution microscopy technologies that enable a further understanding of the structure and regulation of cell adhesions and cytoskeletal remodelling were also reported. These new technologies have led to new discoveries on the structure and physical properties of focal adhesions and invadosomes such as the presence of a characteristic molecular cap on the podosome core.

A round table at the end of the 3rd day of the conference fuelled a very dynamic discussion involving the panel and the audience alike that reviewed the latest findings in the field and possible future lines of investigation. It became evident from this discussion and during the talks at the meeting that the field would benefit from further collaboration and agreement on the experimental procedures and analysis of invasive structures. There is a commitment from the Invadosome consortium to promote the development of tools to foster these collaborations (probably in the form of an interactive online resource). An additional aspect highlighted was the current extraordinary opportunity to generate translational projects by applying all the knowledge from the basic research in cell invasion accumulated in the last two decades. For example, several therapeutic interventions were proposed to prevent cancer metastasis by interfering with the formation of invasive adhesions as well as with the cellular interactions that promote cell mobilisation.

The emerging role of the regulation of various cell organelles such as mitochondria or the nucleus that coordinate several cellular functions like metabolism, cell cycle progression or gene expression during cell migration was also highlighted at the conference. The key role of the interplay between the adhesome and transciptome and even the genome axis to regulate cell migration and the overall cell behaviour was extensively covered during the last day of the meeting. The presentations made evident that critical proteins classically associated with cell adhesions can also play a direct role in regulating gene expression by translocating to the nucleus and viceversa. This is an emerging and exciting angle for the study of cell migration that will surely expand in the nearby future.

The meeting was a great opportunity to review the current state of the field and future directions and the atmosphere for discussion and collaboration was exceptional. A special issue dedicated to this meeting will be issued in the European Journal of Cell Biology that will published in 2020 and the next meeting of this exciting series will take place in France in 2022. See you there!

http://invadosomes.org

*Yolanda Calle-Patino, Senior Lecturer, University of Roehampton*

# Gordon Research Seminar & Conference on Molecular Membrane Biology

13–19 July 2019 . Proctor Academy in Andover, NH United States.

I am a biochemist in my 3rd of 4 years PhD at the University of Bristol, UK, working on protein transport from the endoplasmic reticulum to the Golgi apparatus. Thanks to the funding of the BSCB, I could attend my first ever conference in the USA.

A bit secluded in New Hampshire lies Proctor Academy, host of many Gordon Seminars and Conferences. The campus is composed of several wooden houses accommodating both post-graduate students, as well as PIs in the same building complexes in form of shared rooms with two beds (or if you are lucky to book early enough you have a room to yourself). While the shared bathrooms did surprise me, it was a great location for hosting this event surrounded by hills, lakes and forests.

## Gordon Research Seminar

The conference started with a 2-day seminar, where only post-graduate students were invited to attend and present their posters and/or talks. The keynote presentation was held by Nobel prize winner Randy Schekman. I had a great time with my fellow PhD students and postdocs. It is great to meet so many new people from all over the world who are at the same stage in their career as yourself. The seminar ended with a mentoring slot, where we were free to ask questions to two PIs about the transition from PhD to postdoc and then to PI, which was very informative and inspirational. During the first free time we got (between GRS and GRC) my group of new acquaintances and I decided to go for a little hike and a swim in the nearby lake. The weather was overall very warm for someone from the UK. I thoroughly enjoyed every bit of sunshine I could get, and the lake was perfect swimming temperature. It was amazing to meet other young researchers in this more casual arrangement and I was able to bond with many of them in a way I don't think is as easily possible during normal conferences. I highly recommend the seminar to anyone; it is a great place to make lasting friends for both your scientific and personal live.

## Gordon Research Conference

The days were scheduled with an early breakfast around 8, followed by sets of talks starting at 9am, with coffee break and lunch break after every 4 speakers (talks were 10 – 20 minutes + half discussion). Free time was after lunch from 1:30 – 4pm every day, followed by 2 hours of poster session. The posters were scheduled to be hung up for 2 days, with one day of presentation – regardless, most people presented their posters on both occasions including some after dinner. The food was overall good with buffets covering both vegetarian and non-vegetarian options and fresh fruit (I, however, did notice how the quality in food went drastically up from the GRS (toast with fried egg) to the GRC (Belgium waffles and American pancakes and maple syrup). In the evenings the bar was open and invited for more conversations.

To my positive surprise, there was also an activity programme you could sign up for, including hikes, wine-tasting, horseback riding, stand-up paddle boarding and kayaking (the later 3 for $40 each) to do during the after-lunch free time. They also had a gym, tennis, American and non-American football courts, a pool table and piano on campus. There were plenty of networking possibilities from sitting next to someone new during meals, while walking between the talk/poster/drinks and meal venues and during free time activities.

It was a great event to attend with many amazing scientists and informative and thought-provoking presentations. I received a lot of input and suggestions regarding my research and positive feedback from people visiting my poster, as well as invitations for potential future job opportunities and collaborations. I can undoubtedly say that I left the conference inspired, encouraged and with more self-confidence towards my career choices after my PhD.

*Janine McCaughey*

# EMBO workshop on the Physics and Chemistry of Endocytosis at Multiple Scales

1–6 September 2019. Ischia

The beautiful volcanic island of Ischia was the venue for the EMBO workshop on Endocytosis. This meeting has run biannually for over thirty years and is the foremost gathering to highlight and discuss the latest developments in endocytosis.

This year the meeting focussed on the cross-disciplinary approaches which have been used so successfully to elucidate endocytic mechanisms. Understanding the mechanical properties (membrane tension, cell size and shape) as well as the physical environment of cells (location in tissues and nature of the extracellular matrix) is integral to understanding endocytic mechanisms. To understand at the molecular level how such properties are regulated there is a need to develop highly specific chemical probes which allow membrane dynamics to be followed in living cells using advanced microscopy. Advances in the field have arisen because cross-disciplinary approaches have been embraced and the workshop focussed on showcasing these advances as well as providing a platform to consider the next key questions.

We can only cross the barriers between disciplines when we learn to speak a common language and a novel element of the conference was the inclusion of 'double act' presentations. These provided compelling accounts of how long-standing cross-disciplinary collaborations have enabled quantum leaps in our understanding of endocytic processes. Ludger Johannes and Patricia Bassereau (Institut Curie, Paris) described how their complementary expertise in biology and physics have revealed mechanisms underpinning clathrin-independent endocytosis, while Marino Zerial and Stephan Grill (MPI-CBG, Dresden) described how they had collaborated to understand the mechanisms underpinning organisation of rab5 fusion domains. At an organismal level, Marcos González-Gaitán (University of Geneva) and Frank Jülicher (MPI, Dresden) showed how a combination of computational and cell biology allows us to elucidate the role of endocytosis in establishing morphogen gradients during development.

The protein and lipids of endosomal membranes are key to endocytic function. In the past, our understanding of endocytic proteins has far outstripped our understanding of lipid biology. Several presentations demonstrated how, through the development of new experimental approaches, we have really entered a golden age of analysing how the dynamics of lipids contribute to endocytic function. This was exemplified in talks from the Höglinger (University of Heidelberg) and Nadler (MPI-CBG, Dresden) labs on functionalised lipid probes to understand lipid dynamics in organelles while Yamuna Krishnan (University of Chicago) described how her lab has used DNA nanotechnology to accurately measure ion concentrations in endocytic organelles. Jay Groves (Berkeley, California) demonstrated how protein condensation phase transitions of signalling molecules at the plasma membrane of T-cells increases the dwell time of signalling molecules and thus provides a highly sensitive kinetic proof-reading of Ras activation. The organisation of proteins and lipids is important not only at the cellular level but also at the tissue scale, as discussed by Guillaume Charras and Buzz Baum (UCL).

In a joint talk they discussed the control of protein polarisation in cells and what effect mechanistic stress has in individual cells and on epithelial monolayers.

The impact of the biophysical properties of the membrane was addressed in several presentations around the theme of mechanobiology. We heard how mutations in CAV3, the major structural component of caveolae in muscle cells, lead to myopathies because the muscle cells are unable to respond to mechanical stress due to uncoupling to the IL6/STAT3 signalling pathway (Christophe Lamaze, Curie Institut, Paris). Miguel Angel del Pozo (CNIC, Madrid) described how deposition of the extracellular matrix, which defines the mechanical environment of cells, is dependent on caveolin-dependent regulation of exosome release. There were also presentations on multidisciplinary approaches to understand the forces generated by actin during endocytosis (Dmitrieff lab, Institut Jacob Monod, Paris and Drubin lab, Berkeley, California).

Visualisation of biological processes has traditionally allowed us to test our models of how molecules and cells behave. The plenary talk given by Tom Kirchhausen (Harvard) showcased the power of lattice light sheet microscopy to understand the behaviour of molecules within cells in the context of tissues and whole organisms. His presentation demonstrated how the increased spatial and temporal resolution of the lattice light sheet microscope has revolutionised our ability, not just to validate models based on molecular cell biology assays, but to use microscopy to generate new hypotheses. Other presentations also illustrated the power of state-of-the-art microscopy, for example showing how the behaviour of actin in clathrin coated pit invagination can be understood using a combination of atomic force microscopy with conventional confocal microscopy (Yoshimura, Kyoto University, Japan).

Sessions at the workshop were organised to broadly represent the different scales, molecular, cellular and tissue, with which we need to understand endocytic mechanisms in order to understand many aspects of cellular physiology. Because of its underpinning role in many biological processes, not surprisingly defects on the endocytic pathway can contribute to disease. Pier-Paolo di Fiore (European Institute of Oncology, Milan) explained that although endocytic proteins are rarely mutated in cancers, modulation of the endocytic pathway plays key roles, especially in breast cancer, by downstream effects on gene expression. Sara Sigismund (European Institute of Oncology, Milan) described her findings showing how membrane contact sites affect the fate of activated epidermal growth factor receptor with consequent effects on its signaling.

The workshop was organised to maximise opportunities for scientific dialogue and the poster sessions were particularly lively with a high level of noisy discourse! We have tried to provide a flavour of this very exciting workshop although, due to space restraints, we are unable to describe all of the presentations and apologise to those whose work we have not mentioned. The excellent organisation and content of the workshop was due to Aurelien Roux from the University of Geneva and the late Suzanne Eaton from MPI in Dresden. It was widely acknowledged that much of the special atmosphere of the meeting, which so effectively promoted interdisciplinary discussions, was due to the vision of Suzanne Eaton whose loss was deeply felt by all of the participants. Moving eulogies were delivered by Marino Zerial and Buzz Baum, paying tribute to her scientific stature as well as her curiosity-driven and inclusive attitude to science. It is appropriate that the field will continue to exploit the multidisciplinary and quantitative approaches which she pioneered.

*Patrick Shire and Professor Elizabeth Smythe, Centre for Membrane Interactions and Dynamics, University of Sheffield.*

# Summer studentships

## Exploring kinetics of the polarity proteins via single particle tracking

As a third year MSci Cell Biology student at UCL, this year I found myself at a crossroads yet again. Even though I had been leaning towards pursuing a PhD, I was still uncertain about the exact field. In my course I decided to focus on developmental biology, but throughout I retained my interest in cell biology as well as programming and maths. Therefore, I decided to look for summer project in a lab that would integrate all these areas. This is how I found Dr Nathan Goehring at the Francis Crick Institute who was so kind to offer me a project in his lab.

The Goehring Lab uses advanced imaging techniques to study the kinetics of a group of cell polarity proteins known as the PAR proteins with the goal of understanding how the behaviours of these molecules collectively give rise to polarized patterns of proteins on the plasma membrane of animal cells. They use the C. elegans one cell embryo as a model. Here two sets of PAR proteins segregate into opposite ends of the fertilised oocyte – one set determines the anterior and the other the posterior. By segregating into opposite halves of the cell, the PAR proteins allow the two daughter cells that arise following the first division to acquire distinct identities.

My project was to study one of these polarity proteins, PAR-2, which segregates into the posterior. The lab had already developed tools to look at PAR proteins, but these had not yet been applied to PAR-2. One of the less-characterized proteins, previous reports suggested that it was able to oligomerize and alter its behaviour depending on the presence of other polarity proteins. The aim of my project was to use single particle tracking to measure changes in the dynamic behaviour of PAR-2 that would support these previous reports and provide parameters to inform mathematical models being developed in the lab.

Briefly, my project took advantage of TIRF microscopy which involves illuminating fluorescently labelled molecules at the plasma membrane. The advantage of this technique is that it allows detection and tracking of single protein molecules. To label PAR-2, I used a "HaloTag," a small enzyme that is fused to the protein of interest. When a suitable fluorescent Halo ligand is introduced into worms, the Halo enzyme will covalently attach the ligand to itself, labelling the fusion protein, in this case PAR-2. This strategy has been reported to have a better signal, signal-to-noise ratio and slower bleaching rate than GFP. Moreover, by varying the amount of Halo ligand, I could change the fraction of labelled molecules so that they were not too crowded for tracking. After imaging, I used my experience in Python to run programs to identify and track molecules to extract key parameters of their dynamics, including diffusion and membrane binding rates.

The first part of my project was to compare results obtained with HaloTag to data generated with a PAR-2::GFP fusion that the lab has so far been using to study PAR-2 and ensure that the tag by itself did not alter PAR-2 behavior. I performed single molecule imaging of PAR-2 tagged with GFP and Halo separately and found that their diffusion and off-rates matched well in both cases. This gave us the green light to proceed with further experiments to look at how the dynamic behaviour of PAR-2 was affected by different perturbations.

In what was certainly a learning experience for me, I promptly ran into technical issues that limited my ability to measure the membrane binding dynamics of PAR-2 when I began looking at how PAR-2 dynamics were affected when other polarity proteins were depleted by RNAi. I spent several weeks trying to solve this, testing different ideas, repeating experiments and discussing issues with the lab, but unfortunately, I didn't manage to solve the issue before time ran out.

I had more success with a second project to look for in vivo evidence of oligomerization. Here we generated a worm line that contained two PAR-2 alleles, one labelled with GFP and another labelled with Halo. The idea was then to tether the PAR-2::GFP to the membrane using a membrane-anchored GFP-binding protein (GBP). Our hypothesis was that if PAR-2 oligomerises, the kinetics of PAR-2::HaloTag would also change as it would bind the membrane-bound PAR-2::GFP. By comparing the mean step size of PAR-2::HaloTag in this line to PAR-2 in the line that contains only PAR-2::HaloTag, we obtained interesting results showing a clear difference in diffusion of PAR-2::Halo when PAR-2::GFP was tethered to the membrane, consistent with oligomerisation.

Through this project I have seen that it is possible to synthesize my interests in developmental and cell biology, physics, math and computer science, which is something I aim to continue in the next step in my career. Learning hands on how to perform TIRF microscopy and particle tracking was one of the most valuable experiences I have gained and it was quite satisfying to generate beautiful movies. However, I also encountered numerous unexpected obstacles which gave me a real insight of what it truly means to do research and taught me that patience and persistence are two qualities that every research scientist must possess.

In conclusion, I would like to thank my supervisors in lab, Rukshala and Tom, for guiding me along the way, as well as the rest of the lab for their affability. I would like to sincerely thank Dr. Nathan Goehring for not only giving me the opportunity to work in his lab but also for his support during my stay and in the process of applying for the studentship. I will be forever grateful for the profound experience and knowledge I gained in those 9 weeks that I worked in the Francis Crick Institute, which would not have been possible without the generous support from BSCB for which I am deeply thankful.

*Ana Raffaelli*
*Supervisor: Dr Nathan Goehring*

# Expression of Human Clathrin Heavy chains in a Plant model *T. Benthamiana*

I am currently studying Biomedical Sciences at Leeds Beckett University and having just finished my second year, I felt it would be an incredible learning opportunity to apply for a summer project in hope that I could understand what it truly means to complete a research project. Alongside this I felt it would be vital to broaden my current knowledge of techniques in the laboratory and gain more confidence in my skills as I prepare to move into the third year in which I am undertaking a lab project. I was incredibly fortunate to receive an invitation from Dr Carine De Marcos Lousa for the BSCB summer studentship in collaboration with Prof. Brodsky of UCL which I would later find to enhance my current academic understanding greatly. Prior to the summer project, I have had a few lab experiences in my first and second year academic modules such as Molecular Biology and Medicine or Biochemistry, but this would be my first experience outside of a timetabled session. This studentship has not only allowed me to seek out the first-hand laboratory experience I desired, but has given me the answer to the question I have always struggled to answer which is "what do you want to do after your degree"; that research in biochemistry, cell and molecular biology is the path I want to take.

For this reason, I was very enthusiastic to start this summer project on human clathrin heavy chain expressed in plants. The aim of the project was to clone human CHC22 and CHC17 into plant vector and analyse their subcellular localisation in the model organism N. tabacum. It has previously been found that clathrin heavy chain isoforms 22 and 17 play an essential role in protein trafficking in eukaryotic cells. Despite sharing 85% of protein identity, they are functionally different. CHC22 has been reported to accumulate in muscle Glut4 cells of insulin-resistant type-2 patients. The model mostly used in these reports are mice as they express homologues of CHC17, but none of CHC22. The objective of my project was to show a proof of concept for the successful expression of human CHC17 and CHC22 in plant models as this expression would open new pathways for investigation of CHC22 and CHC17 and their roles in intracellular transport. Indeed, plant models are excellent tools to study cell trafficking via confocal microscopy for 3 main reasons: i) Plant and mammalian secretory pathway share common protein motifs and organisers such as Rabs and adaptor complexes, ii) plant organelles from the secretory pathway are independent and not clustered around the nucleus as in mammalian cells, which allows detailed statistical analysis and more reliable dissection of trafficking pathways and iii) the infiltration method allows visualisation in 2 days post-infiltration without the need for recombinant plants which means results can be acquired relatively fast.

My first week was an introduction, by Dr. Carine De Marcos, to all the new techniques and methods I would need to use throughout the experiment. These included how to carry out successful transformations, home-made and kit minipreps, preculturing, restriction digests, ligations and even making my own agarose gels. I also had the chance to practice techniques I was familiar with such as PCR, gel electrophoresis, and working in a sterile environment.

The strategy for CHC22 involved all of the techniques I was taught in the first week, however the difficulty came when we needed to sub-clone amplified human CHC into plant vectors. CHC genes are large and already contain many restriction sites that were needed to subclone into the plant vector. This meant we had to design a cloning strategy that was quite complex, including partial digest and filling up with polymerase to create blunt ends on 5' and keep directional cloning.

Entering this project, I felt very overwhelmed by the vast amount of new techniques which I had to learn in a short amount of time, and the precision needed in every one to ensure success in the next step. I was oblivious to the amount of work that was needed to simply prepare for the next day such as the amount of agar plates I would need to make, the amount of agarose gel and certainly the amount of 1X TAE buffer I would get through! I will not only be taking away the amazing knowledge I have learnt in these 6 weeks, but I am left with an extreme amount of respect for the technicians who prepare every teaching practicals, and the patience they have had with me in the lab every time I asked a question. I sincerely thank Dr Carine de Marcos Lousa for supervising me through this experience, and most of all for believing in me in the first place. I hope I can continue to work alongside Dr Carine de Marcos when I reach the MSc year of my degree . I would also like to thank the BSCB for giving me this amazing opportunity to spend 6 weeks in the lab doing a research project.

*Jessicca Lines*

# Microtubule Organisation by Motor and Non-Motor Proteins

As an undergraduate student, it is important to comprehend the world of research in order to become a successful scientist. I am a second year Biomedical Science student at Birmingham City University. I have been fortunate to be involved in exciting biomedical research at Warwick University in the laboratory of Dr. Anne Straube under the supervision of Dr. Manas Chakraborty.

In this project, I have learnt about the cytoskeleton and how it can be organised by microtubule-associated proteins (MAPs). These include both motor and non-motor proteins. Using purified proteins, I have attempted to reconstitute microtubule organisation in vitro. Microtubules (MTs) are filaments assembled from $\alpha$- and $\beta$-tubulin subunits, which assemble to form hollow tubes with distinct ends, a plus end and a minus end. Molecular motor proteins such as dynein (directed towards the minus end of MTs) and kinesin (plus end directed MT motor) move along MTs using ATP. Many motor proteins carry cargo and membrane-enclosed organelles such as mitochondria, Golgi stacks, or vesicles to their locations in the cell. Another role of motor proteins is to cause cytoskeletal filaments to slide against each other, generating forces that drive muscle contraction, cilia beating and cell division. Motors are also known to work together with MAPs to organise MTs in specific arrays. In my project, I investigated how dynein motor proteins organise MTs and how dynein motors move within the MT networks they create.

Using total internal reflection fluorescence (TIRF) microscopy, I analysed dynein mediated MT bundling in a gliding assay. In a gliding assay, an imaging chamber is coated with motor proteins and MTs are then perfused into the chamber together with ATP. I observed the alteration in the length and velocity of MT movement by surface-anchored dynein motors. We found that the length of MT structures increased over time due to the formation of MT bundles.

During my project, I also investigated MT bundles formed in solution in the presence of dynein and tested whether these can be split by surface-immobilised kinesin or dynein motors. When pre-formed bundles landed on a surface with kinesin motors, we observed that the length of MT structures decreased and microtubule bundles were split. However, when dynein is on the surface, the length of MT structures further increased.

In addition to the above, I investigated how single dynein motors move along MT bundles formed by the microtubule cross-linker PRC1. I found that the velocity and run length of dynein motors decreases when running on PRC1-mediated MT bundles compared to when running on dynein-mediated MT bundles. It is known that PRC1 forms antiparallel bundles, whereas unpublished results from the Straube lab show that Dynein predominantly forms parallel MT bundles. This suggests that dynein might not move well on antiparallel MT bundles.

Throughout my degree, I have studied many topics ranging from molecular genetics to cellular biology, allowing me to understand the different levels of complexity in organisms. However, experiencing the working environment of a lab is invaluable as it has provided me with a detailed insight into scientific research and furthered my understanding of how we can use in vitro techniques to understand more about cellular biology. Over my 8-week placement, I have learnt a variety of techniques, in particular how to use TIRF microscopy and prepare and analyse imaging-based biochemical assays. I have also learnt how to search relevant literature, analyse and interpret results. Therefore, I would like to thank BSCB and Dr. Straube for the amazing opportunity as well as Dr. Manas Chakraborty for his inspiring guidance and all Straube lab members for their support and hospitality.

*Samia Mohammed,*
*Birmingham City University*

## Yaiza Arranz

I'm a Spanish undergraduate student who has had the opportunity, thanks to the BSCB Summer Studentship, to spend part of the summer vacation doing a project in the laboratories at The University of York under the personal supervision of Dr. Paul Pryor. My project was about The role of Synaptogyrin-2 in regulating the insulin-responsive glucose transporter GLUT4. SYNGR-2 is an endolysosomal membrane protein which, previous experiments show that, it interacts with endosomal reticulum protein VAPB. The project had two aims, firstly to generate Split-GFP constructs to observe an interaction between VAPB and SYNGR2. Secondlyto show the localisation of GLUT4 with the localisation of VAPB and SYNGR-2. During the six weeks of the project I have been learning and putting into practice cell biology laboratory techniques (molecular biology, tissue culture, immunofluorescence and confocal microscopy). The knowledge I have gained will be certainly useful in my last year of university and for my future career in Biology.

## Karolina Jagielka

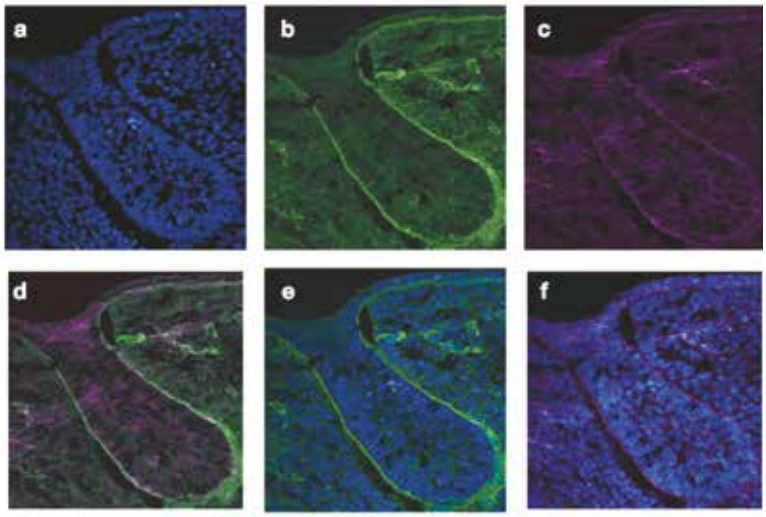
I am a third-year Biomedical Science student at the University of Hull. I was keen to discover biological concepts beyond taught academic material and gain insight into working in a professional environment. Over the summer, I had the opportunity to complete an eight-week research project under the supervision of Dr Francisco Rivero and Dr Leonid Nikitenko at the Faculty of Health Sciences with the support of a BSCB studentship. My project was focused on the neuropeptide calcitonin gene related peptide (CGRP), a potent vasodilator implicated in the pathogenesis of cardiovascular disease and migraine. In the course of my project I had to learn how to culture lymphatic endothelial cells, understand the importance of maintaining aseptic conditions within the tissue culture environment and how to determine optimum cell confluence. Being part of a laboratory team has taught me essential laboratory techniques which are invaluable for my future research and I was frequently challenged to think in new ways during meetings, data presentations and journal clubs. These experiences have improved my communication and teamwork skills as I periodically had to present work that I have completed and collaborate with other lab members. This has also advanced my ability to organise and report data findings. I am privileged and grateful to have worked in Dr Nikitenko's lab alongside his team and under both his and Dr Rivero's supervision. I would like to thank the BSCB for this excellent opportunity to participate in this exciting project at the forefront of endothelial cell biology.

# The cell biology of invagination

I am a biological science student from Zhiyuan College, Shanghai Jiaotong University, China, about to start my last year of undergraduate studies. After various courses, experimental training and my last internship in Prof. Goujun Sheng's lab in Japan, cell biology has hugely aroused my interest. This summer, thanks to the BSCB, Prof. Jeremy Green and Dr. Barbara Vacca, I got a chance to have another meaningful and fruitful research experience in King's College London, which aims to investigate a potential new mechanism of morphogenetic cell rearrangement.

Shaping epithelia through folding and bending, especially invagination, is a critical way in which individual cells to work together and grow into organs. However, the understanding of the cellular mechanisms behind those processes is still limited.[1] The development of ectodermal appendages, such as hair follicles, mammary glands, salivary glands, and teeth, serves as a good set of model systems for organogenesis that shares common, as well as divergent, development processes. Ectodermal appendages all begin with a slight local epithelial thickening called a placode. The invagination of placodes leads to the form of dimples or pits, after which the different organs diverge into their characteristic structures.[2] Due to its relatively large size, easily access and the solid bud structure, the mouse tooth provides a good model to investigate the development of ectodermal appendages, especially the mechanism of epithelium invagination.[3] The previous works in Green lab have demonstrated that the initiation of epithelium invagination occurs through "vertical telescoping" (cells moving apicobasally past one another) [4], and further invagination is driven by cell intercalation among suprabasal cells[2]. In both processes, the absence of fibronectin and the presence of foci of E-cadherin during molar development aroused our attention.

In general, there are several kinds of cell adhesion molecules linking the cell microenvironment to the cell cytoskeleton. Integrins adhere to fibronectin and other extracellular matrix molecules to form focal adhesions, and these act like feet to enable cell migration and a number of known developmental cell rearrangements [5]. E-cadherin, on the other hand, forms adherens junctions, which are cell-cell adhesions not usually involved in cell migration [6]. Although some actin-regulating molecular components, including Elmo2 and Dock1, are common in both two kinds of adhesion [6], the ability of E-cadherin adhesions to drive cell rearrangement (cell-on-cell migration) in lieu of focal adhesion (cell-on-matrix migration) has not been proved or defined so far.




**CD1 mouse at E13.5, fixed with PFA, embedded in OCT and cryosectioned. Staining for a. Dapi (blue), b. integrin β1 (green), c. phalloidin (magenta), d. integrin β1 (green) and phalloidin (magenta), e. Dapi (blue) and integrin β1 (green), f. Dapi (blue) and phalloidin (magenta). Images were taken under 63X glycerin lens by confocal microscope.**

Therefore, my project was to begin to investigate whether cadherin junctions could be involved in actively cell rearrangement during invagination using the mouse molar model.

Since this was the first time I focused on an in vivo model instead of in vitro cultured cell lines, it took me about a month to get a good command of the whole process of dissecting the mouse embryos at the appropriate stage, fixing and embedding the tissue of interest, cryosection the tissue, immuno-staining for the proteins of interest, performing confocal imaging and analyzing the resulting images. The techniques became easy with practice, but problems occurred to me one after another while I was trying to obtain the best possible results.

The first difficulty was how to find the tooth germs in the embryo. As for early developing mouse molars, they were thick epithelial patches at embryonic day 11.5 (E11.5), little buds at E12.5, big buds at E13.5 and a cap-shaped bud at E14.5, seemingly obvious structures. However, for me, it was easy to get confused while dissecting or cryosectioning. I tried using a mouse development textbook but most of the sections reported were transverse rather than frontal, which made buds appear as circles and so very hard to distinguish. To profoundly understand the anatomy of molar and its surroundings, I spent another week to learn how to wax-embed and then section a whole head frontally so that the morphology of whole mouse head was obtained. Doing this myself, rather than relying on the textbook, helped me a lot in the following dissections and cryo-sections

Another difficulty came with the immunostaining. Commercially purchased antibodies with a suitable protocol should guarantee beautiful and reliable immunostaining results, but this was not always the case! Little tips I learned from my failures included: before staining, read the data sheet carefully and follow the recommended protocol in perfect detail; when dealing with the uneven fluorescence, move the sample around to distinguish whether it was due to uneven staining or uneven illumination; always do a no-primary-antibody control to identify auto-fluorescence and non-specific secondary antibody binding. Also, if there is, making a strong known positive control according to the antibody product description or previous papers can help a lot. These are obvious things to do – when you know how!

After fixing the problems, the most exciting part was having an elegant result. Firstly, I confirmed the known result which was the co-localization of foci of E-cadherin and β-catenin in the suprabasal tissue canopy and there are no fibronectin signals. For the laminin and integrin β1, they were only present in the basal outline of the bud (figure a-f) while vinculin was present in the whole bud.

Previous work in Green lab suggested a possibility that E-cadherin could be the focal adhesion-equivalent during cell-on-cell intercalation-mediated invagination. This time, it was further supported by the absence of laminin and integrin β1 and the presence of vinculin. There were also papers suggesting that vinculin could also be triggered to conformation change by signals from E-cadherins. Further work could be divided into two parts, testing more focal adhesion components, i.e. focal adhesion kinase, paxillin and integrin α6, and using inhibitors to test functional similarities and differences between cell-on-cell and cell-on-matrix migration and identify a potential new functional role for E-cadherin in the invagination process.

Although eight weeks were not a long time, I had a good train-

ing for my experimental skills and improvement in my critical thinking. It was a good chance for me to experience the researchers' life and test whether I am happy doing science. The answer is, definitely, yes.

Here I would like to express my strong gratitude towards BSCB, Prof. Jeremy Green, Dr. Barbara Vacca and other members of the group and department who have helped me, Jack, Yushi, Ewa, Jamie and Alasdair.

After eight weeks, now it is the end of summer as well as a start for me to carry on my research life.

*Yangye Zhang Supervisors: Dr. Barbara Vacca, Prof. Jeremy Green*

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## Rachel Finday

I am a UCL student, about to start my fourth year of an integrated Masters degree. This will involve working on an extended research project so I was keen to get some lab experience. The Acton lab is a stromal immunology lab in the MRC LMCB. In particular, they focus on communication between immune cells and stromal cells in the lymph node (LN). The aim of this summer project was to investigate the interaction of T cell zone macrophages (TZMs) with another population of resident macrophages in the LN with the FRC network. We first aimed to stain LN sections for MERTK and PDPN and CD3 to allow us to distinguish between T cells and TZMs.

During my placement, I learned several new techniques, from tissue sectioning and staining to microscopy and analysis for imaging and flow cytometry results. Not everything went to plan, with the MERTK antibody for tissue section staining not working well, followed by a delay while a different MERTK antibody that had worked previously was delivered. However, with the new antibody we managed to take some good images and observe some macrophages.

Overall, I had a great 8 weeks in the lab, learning lots of new techniques, gaining a greater understanding of the scientific basis behind what the lab studies and insight into working in a lab. I would like to thank Dr Sophie Acton for allowing me to spend time in the lab over the summer, Dr Spiros Makris for his guidance and supervision throughout and the BSCB for providing me with funding for this project.

## Riya Verkaria

I am about to start my third year at Kings College London. Over my summer 6-week internship in Dr Elisabeth Ehler's lab, I had the privilege to carry out techniques such as immunohistochemistry, SDS-PAGE and immunoblotting. One of the aims of my project was to investigate the expression levels and subcellular distribution of desmosomal proteins in heart samples from human end stage dilated cardiomyopathy. Imaging, viewing and analysing the results felt rewarding and full filling as I eventually carried out each individual experimental stage by myself to get to the results.

I loved working on this project and enhancing my knowledge on tremendous amount of lab skills. I am sincerely grateful to Dr Elisabeth Ehler for providing me with such an educational and rewarding experience. I would also like to thank the BSCB summer studentship bursary for enabling me to receive such a realistic insight in the field of research. I hope to be able to use the skills I have learnt from this experience in the future as I aspire to apply for a PhD position.

## Krytyna Sadzkowska

I just finished my first year of undergraduate medical degree at the University of Cambridge. This summer I got an amazing opportunity to gain research experience in Professor Ewa Paluch's lab in the Department of Physiology, Development and Neuroscience at the University of Cambridge, where I spent 8 weeks investigating actin networks in mouse embryonic stem cells.

In this study, we investigated changes in actin cytoskeletal networks during a fate transition using mouse embryonic stem (mES) cells as a model system. Together, my findings illuminated how actin organization changes as mES cells undergo shape and fate transitions. I learned a lot of useful lab techniques such as stem cell culture, electron and confocal microscopy, Western blot and immunostaining. I also have learnt how to write a scientific paper and I made a poster summarizing my results, which I hope to present at an undergraduate conference in the coming academic year. I want to thank Professor Ewa Paluch, all the members of Paluch lab and BSCB for giving me this amazing opportunity. I had a great summer in a very friendly lab and I gained a lot of invaluable experience that I will be able to use further in my career.

## Liza Zhabina

I am doing a degree in Natural Sciences, specialising in Biochemistry, at Cambridge University. Over the summer, I spent 8 weeks in Simon Cook's lab characterising the regulatory mechanisms of ERK5 in naïve and primed ES cells.

In order to investigate the role of ERK5 signalling, I learned to culture mouse embryonic stem cells (mESCs) in conditions promoting naïve or primed differentiation states. I used Western Blotting and Immunopreciptiation to investigate protein expression and interactions of ERK5. My time spent at the Cook Lab was an invaluable experience for me both academically and personally. From becoming more confident and independent doing lab work, learning a variety of techniques, and talking with the other scientists in the lab, I now have a far better idea of what a scientific career entails. I learned that independent lab work is far different from the tutored lab sessions that I have previously experienced during my degree so far; having experienced the initial stages of planning an experiment, through to problem-solving any difficulties I encountered, and persevering in the face of failure. I thoroughly enjoyed the challenges I faced during the project, and the feeling of accomplishment in producing data and sharing it with other scientists. As such, I am now more confident in pursuing a future career in science. I would particularly like to thank Dr Pamela Lochhead for her support and guidance through my project.

# Society Business

## BSCB funding to support members throughout their careers

We welcome two joint officers who will be supporting the BSCBs company of Biologists' support funds for members conference travel and career development. Folma Buss and Sharon Tooze came on board in summer 2019. The BSCB Honor Fell and Support Grants schemes continue to be popular and we ask that applications are uploaded at least 6 weeks ahead of time to allow for assessment and transfer of funds to successful applicants. We expect all successful applicants to acknowledge BSCB funding using our logos found on our website. We have recently updated our process for applying for all BSCB Travel awards to use an online portal which is part of the BSCB Members area. All funding applications from July 2019 should be uploaded in PDFf format to the application portal found at bscb.org/members-login/

**Honor Fell Travel Awards** Sponsored by the Company of Biologists provide financial support for BSCB members at the beginning of their research careers to attend meetings and courses. Applications are considered for any meeting or course relevant to cell biology. The amount of the award depends on the location of the meeting or course. Awards will be up to £400 for travel within the UK (except for BSCB Spring Meeting for which the full registration and accommodation costs will be made), up to £500 for travel within European and up to £750 for meetings and courses in the rest of the world.

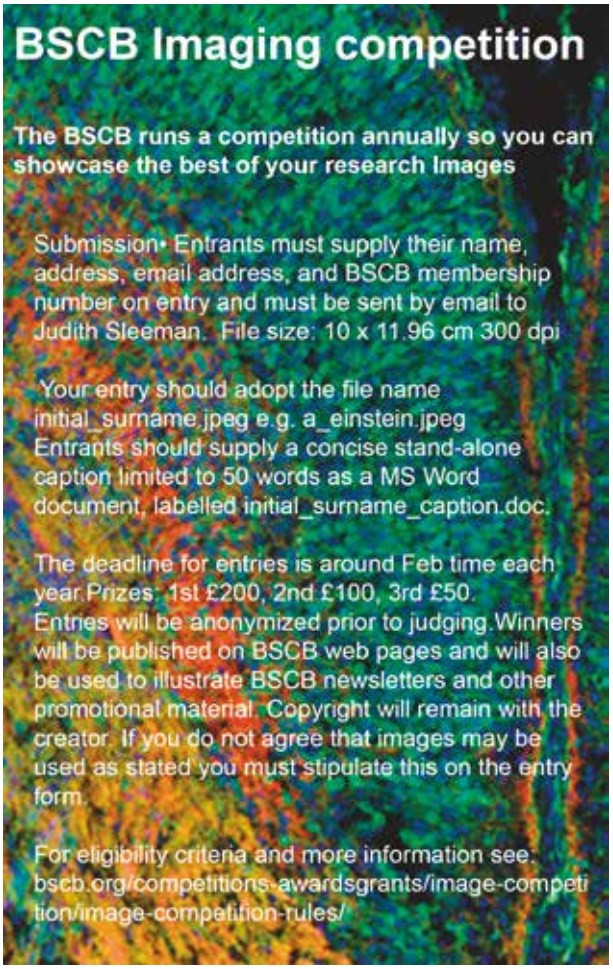
The application form and more information about the scheme are available here: https://bscb.org/competitions-awardsgrants/travel-bursaries/honor-fell-company-of-biologists-travel-awards/

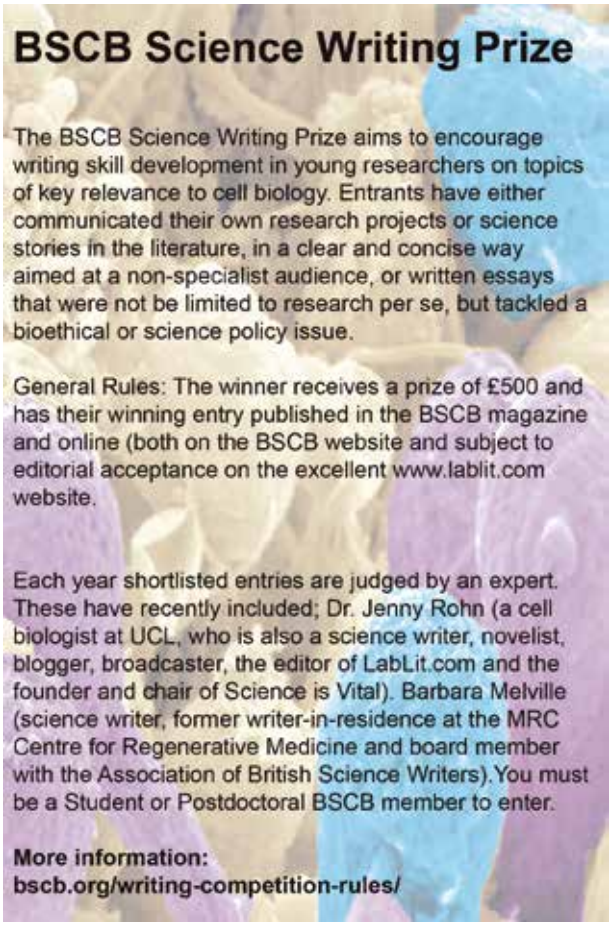
**Company of Biologists Support Grants** are available for independent group leaders/PIs with no current funds for travel to attend meetings, conferences, workshops, practical courses, PI laboratory management courses and courses to re-train. For more information and to apply please see here: https://bscb.org/competitions-awardsgrants/cob-support-grants/

**Childcare Award:** The BSCB now accepts applications to provide financial help with childcare or care for dependents when the applicant is presenting at a scientific meeting. All claims will require approval with appropriate receipts. You will be notified within 2–3 weeks of the outcome. For example, these claims can be for:

- Home-based childcare/dependent care expenses incurred because of meeting attendance (funds may not be applied to normal ongoing expenses).
- Travel of a relative or other care provider to your home to care for your child(ren) or dependent while attending a meeting.
- Travel of a care provider to the meeting with you to care for your child(ren)

For more information and to apply please see: https://bscb.org/competitions-awardsgrants/travel-bursaries/childcare-award/



# The British Society for Cell Biology

## Statement of Financial Activities for the Year to 31 December 2018

| | Unrestricted Funds | Restricted Funds | Total 2018 | Unrestricted Funds | Restricted Funds | Total 2017 |
|---|---|---|---|---|---|---|
| Income from: | £ | £ | £ | £ | £ | £ |
| Grants | 35,000 | 62,500 | 97,500 | 35,000 | 62,500 | 97,500 |
| Investments | 8,932 | – | 8,932 | 8,861 | – | 8,861 |
| **Charitable activities** | | | | | | |
| Meetings | – | – | · | – | · | – |
| Subscriptions | 33,425 | – | 33,425 | 32,802 | – | 32,802 |
| **Total income** | **77,357** | **62,500** | **139,857** | **76,663** | **62,500** | **139,163** |
| **Expenditure on:** | | | | | | |
| **Charitable activities** | | | | | | |
| **Grants payable:** | | | | | | |
| CoB | – | 68,274 | 68,274 | – | 57,352 | 57,352 |
| Other grants | 3,099 | · | 3,099 | 900 | 3,000 | 3,900 |
| Studentships | 17,100 | – | 17,100 | 16,012 | – | 16,012 |
| Costs of meetings | 10,808 | – | 10,808 | 18,859 | – | 18,859 |
| Website expenses | 2,429 | – | 2,429 | 465 | – | 465 |
| Newsletter costs | · | – | · | 3,675 | – | 3,675 |
| Membership fulfilment services | 16,365 | – | 16,365 | 22,267 | – | 22,267 |
| Executive Committee expenses | 3,352 | – | 3,352 | 2,345 | – | 2,345 |
| Examiner's remuneration | 2,644 | – | 2,644 | 2,524 | – | 2,524 |
| Miscellaneous | 915 | – | 915 | 1,056 | – | 1,056 |
| Subscriptions | 2,299 | – | 2,299 | 1,279 | – | 1,279 |
| Insurance | 1,114 | – | 1,114 | 1,095 | – | 1,095 |
| **Total expenditure** | **60,125** | **68,274** | **128,399** | **70,477** | **60,352** | **130,829** |
| Net (expenditure)/income | 17,232 | (5,774) | 11,458 | 6,186 | 2,148 | 8,334 |
| Transfer between funds | – | – | – | – | – | – |
| Net movement in funds | 17,232 | (5,774) | 11,458 | 6,186 | 2,148 | 8,334 |
| Funds brought forward at 1 January 2018 | 204,383 | 31,072 | 235,455 | 198,197 | 28,924 | 227,121 |
| **Funds carried forward at 31 December 2018** | **221,615** | **25,298** | **246,913** | **204,383** | **31,072** | **235,455** |

# BSCB Committee 2020

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, Magazine Editor and Web Co-ordinator) and up to 12 other ordinary members, including one PhD student representative, one postdoc representative and a schools liaison officer which are coopted onto the committee.

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 BSCB 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 prior to the meetings.

The BSCB has charitable status (registered charity no. 265816). The BSCB AGM is held every year at the Spring Meeting.

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# BSCB Ambassadors 2020

The BSCB Ambassadors are the society's advocates in the UK cell biology community. They should be your first point of call for information about what the society can do for you and also how you can get involved. They should also be the people readily available to ask about sponsoring you for membership.

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