BSDB Newsletter

Summer 2013
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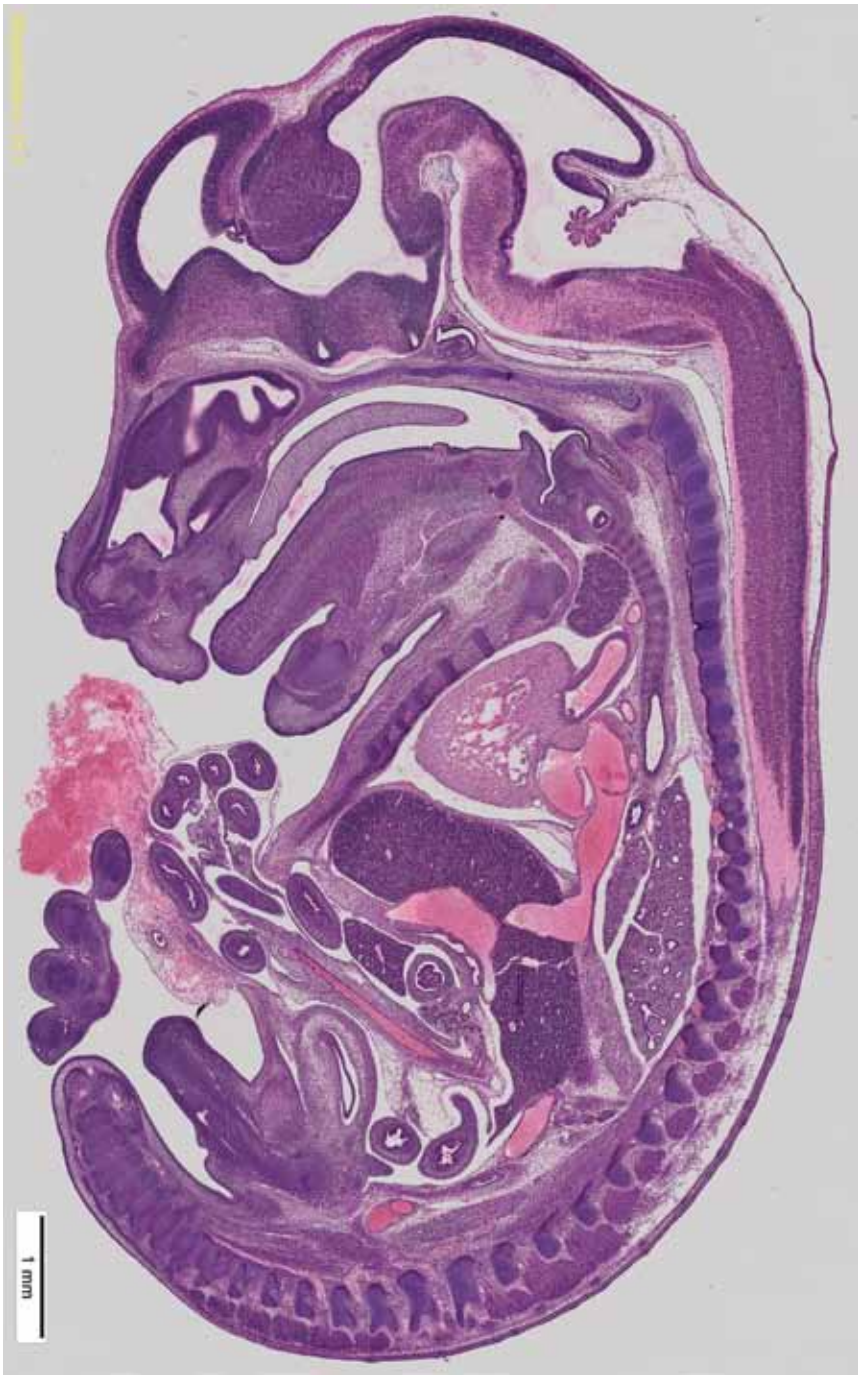
British Society for Developmental Biology
www.bsdb.org



THE COMPANY OF Biologists
www.biologists.com

Matthew H. Kaufman
-a rememberance

Joint Spring meeting
16-19 March 2014
University of Warwick

Editorial

Firstly, my apologies for the delay in the "summer" newsletter.

The make-up of the BSDB committee is in constant flux and this season is no exception. We welcome two new members, Sally Lowel and Andreas Prokop who introduce themselves on p.10. We also have a new Secretary, Kim Dale, who writes on p.5. Committee members and Officers are your points of contact if you wish to raise any issues for the committee to consider or have suggestions on how the BSDB can better fulfill its role in promoting developmental biology.

On the theme of promoting developmental biology, I receive a steady trickle of enquiries from high school teachers who are keen to identify scientists willing to go into the classroom to discuss their work to high school students. This can be a rewarding experience for the scientist and a stimualting supplement to the students syllabus that makes a refreshing change from their textbooks. If any members are interested in presenting their work in schools please contact me and the society will try to coordinate a list of willing volunteers.

Malcolm Logan
mlogan@nimr.mrc.ac.uk

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Liz Robertson
BSDB Chair

Chair's Report

I hope you all agree that this year's 2013 Joint Spring conference at Warwick was a huge success with attendance once again up on previous years. A very full programme but with the slight scheduling tweaks everything ran according to plan and we enjoyed an excellent balance of talks, poster sessions and workshops. Many thanks to our organizers Fiona Wardle and Keith Brennan, together with their counter-parts from the BSCB, for all their hard work in organizing the topics and bringing in a terrific line up of Speakers. Jordan Raff (President of the BSCB) and I were delighted that so many of our senior colleagues accepted our invitation to come along and Chair sessions. As usual the conference organizer Nicola Peel and her team from HG3 did an outstanding job ensuring smooth running of the meeting.

The meeting started and ended with joint sessions, with the Hooke and Waddington Medal talk evening session sandwiched in the middle. The first day saw the very popular graduate symposium, kindly Chaired by Robb Krumlauf, followed by our two Plenary Speakers, David Drubin and Olivier Pourquie. Eric Miska delivered the Hooke Medal lecture which was followed by the Waddington Medal lecture. This year's mystery winner was Jim Smith, currently Director of NIMR. Saving some of the best till last and to encourage everyone to get up bright and early after the conference dinner, the meeting wrapped-up with a joint plenary session, featuring an impressive line-up of national and international speakers, including the Beddington Medal winner Helen Weavers who gave an outstanding presentation of her PhD work on tube morphogenesis in Helen Skaer's lab.

The composition of the BSDB committee is always in flux, and at the end of the Meeting the mantle of Secretary was passed from Mike Taylor to Kim Dale. We owe Mike a huge vote of thanks for his immaculate minute keeping, immense knowledge of the BSDB rules and constitution and for fielding all manner of enquiries as the point of contact with our membership. Mike was also the steward of the famous BSDB filing cabinet, containing all manner of archive materials, now hopefully installed under Kim's watchful eye in Dundee. Chris Thompson also rolled off the committee in the Spring. Thanks to him for his numerous contributions during his term of office. Over the summer Jorge Beira, our hard-working student rep, is also stepping down as he is about to submit his thesis and graduate. At the AGM Sally Lowell (Edinburgh) and Andreas Prokop (Manchester) were elected to succeed Mike and Chris.

The AGM also included a re-visiting of last years debate on whether to change the name of the Society. After what proved once again to be a very lively discussion at a well attended meeting, the clear majority vote was in favour of staying as the BSDB. The other major announcement was that since the BSDB finances continue to be in excellent shape we have decided to implement a 5 year programme of undergraduate summer studentships. Watch out for announcements on our Website in early 2014 about how to apply for these "Gurdon" studentships. We were also delighted that John Gurdon was able to join us at the meeting and give out the poster prizes at the conference dinner.

As the rather better than average summer draws to a close, and the meeting season winds down, I hope this finds everyone with fully re-charged batteries looking forward to the Autumn and the new Academic Year. Finally I hope you will encourage all of the incoming graduate students and post-docs to join the BSDB! The membership fee is nominal, in exchange for which all BDSB members are entitled to apply for travel grants to attend our meetings. It's a great way to integrate new junior colleagues into the UK Developmental Biology community. Please feel free to contact Malcolm Logan for PDFs of fliers and a Powerpoint side outlining the benefits of joining the BSDB.

Liz Robertson

'Watch out for announcements on our Website in early 2014 about how to apply for these "Gurdon" studentships.'

Treasurer's Report Summer 2013

September 2013

BSDB Treasurer's Report Summer 2013

The last financial year (August 2012-July 2013) has again been a successful one for the Society. We supported the attendance of 89 members at the Spring Meeting in Warwick 2013 and the attendance of 9 members at the Autumn Meeting on Axon Guidance and Regeneration by provision of £38,680 funding. The BSDB/CoB travel grants to attend overseas conferences remain oversubscribed and we were able to help 83 members attend such meetings at a cost to the Society of £36,000. The amounts given out in direct support to members were balanced by income to the Society of just under £33,000 (membership subscription) and £35,000 from the Company of Biologists for the BSDB/CoB travel grant scheme. The shortfall in income to cover our expenditure on travel grants was covered by our annual grant from the Company of Biologists of £35,000, which also covered the costs of organizing the Spring and Autumn meetings (approximately £18,000- subsidizing the costs of hiring the venue and paying travel costs for our excellent invited speakers). This income from the Company of Biologists allows us to keep registration costs for members to attend our meetings at a reasonable level, and at the same time ensures that we have a great line up of speakers. The scientific success of our meetings has the knock-on affect of ensuring that numerous companies and sponsors attend BSDB meetings, both raising our profile and bringing in new income. As a result, our Spring Meeting in Warwick managed to bring in a surplus of just over £7,000 which can be usedto further support future meetings and travel grants. The Society holds reserves in investments which provide security for our meetings and the value of these reserves hasheld steady over the last 12 months. Together with the continued and highly-valued support given to the Society by the Company Of Biologists, our financial position remains strong, ensuring that we have a solid foundation for our future activities.

Andrew Fleming

Please Note.
Only members paying the correct subscription to the Society will be eligible for a Travel Grant

Louie Hamilton Fund
There is a small amount of money available from the Louie Hamilton Fund to provide travel support for handicapped members. Applicants should contact the Treasurer.

From the new BSDB Secretary, Kim Dale

It's a great pleasure to have been asked to take over the role of secretary of the BSDB. I'd like to start by thanking my predecessor Mike Taylor for all his hard work over the past five years. In particular, Mike and our treasurer Andy Fleming have both done a magnificent job of streamlining the membership database, which has proved a formidable undertaking!
I would like to thank both Mike and Andy for helping me learn the ropes during the last few months. My first act has been to collate the nominations and count the votes for the Waddington Prize Medal but the winner will of course remain a secret until next Spring so put the dates in your diaries now as it will be a corker : 16-19th March 2014 at Warwick University!

As secretary I would like to encourage you all to continue to invite colleagues and new PhD students and Postdocs to join the society and keep both the membership and the coffers healthy and vibrant. We really are a society worth joining given the very low subscription rates and all that this brings you:

- The chance to join The Society that acts a voice to represent the views and opinions of Developmental Biology in the UK.

- The opportunity to hear the most cutting edge research in the field at annual meetings of extremely high calibre, broad topic range, in friendly, informal settings.

- The chance to apply for travel grants to attend BSDB meetings or indeed other National/ International meetings – these travel grants easily cover the subscription costs.

Please do contact me if there are any issues you would like the committee to consider or discuss at the upcoming Autumn BSDB committee meeting.

Looking forward to seeing everyone in Warwick in the Spring

Kim Dale

Remembering Matt Kaufman (1942-2013)

Matthew Kaufman

It was with great sadness that the developmental biology community learnt that Matt Kaufman died on August 11th after a long illness. While many mouse embryologists and developmental biologists were not fortunate enough to know Matt in person - a modest man who maintained a relatively low-key scientific profile - everyone of us has at some point in our careers made use of his famous "Atlas of Mouse Embryology" – an essential reference volume to be found on the shelves of hundreds of labs worldwide. He was of course equally famous as one of the three co-discoverers of mouse ES cells. Matt was the co-author of the 1981 Nature paper with Martin Evans, that together with Gail Martin's PNAS paper published in the same year, described the all important protocols for deriving stem cells directly from the early mouse embryo.

Matt's original career path was medicine, and only after completing his medical training in Edinburgh, Birmingham and Luton did he decide to change direction and take an academic route, initially doing a PhD in the Department of Physiology in Cambridge. When I first met him in Cambridge around 1980 he was a Lecturer in the Department of Anatomy and a Director of Medical Studies. In addition to pursing his own research on the early mouse embryo, he had a heavy teaching load that included the all important subject of gross anatomy. Matt remains the only person I've known who was licensed to be in the possession of a human body, since one of his University responsibilities was to receive and embalm the donated cadavers. In addition to his remarkable knowledge of adult human anatomy he was also fascinated by embryology and developmental defects in general. Over the years Matt had assembled a very impressive collection of abnormal human fetuses, which resided in white plastic tubs under the bench in his lab, and were used for teaching undergraduates the underlying principles of Human Embryology.

I have very fond memories from the many years when I was a grad student and then a post-doc with Martin Evans in the Department of Genetics and interacted with Matt on an almost daily basis. Our respective Departments were only some 50 yards apart, and because Matt had a long term collaboration with Martin's lab we worked closely with "Uncle Matt", as he was affectionately nicknamed by his junior colleagues. After Martin and Matt first isolated ES cells, we were all determined to find out if they would make chimeras. Martin initially tried to do this with Richard Gardner, but entailing a long drive over to Oxford for every experiment, it proved impractical. Martin secured funds to buy our own micromanipulator set-up, and the challenge Allan Bradley and I took on was to teach ourselves how to inject blastocysts. Allan proved very adept at making injection tools in the Department workshop, but we knew very little about mouse husbandry, how to retrieve the embryos and more importantly how to surgically re-implant them and turn them into baby mice. Matt personally and very patiently taught Allan and myself everything we needed to know to succeed, from how to inject a mouse without being bitten, all the surgical procedures, how to tie a proper surgical knot and vasectomize a male mouse with a pair of red-hot forceps! I've passed on all Matt's little technical tricks for isolating and moving mouse embryos around to innumerable students and post-docs in the intervening years.

Although Matt could come across as being somewhat prickly on occasion, he was incredibly kind to his junior co-workers, possessed a great sense of humour and a real passion for his science. I would often find him sitting in his office looking a bit morose, working away in longhand on his Monograph detailing his in-depth analyses of parthenogenetic mouse embryos, but once we got chatting about experiments he would jump up and shoo me into his lab to show me something especially interesting down the microscope, or residing in one of the white tubs under the bench. In 1984 the Evans lab made a limited edition Christmas card featuring one of our very first germ line chimeric mice announcing "a Merry Mousemas and Seasonal Squeakings". Within minutes of delivering our card to Matt's office he sent one back with a perfect spread of 20 chromosomes

everyone of us has at some point in our careers made use of his famous "Atlas of Mouse Embryology" – an essential reference volume to be found on the shelves of hundreds of labs worldwide.

Remembering Matt Kaufman (1942-2013)

adorning the front and wishing us all "A very haploid Xmas".

Matt's major attributes were his patience, perseverance and attention to detail in whatever he did. He was always busy, with some major long-term project on the go. When he wasn't writing, or doing experiments at the bench, he was in his garage workshop restoring his vintage car. I was around while he was developing, then starting to execute the idea for his mouse atlas. This was in the pre-digital technology era and all of Matt's serially sectioned embryos were individually photographed, printed, trimmed, mounted and finally hand annotated using Letraset to create giant plates that were sent off to the publishers for re-photographing. A true labour of love, "The Atlas" took years to put together and was finally published in 1992, some years after Matt left Cambridge to return to Edinburgh, the city where he originally trained, to become Professor of Anatomy and Head of Department. It's a testament to Matt's perception for the need for such a resource that "The Atlas" was re-published no less than eight times. He also co-authored a companion volume "The Anatomical Basis of Mouse Development" in 1999 with his Edinburgh colleague and long time friend Jonathan Bard. Some 20 years later Matt's original embryo sections have been digitally captured and are currently being converted to a user friendly "zoom-able" on-line colour version by the Edinburgh emouse Atlas team. The site will shortly be available via a link - Kaufman Atlas - on their web site www.emouseatlas.org.

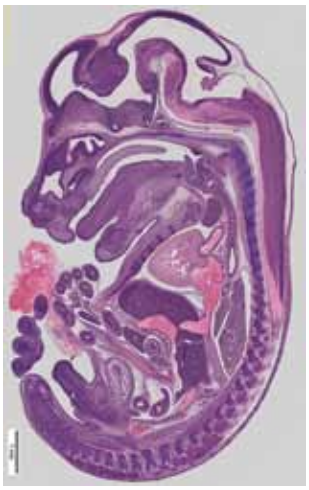
After I left Cambridge for the US, and Matt moved to Edinburgh unfortunately our paths rarely crossed. While I was working at Harvard I was delighted to host Matt and his wife Claire during a trip they made to the States. After an informal seminar in my Department, Jeremy Green (then working at HMS) and myself took Matt and Claire for a tour of the Harvard campus followed by a very enjoyable lunch at the Charles Hotel in Harvard Square. In 2006 Austin Smith hosted an event marking the 25th Anniversary of ES cells in Cambridge, the perfect opportunity for a reunion with Matt to gossip about the old days spent walking back and forth between our Departments carrying dishes of embryos or exchanging manuscript drafts.

Matt's scientific legacy is notable for its breadth and diversity. As well as his important contributions to the discovery of ES cells and educating us about mouse embryo anatomy, he was a prolific writer. In addition to his large number of primary papers and text books, Matt wrote books on medical history ranging from an account of war time sabre and musket ball wounds, to the subject of phrenology!

On a personal level Matt was also a very kind and generous human being who engendered enormous respect from those of us who knew him well.

Liz Robertson

Allan Bradley, Matt Kaufman, Liz Robertson and Robin Lovell-Badge at the 2006 reception held in Cambridge to celebrate 25 years of ES cells.



An example of Matt's perfect histological sections through an E14.5 embryo (image kindly provided by Richard Baldock)

AUTUMN 2014

1-3 September
at the University of East Anglia, Norwich

To be hosted jointly with the Society for Matrix Biology, BSMB

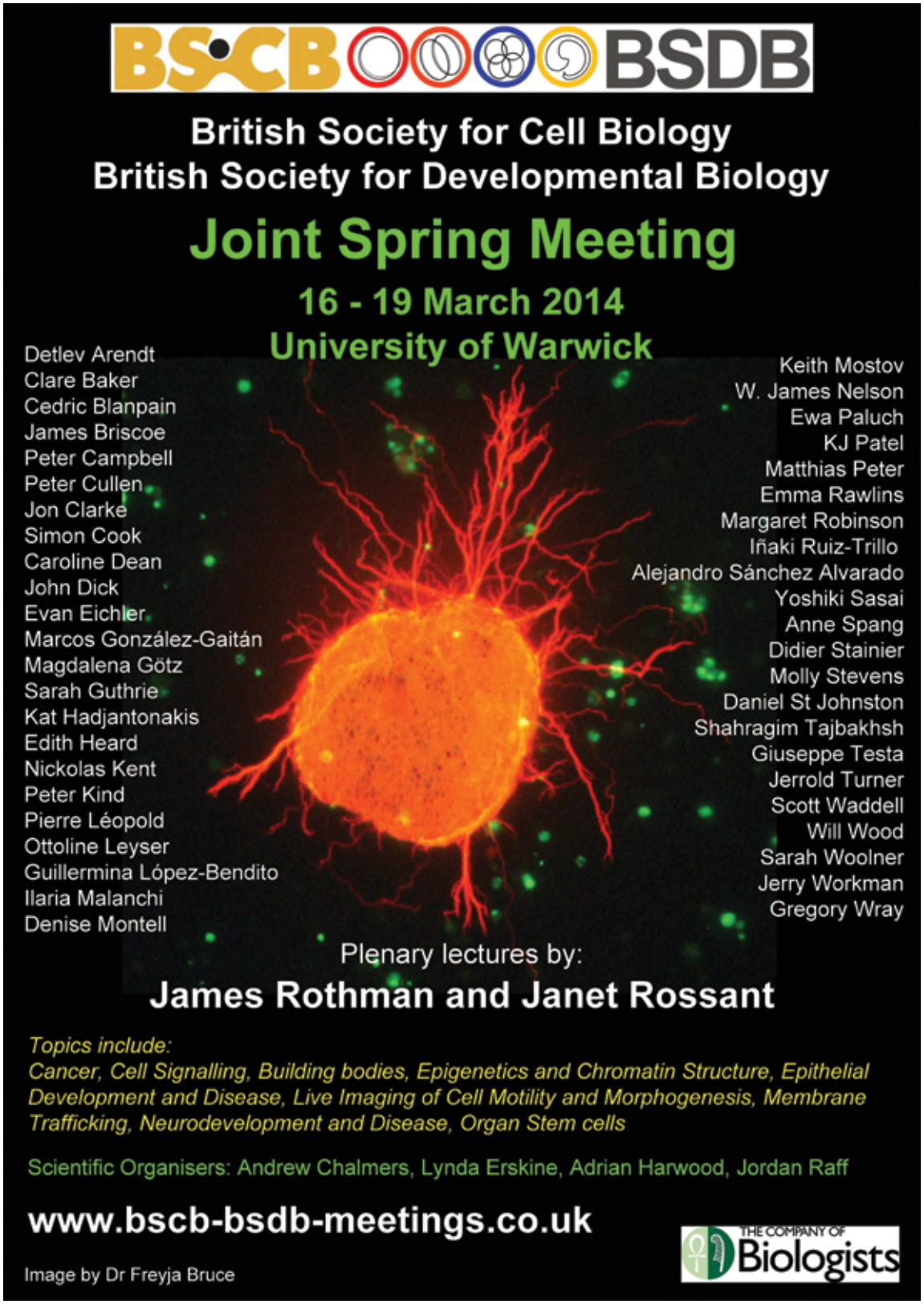
Organizers: Andrea Münsterberg (BSDB), Uli Mayer, Ian Clark, Tonia Vincent (BSMB)

International Society for Differentiation – joint meeting in London.

2-5 November

Organisers:

Mariane Bronner, Josh Brickman, Fiona Wardle, Robb Krumlauf, James Briscoe and Elly Tanaka


BSCB
BSDB
British Society for Cell Biology
British Society for Developmental Biology
Joint Spring Meeting
16 - 19 March 2014
University of Warwick
Detlev Arendt
Clare Baker
Cedric Blanpain
James Briscoe
Peter Campbell
Peter Cullen
Jon Clarke
Simon Cook
Caroline Dean
John Dick
Evan Eichler
Marcos González-Gaitán
Magdalena Götz
Sarah Guthrie
Kat Hadjantonakis
Edith Heard
Nickolas Kent
Peter Kind
Pierre Léopold
Ottoline Leyser
Guillermina López-Bendito
Ilaria Malanchi
Denise Montell
Keith Mostov
W. James Nelson
Ewa Paluch
KJ Patel
Matthias Peter
Emma Rawlins
Margaret Robinson
Iñaki Ruiz-Trillo
Alejandro Sánchez Alvarado
Yoshiki Sasai
Anne Spang
Didier Stainier
Molly Stevens
Daniel St Johnston
Shahragim Tajbakhsh
Giuseppe Testa
Jerrold Turner
Scott Waddell
Will Wood
Sarah Woolner
Jerry Workman
Gregory Wray
Plenary lectures by:
James Rothman and Janet Rossant
Topics include:
Cancer, Cell Signalling, Building bodies, Epigenetics and Chromatin Structure, Epithelial Development and Disease, Live Imaging of Cell Motility and Morphogenesis, Membrane Trafficking, Neurodevelopment and Disease, Organ Stem cells
Scientific Organisers: Andrew Chalmers, Lynda Erskine, Adrian Harwood, Jordan Raff
www.bscb-bsdb-meetings.co.uk
Image by Dr Freyja Bruce
THE COMPANY OF Biologists

New Committee members

Sally Lowell

Sally Lowell is a Wellcome Trust Career Development Fellow at the MRC Centre for Regenerative Medicine, University of Edinburgh. She did her PhD with Fiona Watt at CRUK, followed by postdoctoral training with David Anderson at Caltech and Austin Smith at the University of Edinburgh, before setting up her own group in Edinburgh. She works on understanding the differentiation decisions of pluripotent cells.

Andreas Prokop

Throughout my scientific career I have always been fascinated by Developmental Biology, in particular the development of the nervous system. Using Drosophila as my model of choice, I have worked on a range of aspect including neuronal cell lineage regulation and the mechanisms that underlie the electrical wiring of the brain, i.e. synapse and dendrite formation as well as axon growth. A more recent trend in my group is to study the mechanisms that maintain axons for the life time of an organism, a unique biological challenge in the ageing brain where developmental mechanisms are contributing to a surprising degree..

Travel grants (Company of Biologists Travel Awards)

BSDB Spring and Autumn meetings
These are the only UK meetings for which there is BSDB support. Grants cover cost of registration (but not conference dinners) and basic travel if funds permit. Generally we are receiving more applications than we can fund in full and preference is given to student members who present posters. BSDB members based abroad are eligible for a contribution (max. £400) to attend our meetings. All applications for travel grants to attend BSDB meetings must be in the hands of the Treasurer by the published deadline.

Overseas meetings
There is considerable demand for funds to travel to meetings overseas. Applications are collected each month and a decision on awards made at the end of the month with funds awarded according to the remaining budget. To allow us to fund as many applicants as possible we are currently limiting awards to a maximum of £400. Preference is given to members presenting work at the meetings.

Practical courses
The BSDB will also provide funds up to a maximum of £500 for members to attend courses or to visit laboratories overseas. These applications are considered alongside those for overseas meetings.

I process the applications as rapidly as I can but it can be 6–8 weeks after you submit an application before you are notified of your award. Please note that I do not make funds available to attend meetings that have already taken place when I come to consider the applications. Please bear this in mind and submit your application at least two months before the start date of the meeting.
Applying for a travel grant
Members should complete a Travel Grant Application form and send it to the Treasurer. Forms can be downloaded from the BSDB website: www.bsdb.org. Applications for overseas meetings are advised to be submitted 3–4 months in advance so that the BSDB contribution can be used as a lever to prise the rest of the money from other sources. Grants will NOT be awarded in arrears.
Please note: Nobody will be awarded more than one travel grant per year for an overseas trip. No more than two people from one department or one person from a group will be awarded a grant to a particular meeting. Also, due to our charitable status, the purpose of any award must be clearly identifiable as Developmental Biology.

Please Note.
Only members paying the correct subscription to the Society will be eligible for a Travel Grant

Subscription information

Full members	£35 per annum
Student members	£15 per annum

BSDB Axon Guidance and Regeneration

28th - 30th August, 2013
University of Aberdeen, UK

The Autumn Meeting of the BSDB on 'Axon Guidance and Regeneration', held on the 28th - 30th August, 2013 at the University of Aberdeen in the beautiful surroundings of Old Aberdeen, was an excellent conference of around sixty delegates, full of exciting talks, highly distinguished speakers, and many opportunities for interaction and fruitful discussion. Talks and posters throughout the conference ranged over a number of fascinating topics, including both classical and novel axon guidance mechanisms (how neurons project axons correctly to specific targets to achieve the circuitry of the nervous system) and how these findings may be used to promote axon regeneration after injury or disease. How different axons project to specific targets in the same environment was discussed in detail, including novel and exciting evidence to support the idea of how not only one specific axon guidance cue, but combined cues acting in synergy, combined with a variety of receptors on different cells, as well as translation and transcription, can guide axons. We were extremely lucky to have two wonderful and inspiring plenary talks. Using the optic system as a model, Professor Carole Mason (Columia University, USA) showed her work on how a combination of the guidance molecules Sema6d, PlexinA1 and NRCAM are all required at the optic chiasm for contralateral retinal ganglion cell axons to cross the midline, an important mechanism for the correct connectivity of the visual system. These findings bring forward the idea that a consortia of guidance molecules and specification cues both on the axon growth cone and in the environment is needed for correct axon guidance. In addition, Professor Mason showed exciting new work on how the birthdate (neurogenesis rate) of different neurons in the eye may lead to specification of their identity. In the second plenary lecture, Professor Christine Holt (University of Cambridge, UK) showed us her fascinating work on how differential translation of the actin assembly machinery in different parts of the axon growth cone can lead to attraction or repulsion. This suggests that local translation in the axon, dendritic spine and surrounding cells can affect axon guidance and neuronal activity. In addition, Paola Bovolenta (Instituto de Neurociencias, Spain) described her work on how different levels of the morphogen sonic hedgehog (Shh) in both RGC cells themselves and at the midline are important for correct guidance of RGC axons. Artur Kania (Institut de Recherches Cliniques De Montreal, Canada) and Franco Weth (Karlsruhe Institute of Technology, Germany) added to this theme and described complex and novel work showing how guidance cue additivity, synergy and a variety of forward/reverse and cis/trans signalling through multireceptor complexes on growth cones can guide axons. How to study what happens to the circuitry of the nervous system when correct axon guidance is disturbed or incomplete was discussed by several speakers, in particular by using transgenic mouse, fish and fly models to disturb genes in particular parts of the optic system. The function of non-neuronal cells in axon guidance and regeneration was also discussed. Iris Salecker (NIMR, UK) described how their beautiful imaging of CNS glia in Drosophila medulla neuropil glia (mng) mutants is helping to define the development of different glial classes and the nature of their association with developing axons, and to suggest novel genes involved in these processes. Charles ffrench-Constant (MRC Centre for Regenerative Medicine, UK) told us about his group's work on oligodendrocytes and central remyelination, and in particular, how a limited window for CNS remyelination in the CNS by oligodendrocytes may be extremely important for targeting therapies in multiple sclerosis. Several talks focused on the genes and mechanisms controlling the physical process of axon extension and how these may be manipulated to promote axon regeneration. Kristjan Franze (University of Cambridge, UK) used high-resolution 'stiffness' maps of Xenopus brain tissue to show that axonal growth speed and length is affected by the 'stiffness' of the axonal growth substrate. This exciting finding suggests that, in addition to typical chemical signals, mechanical forces in surrounding tissue are important for correct axon guidance, and suggest that a

mechanosensative channel may be important. In a similar technological advance, Geoffrey Goodhill (University of Queensland, Australia) showed how their careful and in-depth timelapse analysis of axon growth cone morphology led to the discovery of oscillations in growth cone shape over time, and that these oscillations predict the eventual movement and guidance of the growth cone. Finally, exciting findings in enhancing CNS axon regrowth were shown by Frank Bradke (DZNE, Germany). By using a blood-brain barrier crossing drug to stabilise axonal microtubules, causing an accumulation of microtubules at the axon leading edge and axon regrowth, they were able to show functional recovery after CNS injury in rodents, an inspiring result in the difficult CNS environment.

The conference location in the historic Elphinstone Hall and New Lecture Theatre at the University of Aberdeen, surrounded by greenery and beautiful buildings, provided a tranquil environment for many enjoyable and productive discussions and informal chats over refreshments and during excellent poster sessions. On the last night, we were treated to the sight of dolphins swimming in the sea next to Aberdeen beach, during a drinks reception before a great Conference Dinner and opportunity to relax and socialise in the Beach Ballroom on Aberdeen seafront. This was followed later in the evening by a very active and enjoyable Ceilidh (traditional Scottish dance), ably assisted by our Scottish delegates.

I would like to thank the conference organisers and BSDB for providing this great opportunity for researchers to hear about and discuss cutting-edge and exciting research in the field of axon guidance and regeneration.

Francesca Mackenzie
Research Associate, UCL Institute of Ophthalmology

ISDB 17th Congress in Cancun Mexico

16-20 June, 2013
Cancun Mexico

The 17th international congress of developmental biology was held in June this year in Cancun, Mexico. The meeting, with over 600 participants and three parallel sessions every day, covered a wide range of areas in developmental biology from molecular, cellular and organismal perspectives.

The meeting started with a session on 'growth and form' where an insightful talk by Alejandro Sanchez Alvarado discussed how developmental transcriptome could be used to overcome the inadequacy of traditional terminology in describing the stages in flatworm embryonic development. This was followed by Celeste Nelson's talk on the role of biomechanical cues in morphogenesis and branching of epithelial tubes. This talk discussed a method to reliably quantify mechanical stress during the morphogenesis of cultured epithelial tubes. Talk by Elly Tanaka highlighted two different ways of limb regeneration in axolotls and newts. Elliot Meyerowitz delivered this years EMBO lecture on how mechanical forces can control chemical signalling during pattern formation in Arabidopsis meristem.

There were several excellent plenary talks throughout the meeting. John Gurdon rose to deliver the first of these amidst a standing ovation from the audience to honour his seminal contributions to the field and his recent Nobel Prize. Prof. Gurdon focused on the process of gene re-activation and the mechanisms of resistance to reprogramming in somatic nuclei transplanted into the Xenopus germinal vesicles. His results showed that understanding both these aspects of reprogramming are essential for developing an effective cell replacement therapy. Plenary talks by Peter Holland and Patricia Beldale addressed the genetic basis of phenotypic diversity in animals. While Peter Holland concentrated on genotypic diversity and Hox cluster expansion in butterflies and moths,

Beldale approached this question by studying the genetic basis of pattern formation in butterfly wing spots.

Cliff Tabin's talk on the evolution of morphological traits in cavefish and in humans was of particular interest. By comparing human and chimp genomes, his lab has identified over 200 human specific enhancer deletions that could underlie regressive human traits (like reduction in body hair).

Janet Rossant delivered this year's ISDB Harrison medal lecture. The ISDB president Claudio Stern presented Prof. Rossant and many of the past recipients with a newly designed Harrision prize medal. In her highly entertaining talk (with a cheesy 1980s video on 'transgenic techniques in mice'), Prof. Rossant gave an overview of her research stretching back to her PhD days in Cambridge. She discussed the ideas and experiment that led to an understanding of cell fate decisions in mouse embryos and the mechanisms that regulate pluripotency and differentiation in ES cells. She had an important advice for young researchers, "start with an interesting problem so that you can keep coming back to it."

Neural crest research was in the limelight this year, with the EG Conklin medal of the SDB to Marianne Bronner, the first ever LASDB prize for Roberto Mayor and the SDB poster prize to Kara Nordin (a PhD student from Carole LaBonne's lab at the Northwestern university). Kara studies the function of SoxE factors and Sox5 in neural crest development. Her results have clarified the role of these transcription factors in melanocyte vs chondrocyte fate decision. She will be presenting her work at the next BSDB meeting in Warwick. John Fallon was presented with the SDB lifetime achievement award. In his talk, 'The limb and I', Prof. Fallon discussed experiments that led to an understanding of molecular and cellular mechanisms that drive vertebrate limb development.

Claudio stern organised a very useful round table discussion on 'suceeding in research in a competitive environment'. A panel of eminent scientists (Marianne Bronner, Eddy de Robertis, Maria Leptin, Janet Rossant and Masatoshi Takeichi) engaged in a frank discussion with the audience on the do's and don'ts in research. All of them emphasised the importance of focus, lateral thinking and having a work-life balance.

Finally, Phil Ingam was elected as the new president of the ISDB at the meeting and Singapore was chosen as the venue for the next ISDB congress in 2017.

Aditya Saxena
PhD student with Helen Skaer
Department of Zoology
University of Cambridge

Graduate Student Column

Magdalena Stasiulewicz

After 2 years of doing an excellent job as Graduate Representative for the BSDB Jorge Beira has passed on the role to me. As a PhD student from up north, where any sunny day above 20oC is considered a heat wave, I am hoping to encourage more graduate students from Scotland, as well as the rest of UK, to join BSDB. Moreover, I aim to support the contact between student members of BSDB and represent their opinions to the BSDB committee.

Writing this piece I have realised that it has been almost 6 months since the last BSCB-BSDB spring meeting which means it's only 6 months left until the next meeting. I am always very excited about that conference as it brings together cell and developmental biologists from across the whole of Europe and beyond. It is a great opportunity to get to know other scientists, especially graduate students, from the same field. On that note, I am very excited about organising the Graduate Symposium and the evening social for the next meeting. I believe the Symposium encourages students to interact and build up connections that are surely beneficial for the science part. In addition to that, I have witnessed myself how the social activities bring students together and make the whole meeting also a lot of fun. I have big shoes to fill and I hope to contribute to that great atmosphere of the meeting.

I believe that by now most of you know about "The Node: the community site for and by developmental biologists". It is a great connection point for everyone from developmental biology field. Here you can find reviews of the recent publications and biology related books, as well as, info on the upcoming events and possibly the funding that you may need for them. Many other topics are covered that may be of interest to developmental biologist. Also everyone is encouraged to share the news from the developmental biology community and take part in discussions on various relevant topics.

You are also encouraged to join our "BSDB graduate students" Facebook group where I will post news on any upcoming events and courses. It can also act as a place where we keep in touch and share our comments or ideas.

Finally, do not hesitate to contact me if you have any comments or suggestions for the BSDB. We would love to hear your feedback on the meetings we organise. I will do my best on passing them to the rest of the BSDB committee which will meet again very soon in November so please do get in touch. Hope to see you all at the next spring meeting in 2014!

Top tips for organ shape – the elaboration of renal architecture

Helen Weavers

The process of organogenesis – how amorphous masses of cells are transformed into complete organs during embryonic life – has fascinated developmental biologists for decades. How is the behaviour of constituent cells coordinated to produce a mature tissue of highly defined size and shape? And one in which the patterned differentiation of cells results in a physiologically competent structure? These are questions that have occupied Professor Helen Skaer's lab in the Zoology Department at the University of Cambridge for the last 25 years.

Enrolled on the Wellcome Trust-funded PhD Programme in Developmental Biology, I was fortunate enough to be a graduate student in the Skaer lab and recently completed my doctoral research there in the Summer of 2012. During this time, I became intrigued by the way in which organ systems develop with the precise three-dimensional architectures that underpin organ physiology. Indeed, within our own bodies, organs must not only be correctly positioned in relation to surrounding tissues (particularly those with which they physically or functionally interact) but they must also possess a highly specialised internal 3-D structure.

In the lab we study how these precise tissue architectures are generated during embryonic development, with particular emphasis on the formation of renal systems. We exploit the renowned attributes of the fruitfly Drosophila – its ease of experimental manipulation and tractable genetics – to address fundamental questions in organogenesis. The insect renal system, itself comparatively simple, shares many features with more complex organs (especially the vertebrate kidney) which make it a particularly valuable model. In fact, work in the lab has uncovered remarkable parallels between insect and vertebrate nephrogenesis at the structural, molecular and functional levels; for instance, the gene mutated in human nephrotic syndrome (NPHS-1 or Nephrin) has a homologue in the fly which is essential for normal renal development.

The insect renal system is composed of four epithelial renal tubes – the Malpighian tubules – named after the eminent 17th century anatomist Marcello Malpighi. During embryogenesis, the four small primordial buds are transformed into four highly elongated tubules that are very precisely arranged in the body cavity. The tubules also possess a very distinctive looped architecture – which is strikingly reminiscent of the looping observed in the nephrons of the mammalian kidney.

During my doctoral research, I discovered that specialised cells found at the very tips of the developing renal tubules are essential to establish proper tube structure. These tip cells are specified early on during embryogenesis and persist as the tubules adopt their characteristic shapes and positions. By analysing tip cell behaviour in

real-time, it was clear that tip cells are highly dynamic and play a crucial role anchoring the ends of the tubules as they extend. Disrupting this anchorage, both genetically and by cell ablation, causes dramatic defects during tubule morphogenesis; tubules are grossly mispositioned in the body cavity and lack the tight looping characteristic of wild-type tubes. This in turn has profound consequences for renal function, with a severe loss of fluid homeostasis that causes the adults to develop swollen abdomens and die prematurely.

In fact tip cells have been shown to play important roles during the development of other tubular systems, such as the lung, pancreas and vasculature. Here, cells at the growing tips of these branched networks act as leading cells that steer tube outgrowth. However, we find that renal tip cells act in a remarkably different manner - clearly playing no role in leading renal tube outgrowth – and instead anchor the tubule ends to generate tightly looped tubular structures.

In vertebrates, looped architectures are most prominent in the nephrons of the mammalian kidney where the loop of Henle connects the tubule tip (at the glomerulus) to the collecting duct. Here, looping of both the nephron and its vascular supply creates a counter-current system that maximizes the efficiency of ion and fluid homeostasis. Given the similarities between insect and vertebrate renal systems, we hope studies such as ours may provide important clues to how mammalian nephrons develop. It is possible that they too employ similar anchorage mechanisms to stabilise the position of the developing glomerulus and maintain their looped structure as the kidney tubules extend, resulting in the final intricate array of nephrons in the mature kidney. Moreover we hope to learn more about the pathogenesis of debilitating renal diseases where normal tubular morphogenesis fails.

In March 2013, I was invited to present my doctoral thesis work at the BSDB/BSCB joint Spring Meeting at the University of Warwick – in reward for receiving the BSDB's Beddington Medal 2013. This award is given each year in memory of Rosa Beddington, an inspirational developmental biologist who had an enormous impact on the field. I am immensely grateful to the BSDB, not only for the honour of this award, but also the beautiful Medal (inset) which features Rosa's own design of mice on a stylised DNA helix. The Spring Meeting was exciting and stimulating, as always, and I was exceptionally happy to have one more (final) opportunity to present my doctoral research to such an esteemed audience. I am also indebted to Helen and all other members of the Skaer lab who have been an invaluable source of inspiration and support during my PhD.

My curiosity and passion for scientific research deepened during my time as a graduate student; I have now chosen to pursue academic research further and recently embarked on an MRC-funded post-doctoral position with Professors Paul Martin and Will Wood at the University of Bristol. Here, I will study the detailed molecular mechanisms controlling wound healing and the associated inflammatory response, with the hope that such research will provide important insights into the wound healing pathologies seen in human patients in the clinic and perhaps offer novel suggestions for remedies.

Waddington Medal winner

Jim Smith

The BSDB Waddington medal is given for "outstanding research performance as well as services to the developmental biology community", and this year it was my great pleasure to present it to Jim Smith, current director of the National Institute for Medical Research, Mill Hill .

Jim has made many seminal contributions to our understanding of morphogenesis and patterning of the vertebrate embryo, working primarily in Xenopus. His early work uncovered the identity of the all important signaling ligands that induce mesoderm in the early frog embryo, and from there he's gone on to make a living trying to understand the molecular circuitry underlying patterning of the lineage with a very strong focus on the roles played by members of the Tbox family of transcription factors. More recently he's been segueing into more topical areas including working with differentiating mouse embryonic stem cells. Jim's work has been recognized by many honors and awards – he was made a fellow of the Royal Society in 1993 at the extraordinarily young age of 39, and was the EMBO Medal winner in same year. During the course of his career Jim has made numerous contributions to UK science. He's a past member of the BSDB committee, and was Chair of the Society from 1994-99. For much of the noughties Jim was the Editor in Chief of our flagship journal Development. As well as running NIMR, he currently Chairs the Wellcome Trust/Royal Society Henry Dale Fellowship committee. Jim has a well deserved reputation as a truly inspiring supervisor, and acts an informal and highly valued mentor for very many past and present Developmental biologists in the UK.

Jim was born and grew up in London, and attended Latymer School where he excelled academically, but focused on science (with the notable exception of biology!). The School boasts many famous alums including Hugh Grant and Milton Jones, and Jim has retained strong connections as he's currently a School Governor. He did his undergrad degree at Cambridge, where he was originally intent on studying Physical Sciences, but fell under the spell of cell and developmental biology as a result of lectures by John Gurdon and Peter Lawrence. After completing a first class degree in Zoology Jim embarked on a PhD with Lewis Wolpert working on chick limbs. I asked Lewis what kind of a student Jim was, but the only thing he could remember were Jim's escapades onto the roof of the building and throwing sandwiches in the air to attract the passing seagulls. But he did think Jim "probably had been quite a good student".

After his PhD Jim moved to Harvard Med School where he spent two years with Chuck Stiles, at the time one of the leading labs working on growth factors. He returned to ICRF for a second post-doctoral stint with Jonathan Slack, where he first became interested in frog mesoderm patterning. During this time he also published a series of important papers from collaborations with Chris Wylie and Janet Heasman. He was recruited in 1984 as a group leader at Mill Hill. The next few years were truly exciting and exceptional ones. Working shoulder to shoulder along side his small team he painstakingly sought the

identity of the elusive morphogen "XTC" made by a Xenopus cell line, that he had shown could induce mesoderm in embryos, publishing two landmark papers in 1987 and 1989 in the journal Development.

To quote one of Jim's junior colleagues from the time "Jim is a perfect example of Pasteur's dictum "fortune favours the prepared mind". In discovering XTC-MIF, and after his post-doc with Chuck it was therefore no accident that Jim immediately knew how to identify the active ingredient as a polypeptide growth factor that wasn't FGF and was most likely a member of the TGF-beta superfamily. Mind you, he was a bit of a jammy so-and-so in getting the mesoderm inducing activity out of the very first Xenopus cell line that he tested!"

All Jim's former members expressed a wish that they could emulate his slightly compulsive phenotype which allowed him to design his wonderful lab notebook structure. To quote "It's probably the best I've ever seen, with many short sections/experiments, each with a title and a number that can be used to label the relevant samples in the fridge as well as enabling a thorough index of the whole notebook".

After 16 years at Mill Hill Jim moved in 2001 to become Director of the Gurdon Institute. Although he enjoyed this job enormously, in 2009 Jim was recruited back to the NIMR, this time as Director, where he's currently in the throes of the mammoth task of planning the upcoming move by NIMR to the new Crick Institute in central London.

Finally, no overview of Jim would be complete without mention of his hobbies. Jim enjoys photography, he's also into modern technology and always on the search for the latest gadget. As an active sender of Tweets and Instagrams, he's well placed to give the youth of today a run for their money in the cyber loafing category. However Jim is no couch potato as he's also an avid cyclist and runner, juggling his packed diary to train for marathons.

Jim was a worthy winner of the Waddington Medal and his lecture provided us with very interesting stories about his life in science and how he became an embryologist, as well as fascinating insights into the strategies underpinning the major findings that have emerged from his lab over the decades.

Liz Robertson

Jim Smith circa 1984

Post-doc column

Stephen Freeman
Riken CDB
Kobe
Japan

Recently it was the two-year anniversary of my arrival in Japan. In 2011 I landed slap-bang in the middle of the summer, which in Kobe is known mostly for its sweltering temperatures and shirt-dripping humidity, occasionally interspersed with a satisfyingly torrential downpour.

Once I had gotten acclimatized to the humidity (which means once my air-conditioning unit was installed in my apartment) I began to realize that, oppressive heat and humidity aside, there is a lot to love about the Japanese summer. My favourite part is the appearance of the cicadas. From mid-July until September these chubby insects emerge from their underground lairs and clamber up nearby trees, the males singing away in the hope of wooing the listening females. Actually the volume of these songs makes it sound more like they are screaming, but given that they only have a week or so to find a mate before they die, perhaps this is understandable.

What I enjoy most is that there is both a temporal and spatial pattern to the songs. As summertime progresses, different species of cicada emerge, each with their own unique song. On top of this, these species are not equally distributed throughout the city, which means that while some areas are relatively quiet at the beginning of summer, they become alive with the overtures of these insect crooners towards its end. This makes the summer months feel as if a much loved mix tape is playing along in the background, one so familiar you know exactly what song is coming next.

There are a couple of reasons why I enjoy this summer soundtrack so much. One obvious one is that most things that have a strong spatial and temporal theme appeal to me – I'm a developmental biologist, and the embryo is the ultimate example of spatial/temporal coordination. But more than this, the reason for my cicada love affair is that they shift my focus onto the process of summertime unfolding around me, and away from my usual summertime goal of surviving in air-conditioned rooms until the arrival of autumn. The cicadas allow me to derive pleasure from the passing of summertime, as well as pleasure from reaching the goal of lovely, temperate autumn.

This predilection for process is something that seems to operate at almost every level of Japanese culture – it is the thing I have noticed and enjoyed the most since moving here. Almost everything has a correct way of being done. Perhaps the most famous example is the tea ceremony, where the process is its raison d'être. But countless other examples exist – the ritualistic picnic parties that accompany cherry blossom season; the sequential cleansing steps taken during an onsen visit, even eating out at a restaurant often has a correct protocol. It may all sound a bit fussy, but these things

are not draconic laws, rather they exist as a result of a culture that places a high value upon appreciating the method as well as the outcome.

Scientists, similarly, place a high value upon their methodology as well as its outcomes; the two are intrinsically linked – without good methodology (or in other words an appreciation of the process) you cannot obtain accurate answers. Since 2010, however, the government's cuts to the research budget have forced research councils, and ultimately scientists, to shift their focus somewhat.

In case you need reminding, it has been five years since the world came crashing down. It feels like such a long time ago that now even the phrase "credit crunch" seems to be an anachronism – as out of place as I feel on those (increasingly rare) occasions I find myself in a "nightclub". But it is important not to forget that the scientific community is still waist deep in the consequences of the credit crunch – specifically the 2010 and 2013 spending reviews. The reviews have marked a shift in funding priorities – one in which the goal has become more important than the process. Both reviews have protected funds allocated to medical research, and so basic research funding has born the brunt of the cuts.

Now, I should make it clear I don't think protecting the medical research budget is wrong, that would be idiocy. My gripe is with the perceived lack of importance that seems to be married to basic research – the syndrome that I call "what good is researching the behaviour of mould/the sex lives of worms/the growth of a frog… get a proper job!" This, I think, is linked in part to the cultural importance in the western world that is placed upon the end result. Basic research often does not have an end result with a clear or immediate benefit to society (and so in some peoples eyes it does not have an end result at all); all it has is its process and methodology.

This can make it a difficult sell to the media and the general public. But the truth is that all science has no end-result – it is just a process of observation, experimentation and conclusion that is repeated infinitely. The success of human civilization has been built upon this repeated process, and the easy-access, broad pool of knowledge it has given us. Basic research may not be the flashy diving board that comes with this pool, but it is the equally important foundations upon which the diving board was built. A consistent squeeze on basic research funding may not seem to have much of an impact now. But it will lead to losses in expertise that may be important in solving problems that arise in the future (like how to repair the diving board when it succumbs to wood rot, to stretch the pool analogy to its limits).

Anyway, the upshot of the anniversary I mentioned oh-so-long-ago at the beginning of the article is that I have been reminiscing about the past and thinking of the future. After the 2015 general election there will probably be another spending review. Let's hope that whoever is in power, when they are drawing up the next research budget they listen to the ghost of science past and the voices of science present, give basic research the appreciation it deserves and

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