Issue 91 / Summer 2013

PN Physiology News

Language, culture and international relations

Reports from national and international associations

The female faces of physiology

International special issue

The Physiological Society

Annual General Meeting 2013

The Annual General Meeting (AGM) of The Physiological Society will be held on 24 July 2013, commencing at 1.00pm at the Symphony Ballroom, Hyatt Regency, 2 Bridge Street, Birmingham B1 2JZ.

Ordinary and Honorary Members have the right to attend and vote at the AGM. Affiliates have the right to attend, but may not vote. Please note that you do not have to register for *IUPS 2013* to attend the AGM. Questions can be submitted in advance online.

The Annual Review, Annual Report and Accounts, and agenda for the 2013 AGM, as well as minutes of last year's meeting, can be downloaded via the link below. The Annual Report and Accounts, which received an unqualified audit opinion, should be consulted for a complete understanding of the financial affairs of The Society.

www.physoc.org/agm2013

The Physiological Society

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Epithelia and Smooth Muscle Interactions in Health and Disease

A Physiological Society joint Themed Meeting in Epithelia & Membrane Transport and Vascular & Smooth Muscle Physiology

Convention Centre Dublin, Ireland
11–13 December 2013

- Airway remodelling
- Gastrointestinal secretion & motility
- Epithelia & smooth muscle ion channels

Plenary speakers

Kim Barrett
(University of California San Diego, USA)

Kenton Sanders
(University of Nevada, USA)

Registration opens 12 August 2013
Abstract submission opens 23 September 2013
Abstract submission closes 23 October 2013
Early bird registration closes 11 November 2013

EM VS

www.physoc.org/emvs13

The Physiological Society

Physiology News

We welcome feedback on our membership magazine, or letters and suggestions for articles for publication, including book reviews, from Physiological Society Members. Please email **magazine@physoc.org**

Physiology News is one of the benefits of membership of The Physiological Society, along with reduced registration rates for our high-profile events, free online access to The Physiological Society's leading journals, *The Journal of Physiology* and *Experimental Physiology*, and travel grants to attend scientific meetings. Membership of The Physiological Society offers you access to the largest network of physiologists in Europe.

Join now to support your career in physiology:
Visit **www.physoc.org/membership** or call **0207 269 5728.**

Membership Fees for 2013	**FEES**	
Membership category	Direct Debit	Non-Direct Debit
Ordinary Member	£73	£93
Ordinary Retired Member	-	-
Affiliate	£16	£21
Associate	£36	£47
Undergraduate Join alone (single payment)	-	£15
Undergraduate Join as part of undergraduate society (single payment)	-	£10

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Editorial

Jonathan Ashmore

President

This issue of *Physiology News*, our Members' magazine, seeks to give a broader picture of the state of physiology, with reports from across the globe, from physiologists and physiological societies. Here at home, our Society is certainly in good shape. However, as Society President, I am concerned that we focus on identifying The Society as the body which younger physiologists in all areas should consider their natural home. There are sections of the bioscience and biomedical communities which have drifted away from the foundation science and we should seek to bring these back together (see page 9 for details of an exciting Society project seeking to assess the state of physiology in the UK and Ireland).

My term as President of The Society began at our Main Meeting in Edinburgh in July last year. Our Main Meeting this year is, of course, IUPS 2013. This edition of *Physiology News* should reach you before the congress kicks off. We anticipate a real buzz, with 103 symposia spread over the five days of the Congress, 2000 posters, a late-breaking poster session (a new departure for The Society) and physiologists (both established and newly minted) from 48 countries coming to Birmingham for the meeting.

Although the meeting has been in the making since our bid to host it was accepted in Kyoto in 2009, the excitement of knowing that the meeting is now really happening is tangible. The local organising committee, chaired by David Eisner and Bridget Lumb, along with Society staff, have put huge efforts into ensuring that it will run smoothly. It is a meeting we can look forward to keenly. And I am willing to bet a new set of traffic lights that, as last time The Society hosted the IUPS – in Glasgow in 1993 – IUPS 2013 will be remembered as a truly outstanding international meeting!

In addition to *Physiology News* (with us in the form of a magazine since 1992), *The Journal of Physiology* (first published in 1878) and *Experimental Physiology* (started in 1908), we can now add another publication to The Society's stable: *Physiological Reports*.

The first paper of PR (as it is known locally) was published on 6 May this year. The journal represents an extremely stimulating international partnership between The Society, the American Physiological Society and our publishers, Wiley-Blackwell. I do not need to say what interesting times we are all living in when it comes to publishing – nobody seems able to find a crystal ball to predict how the landscape will lie in five to ten years' time or how the balance between traditional and online publishing will tip. So with the go-ahead for *Physiological Reports*, Council is ensuring that The Society is thinking ahead and covering all options. It has been extremely impressive to see how enthusiastically both sides of the Atlantic have thrown themselves into this venture and we look forward to the new journal's success (see page 7 for a report on the US launch of this venture – and don't forget to come to the UK launch at the IUPS congress).

As well as a new journal, we have, of course, finally acquired and moved into our own headquarters – Hodgkin Huxley House. The building was formally opened by David Willetts, the Minister for Universities and Science, at the end of May (see page 7). The idea of a wholly owned office had been discussed regularly (and rejected) at The Society's meetings for well over 50 years for reasons of cost. But we have finally taken the plunge. And it is worth it. The location means that the offices should be easily accessible to everyone and we hope that Members of The Society will investigate this new Home for Physiology themselves.

Vote now: 2013 Council elections

The Society has six vacancies on the Council of Trustees from July 2013. Trustees are legally responsible for the overall governance, management and policy of The Society, ensuring that the charitable objects for which it has been set up are met. The Trustees are also the Directors of The Society.

A successful call for nominations resulted in ten Members standing for election:

- Matthew Bailey
- Mark Cannell
- Sue Deuchars
- Lucy Donaldson
- Carolyn Greig
- Anne King
- Prem Kumar
- Mike Ludwig
- David Mazzocchi-Jones
- Rachel Tribe

All candidates have been proposed by five Ordinary or Honorary Members. The candidates' proposers and supporting statements, together with instructions on voting, can be found at www.physoc.org/council-trustees-election-2013-vote.

All Ordinary and Honorary Members are encouraged to vote for those they wish to fill these vacant roles. Members may vote for up to six candidates at the URL above. Voting closes on 17 July 2013.

Time up for Society's Treasurer

PN talks to out-going Honorary Treasurer, Rod Dimaline, of the University of Liverpool

Rod Dimaline has been The Society's Honorary Treasurer since 2009 and is stepping down from the role at the Annual General Meeting in July. He is a professor in the Department of Cellular and Molecular Physiology, in the Institute of Translational Medicine at the University of Liverpool. His research explores the neuroendocrinology of the upper gastrointestinal tract, particularly how changes in gene expression regulate structure and function of the gastric epithelium.

Becoming treasurer
"I hadn't thought about the role and was unaware that The Society was seeking a new treasurer when I was approached by the then president, Clive Orchard. Talking with outgoing treasurer, Graham McGeown, the role sounded very interesting and I believed I could make a contribution to The Society."

Highlights of the role
"It's been a privilege and a pleasure to be involved in several exciting developments over the last four years. In acquiring the freehold of Hodgkin Huxley House, The Society has established a home for UK physiology and opened up the potential for diversification of its income streams. Securing a new publishing contract with Wiley Blackwell provides stability in developing a coherent business plan and reserves policy over the next five years. It has also been exciting to launch *Physiological Reports*. This establishes an important presence for The Society in open access publishing and also signals increasing cooperation with our sister society in the USA."

Challenges faced
"As The Society currently relies on publishing for 80% of its income, we have to be wary of the difficult and rapidly changing publishing landscape. The developments outlined above indicate The Society's determination to address this issue. The Society is also keenly aware of the need to maintain the profile of physiology on both national and international stages."

Advice for successor
"Enjoy the challenge of the role! Don't worry about being thrown in at the deep end; the staff and fellow Trustees are incredibly supportive."

Anne King

has been appointed by Council to become the next Honorary Treasuer and The Society look forward to welcoming Anne into the role from July 2013.

Society meetings from 2014

David Wyllie, Meetings Secretary, explains The Society's new approach to the meetings calendar

In 2014 the Main Meeting of The Society returns to London for the first time since 2006. This flagship event will be held at the Queen Elizabeth II Conference Centre in the heart of Westminster from 30 June to 2 July.

Next year also sees a new and exciting development in the events calendar when we launch 'Topic Meetings'. The Meetings' Committee are keen to foster opportunities for our membership which will allow them to attend meetings that provide a science programme which breaks down barriers within subject areas – we hope that Topic Meetings will achieve this. In consultation with our Theme Leads, the Meetings Committee proposes that we hold the first of these Topic Meetings in the autumn of 2014 in the subject area of obesity.

The structure of this two-to-three day meeting will be based on the highly successful *Biomedical Basis of Elite Performance* meeting held in March 2012. Topic Meetings will incorporate education and outreach activities, co-ordination of publications in our journals and we will invite cognate societies together with other charitable organisations and funders of research to join with The Society at a scientific meeting that brings together leaders in the field. Importantly, we want to create an event that appeals to Members from all of our existing Themes. Our intention is to hold two Topic Meetings per year from 2015 onwards (in the spring and autumn) with planned future Topic Meetings to include ageing and degeneration, and another on imaging. We welcome suggestions for other topics that you would like to see included in our programme of events. The excellent facilities of Hodgkin Huxley House in London, with its Bernard Katz Auditorium, also provide additional opportunities to host smaller and more focused meetings for around 75 attendees. These new initiatives, together with our Main Meeting, which will continue to be held in late June/early July, will allow The Society to continue to host meetings that provide excellent opportunities for scientific debate.

Minister opens Hodgkin Huxley House

The Right Honourable David Willetts MP, Minister for Universities and Science, performed the official opening of The Society's new headquarters, Hodgkin Huxley House (HHH), at an evening reception on 21 May.

The Minister addressed an audience consisting of Society Trustees, committee members and award winners, as well as members of the Huxley, Hodgkin and Katz families. He said: "It's a great honour to be here this evening for the opening of this great, new headquarters for The Physiological Society, named after the Nobel Prize winners Alan Hodgkin and Andrew Huxley who won their Nobel Prize 50 years ago. There is a great history here, in British physiology, of winning Nobel Prizes, with Bernard Katz in 1970 and Robert Edwards in 2010."

An exhibition of historical journals celebrated Hodgkin and Huxley, and also Bernard Katz, after whom the main auditorium is named. The Huxley family also kindly allowed The Society to display Sir Andrew's Nobel medal.

President Jonathan Ashmore and David Willetts MP

Willetts described attending the 2010 Nobel Prize ceremony, a year of particular note for Britain, with resident academics winning four prizes. "We had Edwards in Medicine or Physiology, we had Christopher Pissarides in economics, and we had Geim and Novoselov in physics. It really was an *annus mirabilis*. And of course of those four, only one had been born in Britain. What that told me was that part of the greatness of our science and research activity here is that we provide an environment that attracts people from around the world.

"One of the reasons why it is such a great place to do science is the very rich network we have of learned societies and publications associated with them. The long history of your Society, and the happy links it has to academic publishing, are part of the wider ecosystem that makes Britain such a great scientific location."

Physiological Reports US launch

Physiological Reports, The Society's new open access journal, jointly owned with the American Physiological Society, held a well-attended launch event at the Experimental Biology conference in Boston on 21 April. Editors and staff handed out free leaflets, pens, drinks and food as the Deputy Editor-in-Chief, Tom Kleyman, and the Chief Executives of the two societies, Philip Wright and Marty Frank (APS), explained their vision for the new journal and answered questions.

Tom Kleyman said: "It was great to see so many people come and join us. There was a lot of enthusiasm and I had several people tell me that they already had a paper submitted to the journal or had just decided to submit. Everybody congratulated us on getting the two societies together on this new venture."

Sue Wray, Editor-in-Chief, was unable to attend due to a prior engagement, but said: "I can't wait to play host at the UK launch event at the IUPS meeting in Birmingham!"

Left to right: Philip Wright, Rita Scheman, Tom Kleyman, Cornelia Schnelle and Marty Frank

The UK launch will take place on Monday 22 July, 5-6.30pm, at the IUPS Congress, at stand #75.

The two Directors of Publications, Cornelia Schnelle and Rita Scheman (APS), also used the launch event to catch up with the Wiley editorial team, Christina Dzikowski, Kristen Greaney and Kristin McNealy, on the journal's progress. *Physiological Reports* had then received 34 submissions since its launch on 28 March and 13 more manuscripts were submitted in the following two days alone. The first article has since been published and two more are in the pipeline at the time of writing.

Those of you looking to publish in *Physiological Reports* are encouraged to submit as soon as possible, as only the first 100 accepted articles will be published free of charge.

Launching this summer: a new school research competition

Following the huge success of *The Science of Sport: How to Win Gold* last year, The Society is pleased to launch another school research competition this summer

The Science of Life: How your body Works will have a much broader theme than the previous competition - projects from all areas of physiology will be accepted. Open to all 16-19 year-olds studying towards their A-levels; or equivalent qualifications, the competition will give students a chance to design and carry out their own research project, and then present their findings to active research scientists at The Society.

Students will be invited to submit their findings in two phases: the first in the form of a progress report (e.g. a video, podcast or presentation) following 15 hours of initial research, which will be reviewed and shortlisted; and the second, following 15 further hours of research, in the form of a poster presentation at The Society's main scientific meeting, *Physiology 2014*, in London. Gold, Silver and Bronze prizes will be awarded to the top three projects at the meeting.

Registration for the competition will close on *4 November 2013* and more details will be posted on www.understanding-life.org during the summer.

Key to the success of *The Science of Sport: How to Win Gold* was the brilliant support provided by the researchers who volunteered their time and expertise to mentor the students throughout their projects. Both parties benefited greatly from this collaboration, so we would like to increase the number and range of mentors involved this year.

To this end, we are welcoming researchers at any stage of their career (i.e. PhD upwards) from any area of physiology to participate as a mentor in The Science of Life: How your body works. If you're interested, please email education@physoc.org.

The Science of Life
How your body works

A poster promoting the competition is enclosed with this issue of *Physiology News;* please help us spread the word by passing this onto your school contacts or, if you are a school teacher, displaying this on a noticeboard your students will see.

The Enlightenment Café's immersive theatre event: '*Deadinburgh*'

Public Engagement Grants

In April, The Society announced the projects that have been funded in this year's Public Engagement Grants. The scheme, now in its second year, offers up to £5000 for projects that promote engagement between public audiences and physiologists. This year we have funded five imaginative projects, which take physiology to a range of different audiences.

Following the success of last year's Sports Zone, we are funding the Human Limits Zone in June's round of *I'm a Scientist: Get me out of here!*

Physiology Bites, from Adair Richards Associates, brings together physiologists and school children to discuss exciting areas of physiological research and to make radio documentaries.

The Royal Veterinary College is being funded to expand its RVC Lates, evening events combining hands-on activities and demonstrations.

The Angel Exit Theatre company will bring the endocrine system to life at the Green Man Festival in August using Greek mythology in an event called *Hormone Harmony*.

The Society also provided a grant to support The Enlightenment Café's *Deadinburgh* event, in the Scottish capital, that ran from 18–21 April. *Deadinburgh* was an immersive theatre project in which scientists from the Roslin Institute, Wellcome Trust Centre for Cell Biology and neuroscientists from Edinburgh University interacted with a lay audience to determine how to respond to an epidemic turning the city's residents into zombies.

Physiology Friday: 18 October 2013

biology week 2013

Physiology Friday, now in its second year, is the UK's premier physiology-themed day! The Society is calling on UK Members to mark the occasion by hosting their own events to showcase physiology and highlight the importance of the discipline.

While some events will be organised through The Society's office (watch our website for more information in the near future), many will be held independently by Members. Whether this is a seminar for your colleagues and students, an event for the public, or a visit to a school, we aim to have events covering the length and breadth of the country.

Through Society Outreach Grants and our Departmental Seminar Scheme, we aim to provide funding for those events that need it, though there are many activities that can be run on a shoe-string. There is more information on The Society's website at www.physoc.org/physiology-friday-2013.

The day makes up part of Biology Week, which highlights biological science of all forms to a broad audience. This year there will be a chance for you to get involved in a range of different hands-(and binoculars and microscopes)-on activities between 12 and 18 October.

Lewis Dean, Society Outreach Officer, said: "Physiology Friday promises to be a really exciting chance for physiologists to showcase their work and connect with a range of audiences. It's great to be putting the discipline on the map and allowing audiences to find out why physiology is so important to the biological sciences."

Society to review the health of physiology

The Society has announced the initiation of a major investigation into the state of physiology in the UK. The *Health of Physiology* review will seek to find ways of measuring how well physiology is faring as a discipline in the 21st century. This will inform future priorities and strategic thinking for The Society and, it is hoped, influence policy makers in government.

Led by the Deputy President, Richard Vaughan-Jones, a steering group comprising Society Members and external stakeholders will publish their report in 2014.

Society President, Jonathan Ashmore, said: "The environment for physiology as a discipline has changed dramatically over the last 15 to 20 years as both the scientific and the funding environments have evolved. Emerging new areas of physiology and related sciences, coupled with the move from dedicated 'departments of physiology' to integrated biological, medical and life science faculties, have affected the visibility of the discipline. This directly affects its funding both for its research and how it is taught.

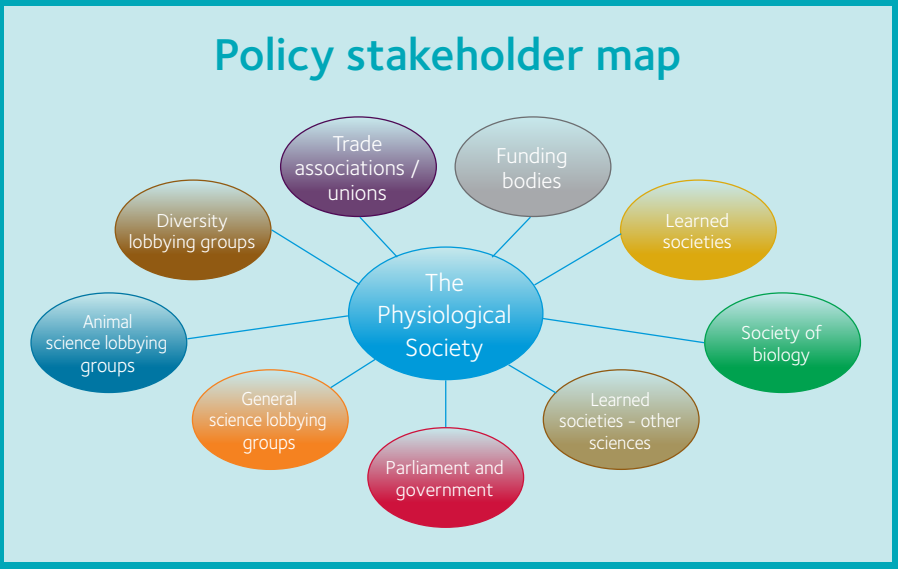
"The report – the first of its kind– will explore the strength of physiology in the UK, its role in supporting UK life and biomedical sciences and, most importantly, the impact the changing landscape for education and research has had on the discipline in both academia and industry. The report will identify strengths and weaknesses of the discipline and provide recommendations to ensure the UK remains at the forefront of physiological research worldwide."

Policy Corner

The Policy Committee welcomes Ed Hayes, our new Policy Officer, who started in March. He and the Committee are committed to creating value for our members. One of our priorities going forward is to refresh the policy pages on the Society's website to provide a more useful resource. With this in mind, we have created the policy stakeholder map displayed below, together with a combined index accessible from the policy webpages www.physoc.org/policy. The map provides a portal to further information on policy issues that may be of interest and shows the diverse range of people with which The Society interacts.

Policy Collaborations

Much like scientific research, the majority of high-impact policy work is achieved in collaboration with others. Recently, The Society has had interactions with representatives covering every sector on the stakeholder map.



Animal research is a great example of how the sector has come together to achieve unified goals. The Society is collaborating with funding bodies, universities, industry bodies, charities and others on the 'Concordat of Openness on Animal Research'. We have a position on the working group and are working hard to make sure that the concordat achieves its aims. Further information can be found online at www.understandinganimalresearch.org.uk/policy/concordat-on-openness-on-animal-research.

In addition, as a member of the UK Bioscience Sector Coalition (UKBSC), we have responded to three separate Home Office consultations on animal research in 2013. Special thanks must go to Professor Max Headley who has put in a Herculean effort to make sure that The Society's position of enhancing animal welfare, whilst making sure that unnecessary bureaucratic burdens are not placed on researchers, is fully incorporated into the new Home Office guidelines. This has been the core theme in the UKBSC responses. Max has penned a detailed update on the current situation regarding the new regulations on the use of animals in research, which you can read on page 10.

Ed Hayes

The Society has also been collaborating with the Science Council and others on plans for this year's political party conferences. In addition, we are working alongside the British Pharmacological Society, the Biochemical Society, the Royal Society of Chemistry, the Association of British Pharmaceutical Industry and others in a joint project on the skills of the Drug Development Pathways. The group recently had a letter published in the Financial Times, which The Physiological Society co-signed.

....Watch Policy Corner to follow the outcome of this and other actions.

EU Directive 2010/63 and its implementation in the UK as the revised Animals (Scientific Procedures) Act

Max Headley
University of Bristol, UK

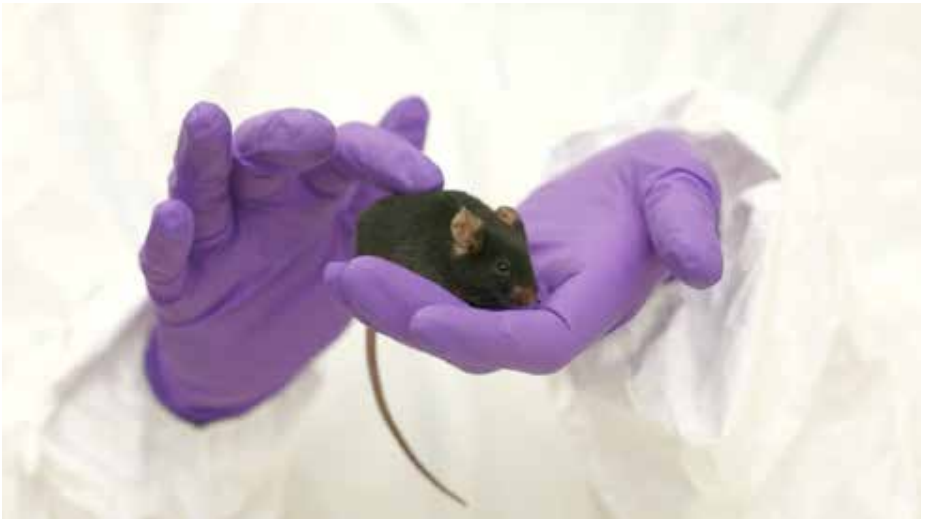


Photo: Understanding Animal Research.

I last wrote an update for *Physiology News* nearly two years ago. At that stage the new Directive had been passed by the EU parliament and work was under way to 'transpose' the Directive into UK legislation. That process, with its various consultations with the public, learned societies and within government, took longer than expected, such that the final version of the revised legislation was only laid before Parliament in November 2012. There were concerns that there might be a last-minute push by the antivivisection lobby to get additional restrictions added in at the parliamentary stage. To help deflect any such move, Members of The Society were encouraged to write to their MPs supporting the legislation as laid. A gratifying number of Members obliged (130 letters sent to over 75 MPs) and, while we can't say that that made the difference, we can say that the debates in both Houses went smoothly – perhaps surprisingly so. As a result, the new legislation was signed off on 16 December 2012 and became law on 1 January 2013.

For various quite complex reasons, the legislation was adopted by amending the old 'ASPA' (the Animals (Scientific Procedures) Act 1986). As a result, and somewhat confusingly, the new Act has the same name, including the 1986 date, as the old one.

Some of the changes of significance to physiologists

The licences

The Certificate of Designation (PCD) has now become an Establishment Licence (PEL), but the essence remains little changed. The Project Licence (PPL) is so far minimally changed. However, as Personal Licence (PIL) holders should already know, the new PIL has lost the list of techniques (s15); instead applicants apply for one of (almost always) four categories of technique, within which (and subject to competence) they may use whatever technique is appropriate to their study (see

Research and testing using animals, URL below). However, the transition to the new categories has *not* happened automatically, so that users with pre-existing PILs remain limited by their s15 techniques list until their licence is updated. The Home Office (HO) will complete the conversion as soon as it can, but in the meantime users who need extra techniques will still need to apply for an amendment. But to avoid swamping the system, please only apply for amendments if/when necessary.

Emphasis on 3Rs
The 3Rs have a high profile in the new legislation and that will inevitably find its way into all corners. Licence holders should recognise the need to embed 3Rs thinking into all relevant paperwork.

Developmental forms
Mammals, birds and reptiles will be protected from 2/3 gestation/development, rather than half way, as at present. That should remove a significant amount of developmental work from the controls.

Breeding
There are more overt controls now over breeding, even where it is for tissue harvesting rather than for use in licensed procedures.

Humane killing
The HO readily admits that some of the humane killing arrangements in the Directive are not ideal. Offsetting this, however, is a new ability to apply to get extra methods of humane killing (outwith Schedule 1) attached to the Establishment Licence (PEL). This means that a PPL would not be required for individual users. This facility is being taken up by various establishments and could apply, for instance, for techniques that require added equipment or skills that may not be generally available. Under the Directive, the UK also has the right to make extra techniques available on a national basis, but at present the HO is not going that far. One other distinct benefit of the new rules is that where it is in the animal's interests, sedatives can be used prior to Schedule 1 killing.

Competence
Institutions are more responsiblethan before for ensuring the competence of staff. There is flexibility over how this is achieved, but in many institutions it will require additional planning and monitoring. PPL holders will have to assume more responsibility for ensuring that those working on their project are assessed formally as being competent to do so.

Wildlife studies
Licensees doing this sort of work will have to tread rather carefully. Despite many requests to the HO, there are several regulations limiting/precluding such work without explicit exemptions.

Education and training
Education and training are now allowable purposes, although the HO has said it will pay such applications particular attention.

Sharing tissues
Sharing tissues is now an explicit expectation. That should facilitate appropriate provisions in PPL applications.

Statistics reporting
Statistics reporting will not change materially for 2013, but will for 2014 to match EU-wide data. An important (and ultimately beneficial) change is the requirement to assess severity retrospectively for every animal undergoing a procedure. Although those data will be collected formally only from January 2014, the HO has stated that they should be being collected from January 2013; the sector has queried the practicality and feasibility of this, but so far without confirmation from the HO. Various EU groups are working up examples that should help us all to apply this in a reasonably consistent manner.

Ongoing issues

Government guidelines for the implementation of EU Directives indicate that the formal guidance documents (which must be laid before Parliament and therefore carry some legal weight) should be published at least three months before the legislation comes into force. With the late adoption of ASPA by Parliament, this did not happen. The HO did produce some interim guidance in December, but the definitive guidance documents are still far from complete. Rather, in January/February the HO released draft documents for the sector's comments. For several years the sector (industry, funders, charities, etc., as well as academia) has cooperated under the banner of the UK Biosciences Coalition (UKBSC) over the many issues involved in the Directive and ASPA. under the banner of the UK Biosciences Coalition (UKBSC). So UKSBC has been working on these HO drafts.

A response to the draft Guidance was submitted by UKBSC in mid-March and your Society (together with others) submitted a further detailed list of comments. We now understand that the next version of this

Photo: Understanding Animal Research.

detailed Guidance document should be released for further comment in June 2013.

At the time of writing there are consultations open on the Code of Practice (on how animals are kept) and on statistics. UKBSC is formulating its responses with input from The Society's reps.

A major issue that is far from resolved concerns ASPA section 24 – on confidentiality of the material submitted to the HO. This was one topic raised in the House of Lords that the Government pledged to address. Universities are receiving ever more Freedom of Information requests and the situation is far from satisfactory from all parties' perspectives. UKBSC has submitted its views and continues to liaise with the HO on this issue. We anticipate hearing more over the summer about government moves on both the Freedom of Information Act and s24 ASPA, and UKBSC will certainly be keeping a close eye on such moves.

So although we thought a year ago that all would be resolved by now, in practice we are still very much in transition, with many regulatory issues still far from resolved. Your reps will continue to feed into the discussions with a view to promoting research and animal welfare while minimising unhelpful regulation.

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Animals (Scientific Procedures) Act 1986 Amendment Regulations. Available at: www.gov.uk/government/publications/animals-scientific-procedures-act-1986-amendment-regulations [accessed 14 May 2013]

Research and testing using animals: Details of the law on scientific research and testing involving animals, and guidance on applying for licences. Available at: www.gov.uk/research-and-testing-using-animals [accessed 14 May 2013]

Affiliate Member Representatives

The Society's departing Affiliate Member Representatives reflect on the last two years as a rewarding and educational experience in which they gained great insight into the inner workings of The Society and enjoyed making valuable contributions.

Jamie McPhee

Jamie McPhee

Manchester Metropolitan University, UK

It has been a privilege over the past two years to sit on Council of The Physiological Society as an Affiliate Member Representative. In attending my first meeting it was apparent that members of Council work hard to maintain the quality and impact of scientific meetings, research, teaching, public engagement and policy.

As one of the Affiliate Representatives, I was invited to sit on the Meetings Committee. The purpose of the Meetings Committee is to develop and oversee the strategic planning and funding of Society and non-Society scientific meetings and workshops at home and abroad, and to recognise and promote excellence in physiology through scientific meetings. When I joined the Meetings Committee the major conference on the Horizon was IUPS and I am pleased to say I have played a small part in preparing for this meeting as well as being involved in some other developments in the meetings calendar. I was also invited to join the Editorial Board for *Physiology News*, one of The Society's publications. I played a small role in the re-branding of *Physiology News*, preserving popular features from the older format and introducing newer features. The new format is accompanied by online content that includes a searchable archive of back issues.

Overall, my time as Affiliate Representative has been very rewarding. I got to know a number of high-profile physiologists and received an education in the charitable objectives and organization of The Society and Council duties.

Keith Siew

University of Cambridge, UK

While writing this piece, it dawned on me that it had been exactly two years to the day since I received the call for Affiliate Rep nominations myself. It was April 2011, and I had only recently learnt of my award to undertake a BHF funded PhD at Cambridge University with Kevin O'Shaughnessy, whom I had fortuitously met at Physiology 2010. I can still distinctly recall my strong desire to give back to The Society, to find some way to express my gratitude for the life changing opportunity it had afforded me, and thus I threw my name in the hat and much to my surprise was successfully elected!

At first, being the most junior member of Council was an intimidating ordeal. I had barely stepped foot on the career ladder and found myself surrounded by a diverse group of successful senior scientists. However, my apprehension soon melted away as in no time I was made to feel exceptionally welcome, my opinion was often sought and my enthusiasm and eagerness to participate regularly encouraged. At Council level the role of Affiliate Reps is mainly observational in nature, although we may raise questions, place items on the agenda and contribute towards discussions, but as non-trustee members we cannot vote. It is on committees that Reps can make their biggest contribution. With a little coaxing from the inspirational Louise Robson, I took a seat on the Education and Outreach committee she chaired, and later was invited by the CEO, Philip Wright, to represent the interests of both Irish and younger society Members on the newly formed Membership and Grants committee.

Through the committees I served on I was involved with several initiatives, I aimed to give Affiliates free access to The Society's journals and reduce the restrictions on travel for first year members, while also pushing to retain the Young Physiologists' Bursary Scheme (now called the Early Career Bursary Scheme), which I felt an important gateway for young people into The Society. Other projects included introducing local Affiliate Reps at university level and trainee members onto all Council committees, while also reviewing vacation studentships, Otto Hutter prize nominees and proposals for outreach/public engagement events. I'm delighted that some of these initiatives have been successful, although others are still an on-going discussion, but nonetheless it has been exciting to be actively involved with inner workings of The Society.

The experience I've gained has been invaluable and the memories unforgettable. As I reach the end of my term I leave with a greater reverence for the staff and Members who are both passionate and hardworking in their efforts to better The Society and the discipline of physiology as a whole. I wish only that future Affiliate Reps enjoy their time as much as I, and may their endeavours be fruitful.

Keith Siew

The Affiliate Representative elections 2013 are open until 17 July and all Affiliates are encouraged to vote for the individuals they wish to fill these vacant roles at www.physoc.org/affiliate-election-2013

2013 *Forthcoming events*

19 July

Ion Channel Regulation and Neuronal Physiology: A symposium in honour of David Brown
The Royal Society, London, UK
www.physoc.org/davidbrown

21–26 July

IUPS 2013
International Convention Centre, Birmingham, UK
www.iups2013.org

21 July

Brain-Heart Interactions in Health and Disease: A symposium in honour of John Coote
Austin Court, Birmingham, United Kingdom
www.physoc.org/johncoote2013

11–13 Dec

Epithelia and Smooth Muscle Interactions in Health and Disease
The Convention Centre, Dublin, Ireland
www.physoc.org/emvs13

Meeting Preview

Epithelia and Smooth Muscle Interactions in Health and Disease

The Physiological Society Joint Themed Meeting in Epithelia & Membrane Transport and Vascular & Smooth Muscle Physiology

11–13 December 2013, The Convention Centre Dublin, Ireland

Epithelia & Membrane Transport (EM) and Vascular & Smooth Muscle Physiology (VS) Themes share many common interests in numerous diseases which affect both epithelial ion transport and smooth muscle contractility. Examples include diarrhoea, inflammatory bowel disease and respiratory diseases such as asthma, COPD and cystic fibrosis. Researchers in EM and VS tend to work independently of each other on the molecular mechanisms although the full aetiology of these diseases involves dysfunction in electrolyte – fluid secretion and smooth muscle contraction.

In health, the cross-talk between EM and VS functions underlie whole organ physiology, for example, in the airway, gastrointestinal tract, and salivary gland. In the ion channel field, research into the physiological function, differential expression, molecular regulation and pharmacological properties of specific ion channels is usually undertaken separately in epithelia or smooth muscle. Shared knowledge around the role of specific ion channels in physiology and pathophysiology is not facilitated through separate forums. This lack of interaction hampers progress in both EM and VS fields to provide a fuller understanding of pathophysiological mechanisms underlying common diseases.

The Physiological Society Joint Themed EM and VS Meeting will be a unique opportunity to share experiences, generate novel research ideas and forge new collaborations. The Society returns to Dublin, which hosted the Main Meeting in 2009, in December 2013. Brian Harvey (Royal College of Surgeons in Ireland) and Noel McHale (Dundalk Institute of Technology, Dundalk, Ireland) have put together a superb speaker panel that includes:

Plenary Speakers:

- Kim Barrett, University of California San Diego, USA
- Kenton Sanders, University of Nevada, Reno, USA

Speakers:

- Deborah Baines, St Georges Medical School, London, UK
- Peter Bradding, University of Leicester, UK
- Emmanuelle Brochiero, Centre hospitalier de l'Université de Montréal, Canada
- Wouter De Jonge, University of Antwerp, Belgium
- Mark Donowitz, The Johns Hopkins Hospital, USA
- Kim Dora, University of Oxford, UK
- Peter Howarth, University of Southampton, UK
- Luke Janssen, McMaster University Medical Center, Canada
- Stephen Keely, Royal College of Surgeons in Ireland
- Francesco Sepulveda, Centro de Estudios Científicos, Valdivia, Chile
- Gary Sieck, Mayo Clinic, USA
- Robert Tarran, University of North Carolina, USA
- Keith Thornbury, Dundalk Institute of Technology, Ireland
- Valérie Urbach, National Children's Research Centre, Dublin, Ireland and Institute of Functional Genomics, Montpellier, France

Key dates:

- Registration opens 12 August 2013
- Abstract submission opens 23 September 2013
- Abstract submission closes 23 October 2013

Anant Parekh with (left to right) Kevin Tipton, Stuart Galloway, Colin Moran, Ian Walshe, Naomi Brooks, Fraser Scott, Iain Gallagher and Lee Hamilton after an enjoyable dinner

Meeting Notes

GL Brown Prize Lecture Series

20 February 2013, University of Stirling, Scotland

Stuart Galloway & Naomi Brooks

University of Stirling, UK

This year, The Physiological Society awarded the GL Brown Prize to Anant Parekh, University of Oxford. Parekh has had a glittering career to date starting with his acceptance into University College, Oxford to study medicine followed by a doctorate from the same institution. He then moved to begin an Alexander Von Humboldt Scholarship at the Max Planck Institute for Biophysical Chemistry in Göttingen, before obtaining a Wellcome Trust Career Development Fellowship and then a Sir Edward Abraham Research Fellowship at Keble College, Oxford. He was subsequently awarded a Lister Institute Senior Research Fellowship, an Amersham Medical Fellowship (Keble College) and then a Monsanto Senior Research Fellowship (Exeter College, Oxford). This very successful career path led to him being awarded the Wellcome Prize in Physiology in 2002 and in the same year he was granted a personal Chair at Oxford. Parekh's research interests are on intracellular calcium signalling and how changes in calcium can engender a wide range of cellular responses. His work is particularly focused on the store-operated calcium channels (CRAC channels) on the plasma membrane. These channels are most abundant in non-excitable tissues and can have a wide ranging impact upon cellular function through their influence upon gene expression. It is known that their function is disturbed in a variety of debilitating diseases such as primary immuno-deficiencies, acute pancreatitis and possibly Alzheimer's disease. Therefore, an understanding of their regulation and downstream actions is vital if strategies are to be developed to treat or prevent these diseases in the long term.

The Health and Exercise Sciences Research Group at the University of Stirling was honoured to be chosen by Parekh and The Physiological Society as one of the venues to host the prestigious GL Brown Prize Lecture. We welcomed a small but enthusiastic audience of staff, postgraduates and undergraduates from Stirling, Aberdeen, Heriot-Watt, and Dundee Universities on the only Scottish leg of his lecture tour. Parekh presented an interesting and humorous historical introduction on the importance of calcium in organ systems, highlighting the work of Ringer which was published in *The Journal of Physiology* in 1882 and 1883. He went on to present a fascinating overview of his work on the mechanisms and function of the store-operated calcium channels (particularly Orai1) and highlighted their research on CRAC channel opening and activation of the calcineurin NFAT gene expression pathway in mast cells. Parekh also demonstrated the importance of dysregulation in calcium signaling through his work on patients with nasal polyps, suggesting that therapies targeting these calcium channels are likely in the future management of such conditions. His lecture clearly stimulated the audience as evidenced by the many questions afterwards and the discussions that followed late into the evening.

Anant Parekh addressing questions after his lecture

Meeting Notes

Experimental Biology (EB)

20–24 April 2013, Boston, USA

Emma Ward

The Physiological Society

This year's EB meeting in Boston came in the wake of the devastating bombing of the city's marathon.

Those arriving on the Friday found the streets deserted; trains and taxis suspended, public buildings closed and people advised to stay Indoors. A Boston police officer and one of the bombers had been shot the previous night, but a second suspect was on the loose so the city had been locked down while a manhunt ensued. There was non-stop 'breaking news' coverage and that evening saw the dramatic capture of the second bomber and resounding praise for the police force. There was a great sense of solidarity and the phrase 'Boston strong' reverberated across the city as an expression of unity and resilience.

The EB meeting went ahead as planned, The Society's staff had managed to get into the exhibition centre before the lock down and get The PhySoc stand ready for business by Saturday morning while many other exhibitors

Meeting Notes

Out of Thin Air: Surviving high altitude

6 April 2013, Edinburgh International Science Festival, UK

Lewis Dean

The Physiological Society

What does it feel like to be on the top of Mount Everest? How do reaction times change with altitude? Why are some populations better adapted to live at high altitude? These questions and many more

had not been so lucky and were still setting up as the exhibition opened.

The newly constructed Exhibition centre easily accommodated the 13,000+ people from 65 countries attending the meeting. A browse around the massive exhibition hall was a good way to see what other societies and journals are up to.

The Physiological Society's stand occupied a highly visible position and attracted a steady flow of visitors, including existing and potential members and authors, competitors and partners. Over the four days we scanned nearly 300 people's registration badges to be followed up after the meeting, as requested. A modest percentage of the total attendees perhaps, but the Meeting covers a very broad spectrum of interests and a quick glance at The Society acronym on delegate badges helped decide whether browsers were genuinely interested or just after one of our ever popular pink lanyards, society bags, new journal notepads or simply UK travel advice.

The meeting had over 8000 posters and included concurrent programmes from the main participating societies:

- American Association of Anatomists (AAA)
- the American Physiological Society (APS)
- American Society for Biochemistry and Molecular Biology (ASBMB)
- American Society for Investigative Pathology (ASIP)
- American Society for Nutrition (ASN)
- American Society for Pharmacology and Experimental Therapeutics (ASPET)

The Physiological Society had selected three of the most interesting symposia from the APS program 'Physiology track' for sponsorship and reports can be read online:

Kristen Greaney, Chrstina Dzikowski, Kristin Mcnealy, Catherine Hodgkinson (Wiley)

'Fishing with flies, worms and bacteria: emerging models for mammalian membrane transport and trafficking' organised by David Thwaites (http://jp.physoc.org/site/misc/jpevents.xhtml)

'Recent advances in understanding mechanisms regulating breathing during exercise' organised by Hubert Forster (http://jp.physoc.org/site/misc/jpevents.xhtml)

Neuroendocrine regulation of the mammalian reproductive axis organised by William Colledge (http://ep.physoc.org/site/misc/sympspecial.xhtml)

Paul McLoughlin, David Wyllie, Cornellia Schnelle, David Paterson at The Physiological Society stand

With so many interested parties all in the same place EB provided an ideal opportunity to hold formal and informal meetings between editorial board members, editors-in-chief, publishers, society committee chairs and staff. It also further developed relations with the APS, who generously hosted a number of social events.

The launch of the new Society and APS joint venture open access journal *Physiological Reports* caused quite a stir with very good attendance at the APS stand. Delegates came to meet Deputy Editor-in-Chief, Thomas Kleyman and other key staff. There was a great deal of interest – particularly in the 'first 100 accepted articles for free.'

No visit to Boston would be complete without a visit to Fenway Park for a baseball game and this was highly entertaining despite freezing weather, a crushing defeat for the Red Sox, not really understanding the rules and our CEO almost being taken out by a hotdog stand.

As I left for the airport, a seemingly endless fleet of the city's buses flanked by motorcycles was sedately powering along the harbour road displaying 'special service', 'Officer Sean Collier', 'Never forget' and 'Boston strong'.

were answered, for the benefit of the general public, at *Out of Thin Air*, The Society's panel discussion on physiology at altitude. The event took place at just 30m above sea-level, at the Edinburgh International Science Festival.

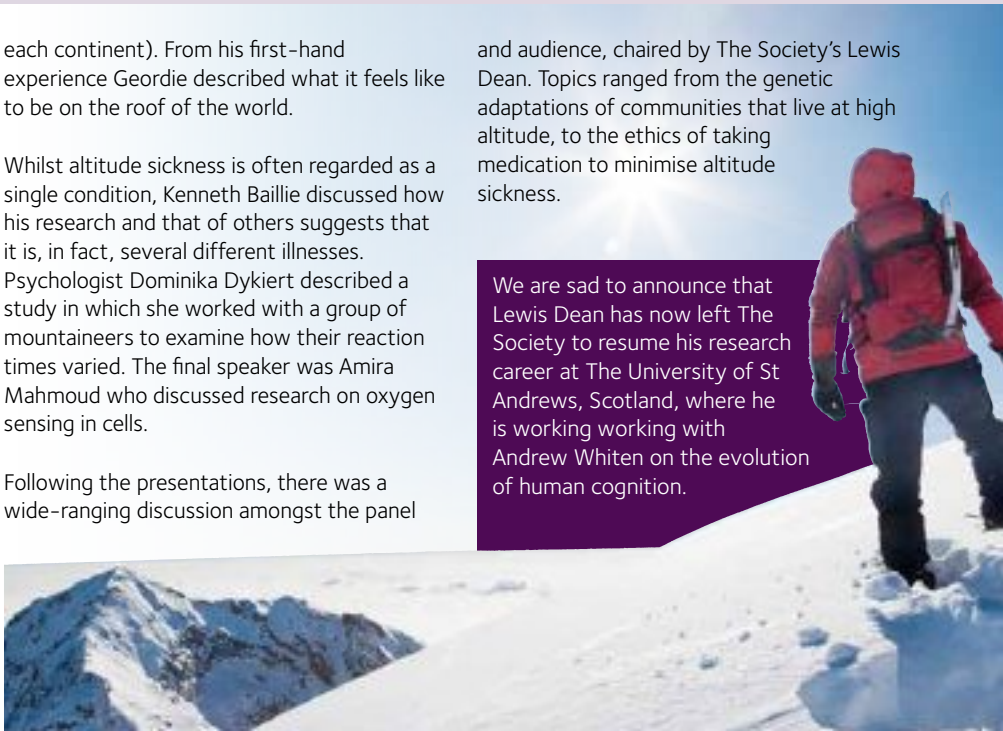
The session, which attracted over 60 people, explored the effect of high altitude on the body, the mind and individual cells. High altitude presents unique challenges for the human body. Reactions can range from mild nausea and confusion to life-threatening conditions affecting the heart, lungs and brain. Indeed, altitudes over 8000m above sea level have been dubbed the 'death zone' as oxygen levels are too low to support human life.

In March 2011, at his second attempt, Geordie Stewart summited Mt Everest and became the youngest Brit to have conquered the Seven Summits (the highest mountain on each continent). From his first-hand experience Geordie described what it feels like to be on the roof of the world.

Whilst altitude sickness is often regarded as a single condition, Kenneth Baillie discussed how his research and that of others suggests that it is, in fact, several different illnesses. Psychologist Dominika Dykiert described a study in which she worked with a group of mountaineers to examine how their reaction times varied. The final speaker was Amira Mahmoud who discussed research on oxygen sensing in cells.

Following the presentations, there was a wide-ranging discussion amongst the panel and audience, chaired by The Society's Lewis Dean. Topics ranged from the genetic adaptations of communities that live at high altitude, to the ethics of taking medication to minimise altitude sickness.

We are sad to announce that Lewis Dean has now left The Society to resume his research career at The University of St Andrews, Scotland, where he is working working with Andrew Whiten on the evolution of human cognition.



Meeting Notes

BMS Early Career Investigators Symposium

13 April 2013, Warwick University, UK

Melissa Gammons

University of Bristol, UK

The recent Early Career Investigators Symposium on 'Advances in Microcirculation', initiated by the British Microcirculation Society, was host to numerous outstanding talks and scientific discussions showing that there is an exciting future for microcirculation research in the UK.

The symposium covered topics ranging from angiogenesis to inflammation and vessel permeability, investigating physiological and pathological aspects of the functioning microvessels. We were overwhelmed by the mature and confident selected oral communications given by early career investigators ranging from first year PhD students to young post-docs. Not only were the talks well paced and informative, the scientific questions that followed demonstrated a clear understanding and thirst for knowledge in a seemingly relaxed atmosphere. This was also evident in the poster session where discussions continued and collaborations began to form. The high standard made prize selection a difficult process.

Registration costs were kept to a minimum by generous support from the British Heart Foundation, the British Pharmacological Society, the Company of Biologists, the Physiological Society, and the Richard Bright VEGF Research Trust, complementing core support by the British Microcirculation Society and the exhibitors (Moor Instruments and PromoCell). Kenton Arkill, an attendee from University of Birmingham said: *"I thought it was the best value conference I'd ever been to. The science was as good as the full BMS; however it was more friendly, constructive and encouraging for the future of vascular biology. It works because the speakers are not the people supervising the science, but the people doing it!'*

Thanks to the level of charitable and society support, we were not only able to keep registration costs low, but also able to offer numerous travel grants and prizes. In total 18 travel grants were awarded to the 46 young investigators that attended, including two international travel grants to attendees for Moscow and Germany. Furthermore, seven prizes were awarded throughout the day. Patricia Kelly, University of Ulster, won the 'Best Abstract' prize. Patricia said: *'I absolutely loved attending the BMS Early Career Symposium! As a direct result of my oral presentation, I now aspire to present at an International conference. I was excited to receive an award for 'Best Submitted Abstract'. It has really boosted my confidence as an early researcher! I sincerely hope the BMS Early Career Symposium can continue as it is a necessary platform for young scientists to present their work, discuss ideas and receive critical review of their research.'*

As an organiser of the event it was a pleasure to hear of the expansive and diverse microvasculature research currently taking place in the UK. In a post symposium poll, 100% of attendees who took part said there was a need for more young investigator events like this one and that it was beneficial to them as researchers. We hope events like this one will continue to be supported in the future and will expand to benefit more early career researchers.

Meeting Notes

The 15th International Conference on Environmental Ergonomics (ICEE)

11–15 February 2013, Queenstown, New Zealand

Steve Faulkner & Nicola Gerrett

University of Northampton, UK

The 15th International Conference on Environmental Ergonomics (ICEE) was organized by Jim Cotter, Sam Lucas (both School of Physical Education, University of Otago) and Toby Mündel (Massey University) and was the first to take part in the Southern hemisphere. ICEE dates back to 1984, when the conference was first held in Bristol, and has become a bi-annual event. The conference was established to cover all aspects relating to the interaction of human beings with their surrounding environment, but has in more recent years began to cover topics more related to human physiology and performance. Despite this, it is a conference that is often not on the radar of many physiologists who have expertise in these areas of research.

The conference began with a welcome drinks function on the Sunday evening. This gave all of the delegates the chance to meet up and mingle with acquaintances old and new, and allowed those of us early in our research careers to meet some of the names that we have become so familiar during the course of our work to date.

The conference covered a wide range of research topics, from the issues of climate change and how this may impact on human physiology and function in the future, to the brain in stressful environments. This session also included the student prize-winning talk: "Regional brain blood flow during passive hyperthermia" by Anthony Bain of The University of British Columbia. The student poster prize was awarded to Yuta Hoshi from Tskuba University: "Effects of voluntary control of breathing on cerebral blood flow and ventilator mechanisms during passive heating".

One of the highlights of the week was the presentation by Ralph Goldman, who drew on his years of experience in detailing exactly how to design and implement a research project based on his three rules, which we could all learn from:

- Don't ask others to participate if you would not participate yourself
- Co-investigators to be subjects too in pilot studies
- Don't run the study if you wouldn't let your children take part!

Needless to say, it was a talk that all present will not forget, due to his eloquent delivery and infectious humour.

The 15th ICEE conference was hailed as a huge success by all in attendance, not just for the stunning scenery that Queenstown and New Zealand has to offer, but because of the high quality of the scientific content of the programme. For students and new researchers, ICEE provides a platform for learning and meeting other established, world-renowned researchers and new academics. This is unlike many of the larger conferences, where it is almost impossible to get such a level of personal contact. The next ICEE conference will be held in Portsmouth, UK in 2015, and if you have an interest in environmental physiology, we urge you to attend this excellent conference.

Without the kind support of both The University of Northampton, and The Physiological Society, Steve Faulkner would not have been unable to attend this conference. Nicola Gerrett is indebted to the University of Worcester for financial support for her attendance.

Nicola and Steve enjoying the scenic boat trip for the conference dinner venue

Turshkanti Ghosh

Meeting Notes

The 100th Indian Science Congress

3–7 January 2013, Kolkata University, India

Jonathan Ashmore

University College London, UK

The smell of dust and diesel tells you that you are in India the moment you get off the plane. I was in Kolkata (renamed in 2001 from 'Calcutta' to its Bengali spelling) to attend the 100th Indian Science Congress at the beginning of January. As well as bringing the Society Dog to present to the Indian Physiological Society at the University of Kolkata (the Department was founded in 1912), I discovered that I had also brought a cold previously doing the rounds in London and which got steadily worse during my stay. The level of pollution in central Kolkata did not help (everyone coughs). The meeting itself was held at the newer University campus on the eastern outskirts, a little cleaner but getting there involved serious taxi bargaining.

I survived long enough to enjoy an interesting meeting. The congress covered all the sciences and was attended by over 10,000 delegates from throughout India. The biomedical section, organised by Turshkanti Ghosh, was three days of packed sessions for about 100 attendees, with a strong focus on pharmacology and cell biology. Neuroscience was somewhat sparsely represented, and there was a notable emphasis on small molecule cancer medicines. Some of the more general computing and mathematics symposia which I sneaked out to see were excellent with lively discussion.

The congress received considerable media coverage: it was opened with much pomp by India's Prime Minister, Manmohan Singh, who pledged a sizeable chunk of India's GDP to developing science. There is clearly no shortage of ability, but most of us would probably agree that India does not currently score well in international science in proportion to its size. Science in India has been closely geared to national goals, to improving a health (and military) infrastructure but fragmented because of the federal nature of the Indian state. Only recently have Indian scientists, often trained in the US or in Europe, started to show an international presence. This situation may be set to change with really outstanding research institutes being set up throughout the country, recruiting from a pool of scientists returning from all over the world.

I was impressed by the organisation of the congress: huge outside tents fed everyone. But perhaps I should not have been as the Kumbh Mela was just beginning at Allahabad – a different sort of congress – with numbers in excess of 60 million. In comparison, organising a science congress is a triviality. Our evening events included a performance from Usha Uthup, a well-known popular singer who really got the house rocking, and an astonishing performance of Tagore's dance opera, Valmiki Pratibha, acted by the inmates of a Kolkata prison (who had been let out for the evening to perform). Now there's a Physiological Society dinner idea.

The international dimensions of the physiological sciences

The world has grown smaller. But the need for language skills, cultural understanding – and the International Union of Physiological Sciences – is undiminished.

Denis Noble

President of the International Union of Physiological Sciences

Department of Physiology, Anatomy and Genetics, University of Oxford, UK

The experience of being President of the International Union of Physiological Sciences is a great privilege, one that I have enjoyed for four years since the Congress in Kyoto in 2009. The previous President from the UK was Sir Andrew Huxley between 1986 and 1993: a very hard act to follow, with his sharp critical mind, and his phenomenal international reputation. One could not visit Russia without being reminded of the deep impression he had made by using Russian, or Japan with his knowledge of Japanese, or in German-speaking countries with German. As a young student at UCL many years ago I was greatly influenced not only by the extraordinary Nobel-prize winning work on the nerve impulse that he did with Alan Hodgkin, but also by his international and linguistic skills. I never imagined that I would one day be in his shoes! Or, indeed, those of his distinguished successors as president, particularly those with whom I served as Secretary-General: Masao Ito (Japan) and Ewald Weibel (Switzerland). They are all hard acts to follow.

Inspired by these thoughts of previous presidents, this article will focus on culture and international relations, and will then ask the question "Where is physiology going in the 21st century?"

Fifty years ago

My first recollection of IUPS goes back to Leiden in 1962, when a Congress was small enough to be held in a university. The days of grand convention centres, like that in Kyoto, situated in beautiful gardens and mountain slopes just on the edge of the medieval city, or the impressive Centre in Birmingham where the 2013 Congress is about to begin, had not yet arrived. In fact, Congresses were not very different from the annual meetings of the larger societies, such as The American Physiological Society, The Physiological Society (UK and Ireland), and some of the other large societies in the IUPS family (now around 50 nations). Last year, I enjoyed taking part in the meeting of the Scandinavian society held in Helsinki. That meeting also was fully international.

Back in 1962, we all had to be multi-lingual, or put up with sitting through talks we couldn't understand. I recall talks at that Congress in English, French, German and Russian. Italian and Spanish were also used in earlier Congresses. Major international journals still published in languages other than

Manuhiri (the guests), Christchurch, New Zealand, 2001. From right to left: Ewald Weibel (President IUPS, holding the wero placed by the Maori warrior), Dame Silvia Cartwright (Governor-General of New Zealand), Tony McKnight (Congress Chairman), Denis Noble (Secretary-General, IUPS), Olly Ohlson (Maori speaker for the Manuhiri), Shu Chien (Treasurer, IUPS), Ramon Latorre (Vice-President IUPS) - (Credit: Poul Nielsen)

"Back in 1962, we all had to be multi-lingual, or put up with sitting through talks we couldn't understand"

English. The conversion of *Pflüger's Archiv für die gesamte Physiologie des Menschen und der Tiere,* for example, into the *European Journal of Physiology,* was still in the future[1]. One of the important papers I needed to read for my PhD work was in French (Katz, 1949).

The last fully multi-lingual IUPS Congress was Paris in 1977, where some of the lectures were in French (and not only by natural French speakers) with simultaneous translation. By the time of Vancouver 1986, however, only a very few abstracts appeared in French. Those days have gone. English has become the dominant international language of science, and the foreign language that young scientists should perhaps consider learning today is Chinese.

These changes pose major challenges for us, both in terms of culture and in terms of international relations.

Culture

Take culture first. You might think that the adoption of English as the international language of science has greatly simplified matters. That is true in the sense that no-one now has to decide what language to use in their presentations at international meetings as they did back in 1962. But it has also created its own complications. A form of international English has developed, with a much narrower range of vocabulary and idioms. Most users of English today are not from countries where it is the native tongue. Native English speakers often forget this. They may not realise that, most often, the easiest people to understand at Congresses are the non-native English users, precisely because they use a simplified language. The problems in understanding are created by the rich idioms and extensive vocabulary used by those of us for whom English is the native tongue. The international language that has developed is not really our own: it is just a small subset. When I lecture outside native English-speaking countries I try to do three things: slow down, speak clearly, and avoid too many strongly idiomatic expressions.

The second problem for native English speakers is the monoglot nature of our culture, with very few learning and even fewer using other languages. The losers in this case are the monoglots. It doesn't really matter which other languages you can use. No-one can be master of, or even just dabble in, more than a few. Everyone knows that. What matters is the social advantage of acknowledging other cultures. It opens otherwise closed doors. During the Kyoto meeting, I used the limited Japanese that I have. It opened diplomatic doors at a very high level and enabled me to have unique experiences that I will treasure for the rest of my life. These experiences depended on others being able freely to converse in their own language without feeling that they were embarrassing me. My relatively limited knowledge gave them cultural freedom, from which I benefited myself in what I experienced and learnt.

I also recall the impact of the spectacular opening ceremony in Christchurch, New Zealand, 2001, where the fact that the whole of IUPS Council learned enough Maori to sing the required welcome at the Maori Powhiri (ceremonial welcome) impressed everyone, not just the Maori tribe that welcomed us. It is a rule of the Powhiri that everyone must use Maori until permitted to use another language.

1 Even today, one of the most frequent downloads from that journal is an article in German: Geller F (1941). Über die Blutgerinnung unter dem Einfluß von Gasen. *Pflügers Arch* 244, 687-695

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"English has become the dominant international language of science and the foreign language that young scientists should perhaps consider learning today is Chinese"

International relations

Our Congress host this time, The Physiological Society, is no stranger to the international dimensions of our discipline. When it was founded in 1876, it entertained foreign guests from various parts of the world at its first scientific meeting. Its national meetings nowadays are like mini-international congresses. The same is true for the societies in the USA and in other parts of the world. A recent meeting in Suzhou in China was attended by a large enthusiastic audience of young Chinese, but it was also helped by scientific contributions and finance from many other societies around the world.

IUPS welcomes these developments. The future of physiology depends very much on the strength of the national societies, including the need to develop societies in parts of the world where they do not exist or are still relatively weak. The whole world benefits from the great strengths of the large national societies.

One might therefore wonder why we still need an organisation like IUPS. Have its original purposes now been taken over by the larger national societies?

Part of the answer is that there are international aspects of the work of IUPS that national societies are not so well placed to perform. A lot of IUPS's work has focused recently on parts of the world that are or have been politically difficult, particularly for Western countries. Myanmar (Burma), Iran and North Korea are just a few examples where IUPS initiatives have been important, smoothing the way past diplomatic difficulties. Having a neutral body like IUPS allows the physiological community to function in ways that are not dissimilar to ways in which the UN and UN Agencies can achieve difficult negotiations beyond the capability of any national organisation acting alone. The relations with the International Council for Science (ICSU) are also important. Led by the initiatives of our Secretary-General, Walter Boron, IUPS has played a great role in joining with other biological science unions to increase our weight and influence in ICSU. One outcome is the joint Bio-Unions satellite meeting being organised after the Birmingham Congress. Another is that there will be delegates at the 2013 Congress from nations that have never participated before.

The second important aspect of the international work that IUPS does is rather more subtle. It derives from some of the points I have made concerning culture and languages. Even with the best of intentions, it is hard for a nationally based organisation to keep the sensitivities of the rest of the world in mind. One of the functions of the International Scientific Program Committee (formed equally by IUPS and the national host society) is precisely to ensure the various balances that are important in implementing the ICSU Principle of Universality to which IUPS (and through it, the various national society members) adheres. No discrimination on the basis of ethnic origin, religion, citizenship, language, political stance, gender or age is a goal towards which we have continually to strive, difficult though it may be to achieve it. The work of the women's group within recent IUPS Congresses (Kyoto and Birmingham) shows what can be achieved and how important it is to work towards the goals. So do the initiatives IUPS has taken in Africa.

Many of these aspects of the work of IUPS involve quiet, patient diplomacy. Not much can be said about them unless they succeed.

Whither physiology?

Culture and diplomacy are important enough. But they would be of little avail if some of the depressing prognostications about the future of physiological science in the twentieth century had continued to be realised during the first decade of the twenty-first century.

Physiology was the gradual and unintended loser in a pincer movement that gathered momentum during the second half of the twentieth century (Noble, 2013). We were squeezed out from the central role in biology and medical science by developments in molecular biology on the one hand and evolutionary biology on the other.

Molecular biology held out the prospect of completely understanding organisms bottom-up. The dominant ideas included the 'genetic program' (Jacob and Monod, 1961), later to be described as the 'book of life' when the human genome project was launched, and the 'central dogma of molecular biology' (Crick, 1970). These ideas and metaphors strongly reinforced the trend within evolutionary biology to relegate the phenotype to the role of a transient carrier of the 'real' holders of the 'secret of life' – the genes (Dawkins, 1976, 2006). The version of neo-darwinism that became the Modern Synthesis (Huxley, 1942) went further. Genes became the real object of natural selection. Moreover, the source of variation was attributed to chance mutations. But, if the source of change was entirely random, physiology would have no role whatever in understanding the process. It would become important only at the stage of selection amongst the random variations. Any influence of the environment on the genome, other than retrospectively through the selection process, was also excluded.

From left to right: Two Shinto priests of the Kamigamo Shrine, Denis Noble, Ambassador Amae and Ambassador Amae's assistant during the IUPS Congress in Kyoto, Japan, 2009

But during the last ten years the world has moved on from these stringent (and, surprisingly enough, unproven) restrictions on how nature might behave. All the main assumptions of the Modern Synthesis need to be modified or abandoned (Pigliucci and Müller, 2010). Even a cursory listing of the titles of some recent articles shows new experiments breaking the rules of that synthesis, sometimes in quite astonishing ways: 'Rocking the foundations of molecular genetics' (Mattick, 2012); 'A unified approach to the evolutionary consequences of genetic and non-genetic inheritance' (Day and Bonduriansky, 2011); 'Finding the missing heritability of complex diseases' (Manolio, Collins *et al.* 2009); 'Paramutation: from maize to mice' (Chandler, 2007); 'Nuclear RNAi maintains heritable gene silencing in *Caenorhabditis elegans*' (Burton, Burkhart *et al.* 2011); 'Epigenetic inheritance and the missing heritability problem' (Slatkin, 2009).

To quote from Mattick's recent PNAS article:

"The available evidence not only suggests an intimate interplay between genetic and epigenetic inheritance, but also that this interplay may involve communication between the soma and the germline. This idea contravenes the so-called Weismann barrier, sometimes referred to as Biology's Second Law, which is based on flimsy evidence and a desire to distance Darwinian evolution from Lamarckian inheritance at the time of the Modern Evolutionary Synthesis. However, the belief that the soma and germline do not communicate is patently incorrect."

This passage would have been unthinkable in such a prestigious journal 10 years ago. The article on which it comments demonstrates a trans-generational epigenetic effect forbidden by the Modern Synthesis (Nelson, Heaney *et al.* 2012). We are at the threshold of a phenomenal development. It is such a radical change that many consider that a complete reformulation of evolutionary theory is required. The remarkable fact is that much of the deconstruction of the central dogma and of the Modern Synthesis has come from molecular biology itself (Shapiro, 2011).

It may be too early to see where exactly all this is leading. But the implications for a reintegration of physiology with evolutionary biology are already clear. What seemed impossible a decade ago is now a reality. The opportunities for physiological science are immense, which is why I have chosen to devote the President's Lecture at the Birmingham Congress to this topic (Noble, 2013). The true international dimension of our discipline is that it is set to make one of the most spectacular comebacks known anywhere on earth. All over the world, we are where the action will be during the rest of the twenty-first century.

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Physiology in Africa

Scientific research in African nations has to cope with a massive dearth of resources and a climate of poverty. But, led by The African Association of Physiological Sciences, the discipline of physiology is coming together across this vast and diverse continent to confront these challenges.

Amal M Saeed

President, African Association of Physiological Sciences (AAPS)
University of Khartoum, Sudan

Anthony B Ebeigbe

Editor-in-chief, Journal of African Association of Physiological Sciences (JAAPS)
University of Benin, Benin City, Nigeria

The beginning of physiology as a discipline in Africa dates back to the 19th century. The early history of Africa is characterized by colonialism, and the educational system of each colony reflected the political attitude and educational system of the imperial power. From about 1960 various African countries became independent and the tertiary educational systems developed according to the country's national character.

Physiology in Africa seems to have started in each country at the medical schools. The growth of physiology and interaction amongst physiologists was along the line of regional associations. In recent years, efforts at integrating the various regional/national societies of physiology have been encouraging. The African Association of Physiological Sciences (AAPS) was founded in 1989 and since then collaboration between African physiologists has escalated. A short review of the historical development of physiology in Africa and key achievements by African physiologists are presented in this article.

In the nineteenth century the first department of physiology in Africa was established within the Kasr El-Aini School of Medicine of Egypt. This department was chaired by a number of pioneers, among whom were the Egyptian Professor Abd El-Rahman El-Herrawi and the well-known Russian physiologist Gleb von Anrep. Today in Egypt, there are 21 departments in public and two in private schools of medicine. All departments in the public schools have graduate programmes of physiology, and they have teaching and research laboratories with different research interests. In addition, there are medical physiology departments exclusively for research purposes in the national research institute in Giza and the medical research institute in Alexandria.

In Sudan the first medical school was inaugurated in 1924 as the Kitchener School of Medicine. The physiology department was established in 1951 to cater for both physiology and biochemistry. The main objectives of the department were to take care of teaching physiology to undergraduate students and to conduct research relevant to the needs of the country. In 1956, the school was affiliated to Khartoum University College to form the University of Khartoum. The department shouldered the responsibility for training physiologists and the first Sudanese head of department was appointed in 1962.

The teaching of physiology in West Africa started with the establishment of the first medical school in Nigeria in 1948, at the University College in Ibadan, a college of the University of London. The physiology department included John Grayson and John Parrat, and, later, the first Nigerian, Felix Dosekun, who joined in 1959 before moving to the new department of physiology at the University of Lagos in 1962.

Physiology teaching differs across African countries. In some countries it is a function of the medical schools and in others it is aligned with science faculties. In Egypt, physiology is taught mostly in the first two years of the medical programmes through system-based modules that are either not integrated or

Participants at the 6th AAPS congress held in Ismailia, Egypt on 1–6 September, 2012

have a limited number of integrated learning activities with other disciplines. In the Suez Canal University, it is integrated with other disciplines in a problem-based curriculum, and is taught in the first three years of the programme. Despite the difference in teaching methods, the learning outcomes and the knowledge content are nearly the same.

Research is mainly directed at the health needs of each specific country and in particular the endemic diseases. In Sudan, where goitre and iodine deficiency is a real problem, it is the research subject for many Sudanese physiologists. Nutrition, nutritional deficiency, diabetes and malaria are common health problems addressed by researchers in different African countries. Neurophysiology, cardiovascular diseases and the efficacy of indigenous medicinal plants are also research topics of great interest to African researchers.

Each country has at least one physiologist who inspired the younger generation to love the subject. In South Africa, Cyril Wyndham had an 'infectious addiction' to research and he guided his students and colleagues through the challenges and into the excitement and fun of experimentation. He graduated from the Medical School of the University of the Witwatersrand in 1940. The intervention of the world war and encouragement from his colleagues led him to study at Oxford University. At Oxford, the legendary Sir Wilfred le Gros Clark set him in the direction of applied physiology. On his return to South Africa, he set up what was to become the famous Human Sciences Laboratory of the Chamber of Mines Research Organisation. Through his work on the physiological problems faced by the miners, Wyndham became the leading international expert on human thermal physiology. By 1975, he had published over 250 papers on applied physiology, and launched the careers of numerous young scientists – ten of his protégés were later to hold chairs at universities in South Africa and overseas. In remembrance of a brilliant scientist, and of his contribution to thermal physiology, the Physiology Society of Southern Africa set up the Wyndham award. This is given to a young scientist at its annual congresses. Don Craib (South Africa) formulated the 'doublet' hypothesis as the origin of electrical signals in heart muscle. Although his work caused a rift amongst his colleagues at the time, he was totally vindicated in 1976. Craib's dedicated research helped to lay a strong foundation for electrophysiology in this developing country.

Physiology societies in the different African countries bring physiologists together on an annual basis. The Physiological Society of Nigeria (PSN) was established in 1978 and has regularly held annual conferences, with the 32nd such conference taking place in Calabar in August 2012. It also publishes the *Nigerian Journal of Physiological Sciences* (since 1983), which is now indexed in MedLine/PubMed with two issues published in June and December every year. The PSN continues to be an affiliate of the IUPS, the current President is E E Osim, while Frank Mojiminiyi is on the Teaching Council of the IUPS. Physiology has been growing in West Africa, with about 40 departments in various countries in the sub-region; including the Francophone countries of Ivory Coast, Senegal, Benin and Togo. The Sudanese Physiological Society was formed in 1996 with just 35 members. Now the association has about 125 members. Its main objectives are to promote physiological sciences and to create a base for the collaboration of research among local and international colleagues. The Egyptian Society of Physiological Sciences was established through the efforts of a number of senior physiologists, headed by Ibtessam Elbagoury about 15 years ago. In

"The biggest challenges African Physiologists face are funding problems, since the governments have limited budgets and therefore little national support is given to tertiary research and teaching"

Members of the AAPS Council

South Africa the Physiology and Pharmacology Society organised joint annual meetings from 1974 till 1987, after which both societies were strong enough to organise independent meetings.

The African Association of Physiological Sciences (AAPS) was established in Kuopio, Finland on 8 July 1989 with an overall objective of encouraging the training of a new generation of basic medical scientists for the second millennium, equipped with the wherewithal to teach and evolve relevant research to handle Africa's medical issues and to support the acquisition of basic as well as advanced facilities and equipment to ensure proper teaching and research. The founding of AAPS was pioneered by 35 physiologists from 15 countries in Africa that attended the centennial Kuopio IUPS congress under the guidance of Osmo Hanninen (Finland) and Kayode Adeniyi (Nigeria), who served as Secretary General. The first congress of AAPS was held in Nairobi, Kenya, in 1992, with over 300 participants from 30 countries in Africa, Europe, Asia and the USA, as well as key officials of the IUPS and American Physiological Society (APS).

AAPS is as a non-profit organization registered in South Africa, a member of IUPS and is affiliated to the International Society for Pathophysiology. It has facilitated the establishment of a number of national societies of Physiology in Africa, including: The Sudanese Physiological Society, The Zimbabwe Physiological Society, and The Ethiopian Physiological Society. AAPS holds its International Congress in the year preceding the IUPS congress. Five other congresses have been held as follows: Durban, South Africa (1997); Pretoria, South Africa (2001); Tetouan/Tangiers, Morocco (2004); Nairobi, Kenya (2008); and Ismailia, Egypt, (2012). The 7th International Congress will be held in Nigeria in 2016. The current president of AAPS is Amal Saeed of the University of Khartoum, Sudan.

The number of physiologists and physiology research activities in Africa are growing. The congresses of the AAPS enable physiologists from Africa to get together and form collaborations to address common research topics. These conferences are also attended by physiologists from first-world countries who give inspirational ideas to AAPS members. The biggest challenges African Physiologists face are funding problems, since the governments have limited budgets and therefore little national support is given to tertiary research and teaching. Researchers have difficulty obtaining advanced research facilities and equipment and therefore cannot develop cutting-edge expertise. Due to these limitations, promising researchers often leave their countries for those where better research facilities and research grants are available. Many African countries do not have a well-developed telecommunication system and hence communications and access to the internet limit scientists and students who wish to be internationally competitive.

Physiology in Australia

For 150 years, physiology has been doing rather well for itself in Australia – maintaining international connections and winning international recognition. PN's own emigrant, Samantha Passey, talks to an established 'Aussie' physiologist, Simon Gandevia, and early-career researcher, Prajni Sadananda to get a true picture of the present and future for the field.

Samantha Passey
University of Melbourne, Australia

The arrival of Professor George Halford in Melbourne aboard the Agincourt in December 1862 heralded the start of an era for physiology, and indeed medicine, within Australia. Halford had travelled on a three-month journey from England to take up a position as the first Professor of Anatomy, Physiology and Pathology at the University of Melbourne.

Since those early days, the department has gone from strength to strength and in 2012 celebrated its 150th birthday. The department was the first in Australia and so the recent celebrations commemorated not only 150 years of physiology at the University of Melbourne, but 150 years of physiology research and teaching within Australia. The event was marked with the publication of *Life's Logic* written by Juliet Flesch, a book that chronicles the history and development of Australia's first physiology department, its ups and downs, successes and occasional scandals, right up to the present day.

And ups and downs there have been. From the early founding years there are reports of difficulties, such as lack of funding, equipment and space for research and teaching activities, problems with retaining trained staff – as physiology 'demonstrators' were only employed on temporary contracts – and complaints about heavy administration and teaching loads leaving precious little time to devote to their research programmes. Readers may be nodding their heads at this point at the hauntingly familiar obstacles faced by academics in those early days. In some ways it seems little has changed!

Much has changed, however, and the department has grown and developed over the years to become firmly established at the forefront of physiology research and teaching in Australia, and indeed globally. Even in those early founding days, academics were attracted to Melbourne from across the globe to take up academic positions in physiology and many maintained active links with other researchers in the US and Europe. This is still a feature of physiology research in Australia today, despite the geographical distance between Australia and many other countries.

From the early founding days in Melbourne, physiology grew in Australia over the next few decades, becoming prominent in the teaching of medicine across the country and as a discipline in its own right. There have been many successes achieved by Australian physiologists, including a number of Nobel Prize awards over the years. Sir Howard Walter Florey was awarded the 1945 Nobel Prize in Physiology or Medicine along with Sir Alexander Fleming and Ernst B Chain for their work in the discovery and investigation of penicillin and its effects in infectious diseases. Later, in 1963, Sir John Carew Eccles won a Nobel Prize, along with Sir Alan Hodgkin and Sir Andrew Huxley, for their work in neurophysiology and the nature of synaptic transmission in the nervous system.

More recently, in 2009, Elizabeth Blackburn was awarded the Nobel Prize in Physiology or Medicine for her work in studying the

"The success of Australian physiology is testament to what can be achieved by the determined few who persist in their goals"

protection of chromosomes by telomeres and the actions of telomerases. Born in Tasmania, Elizabeth Blackburn is a graduate of the University of Melbourne and has conducted her research both in the UK and in San Francisco in the USA.

Australia has developed a thriving physiology and medical research environment with numerous institutions, collaborative alliances and multidisciplinary research teams generating world leading physiology research findings. So looking to the future, what lies ahead for Australian physiology and medical research?

To find out more, I asked the internationally renowned physiologist Simon Gandevia from the NeuRA (Neuroscience Research Australia) Institute in Sydney for his thoughts on physiology in Australia.

Simon Gandevia

By way of introduction, I am a clinical neurophysiologist and a long-term NHMRC Research Fellow. My work is centred on understanding human movement and a range of motor impairments when this system fails. Over my career, I have had continuing interest in the brain's control of breathing, particularly in spinal cord injury and respiratory disorders; the control of human movement and in particular the hand; and understanding the proprioceptive senses which are used to guide all muscle contractions and movements. All my studies are conducted on human volunteers and patients and they use a range of invasive, clinical and psychophysical tests.

What would you say are the similarities and differences between conducting research in a not-for-profit research institute like NeuRA compared to an Australian University environment?

To detail the similarities and differences between operations of a research institute and a university would take some time! A key element is the extent to which the research institute is truly independent from the university or other 'institution'. One obvious difference is the focus on undergraduate teaching within a university, whereas the academic teaching in a research institute is focused more on post-graduate (usually doctoral) students. Funding for independent medical research institutes is quite different from that of a university! In all but the largest and oldest medical research institutes in Australia, research grants provide the foundation for employing the scientists and providing much of the recurrent costs for their work. Some research institutes can generate a large mass of researchers working in a particular area (e.g. cancer or immunology) and this may provide a good environment for driving the science. Of course, strong intellectual groupings can form within university departments and across faculties. Increasingly, Australian universities are employing cross-departmental strategies to bring like-minded researchers together. The true success of these strategies is probably not known!

What does the future hold for Australian physiology research?

If we follow the American model then there will be some convergence towards cellular and molecular physiology in departments/schools/centres, etc. It remains to be seen whether this trend offers real benefits to those within them or to their students. Some human physiology may be shifted to departments of exercise science, etc. Such a trend may have political rather than intellectual advantages. Despite the McKeon Review, funding for physiology and related medical research in Australia for the next five years or so does not look rosy. Neither the political nor the economic outlook favours a substantive investment either in tertiary funding or in medical research institute funding.

The recently published McKeon Review details the findings of a national investigation commissioned by the Australian Government to develop strategies to improve the health of Australians through research. After consultation with over 300 institutions, public meetings and private meetings with individuals and stakeholders in healthcare and medical research, a number of strategic objectives were proposed in a 10-year plan to incorporate the findings of medical research into the healthcare system. A number of aspects were addressed; of particular interest to many research academics, the report detailed the need to train and retain researchers in medical research, a streamlining of the grant application process, support for infrastructure development such as patient databases and tissue banks, and attracting philanthropic funding from international and national sources to support government funds through the main grant awarding bodies.

As part of the focus on training researchers, the McKeon Review detailed the requirements for additional support for early-career researchers and more flexibility in the assessment of research track records and career breaks. I caught up with an early career researcher, Prajni Sadananda, at the University of Melbourne to find out her perspective on the situation for younger researchers in Australia.

Prajni Sadananda

I am currently a post-doctoral research officer at the University of Melbourne, Department of Anatomy and Neuroscience. I completed my PhD at the University of New South Wales before undertaking a two-year post-doctoral position at the University of Bristol, UK, and finally returning to Australia. My research interests throughout my career have focused on the physiology and pharmacology of the urinary bladder, with particular emphasis on changes in bladder function following inflammation or injury to the central nervous system.

You have worked both in Australia and in the UK. What would you say were the main differences and similarities between the two in terms of research environments and opportunities?

The UK and Australia are very similar in their research environments. This makes it straightforward to form collaborations between research labs in the two countries. During my time in Bristol, I met with numerous fellow Australian post-docs who were working in the UK. Similarly, here in Australia, there are a very large number of scientists who have come from, or previously worked in, the UK. Both ways, researchers are able to 'hit the ground running' when they make their move between the two countries, making it a smooth transition.

There are, however, some key differences that I have observed. Although communication technologies have bridged the enormous physical distance between Australia and Europe, we are still relatively isolated. During my time in Bristol, I was able to attend short conferences/workshops in Paris, Stockholm and Dublin, with minimal disruption to my work and at a very low cost. The ability to take part in such events was hugely beneficial as an early-career scientist. It boosted my confidence, fine-tuned my presentation skills, and introduced me to new scientists, new ideas and mentors. The relative isolation of Australia makes international conference travel more expensive and time consuming, and thus cannot be undertaken as frequently.

What attracted you to return to Australia to continue your research career?

After experiencing two English winters, I was keen to return to Australia to pursue my research! Australian post-docs enjoy a higher salary than in the UK and a higher standard of living (as well as a bit more sunshine!). These were major incentives for my return.

How do you find the Australian academic/research environment in terms of catering for career development for early-career scientists such as yourself? Are there funding opportunities for young scientists?

Australian early-career scientists have similar opportunities to their UK counterparts in terms of the availability of fellowships, grants, mentorship, society participation, and community engagement. Fellowships are available from government bodies as well as charity organisations and philanthropic sources. It is also entirely possible for Australian post-docs to make use of international organisations, for example, membership of The Physiological Society, which offers a range of funding opportunities to international members. There are also many Australian societies with partner societies in the UK, making conference participation less costly if you are member of one or the other. However, in general, I have found that Australian society memberships and conference participation are more expensive than in the UK.

Australian post-docs tend to have a tad more research experience than their UK counterparts. This is because of the additional honours year that we have here. In addition, the push to publish in Australia, I feel, is greater. As a PhD student, there is a huge emphasis on publishing your findings while you are completing your PhD. Indeed, many universities here now accept PhD theses in the form of publications. This means that the average Aussie post-doc tends to have a higher number of papers. The downside of this is that Australian fellowships (in keeping with that trend) are also publications-focused, making it often difficult for overseas post-docs to be competitive enough.

Physiology in Australia has certainly come a long way since George Halford stepped off the boat in 1862, developing into a vibrant research environment with a spirit of collaboration and cooperation that has resulted in notable successes along the way. With so much achieved from such small beginnings, the success of Australian physiology is testament to what can be achieved by the determined few who persist in their goals. As Simon Gandevia mentioned, changing trends in the organisation of research and teaching will likely influence the evolution of physiology in the future, and only time will tell what path the future of Australian physiology will take – so watch this space!

Read Samantha's Member/Lab Profile on page 46 for her experiences of shipping her life and career down under.

Physiology in Brazil: The Rhythms of Life: IUPS 2017 in Rio de Janeiro

The host of the next IUPS Congress provides an overview of the field in Brazil. The future looks bright for the field, but work remains to be done in this dynamic nation.

Benedito H Machado

University of São Paulo, Brazil
President of the Brazilian Society of Physiology

Rhythms of Life

The theme of the 38th IUPS Congress in Brazil is inspired by fundamental physiological processes, from cells to the function of whole biological systems, which are based on rhythms and cycles. Considering that the physiological sciences are dealing with the processes that determine life, the theme of the 38th IUPS Congress in Brazil will be 'The Rhythms of Life'. This theme also combines the Brazilian culture and Brazilians' lifestyle in which music, sports and a rich natural environment provide a perfect scenario for a real experience of 'The Rhythms of Life'.

Achievements by our members

Integrative physiology is the hallmark of the scientific activity of several generations of physiologists in Brazil. Cardiovascular, neuroendocrine and metabolism, renal and neurophysiology were and remain the strongest sub-areas of physiology in Brazil and several important contributions in the second half of the 20th century have been made by members of the Brazilian Society of Physiology (SBFis) in these fields. In this historical context, several names have been important in establishing our current status on the international scene, such as Miguel R. Covian, Wilson T. Beraldo, César Timo-Iaria, Eduardo M. Krieger, Gerhald Malnic, Renato H. Migliorini, and José Antunes-Rodrigues among others Brazilians leaderships.

Challenges for research in physiology

Nowadays we have several strong graduate programmes in our universities and an amazing amount of interest from young people to get involved with science in general, and physiology in particular. PhD students can oobtain fellowships from the Brazilian federal agencies for graduate programmes and research development (CAPES and CNPQ, respectively) and there is quite reasonable financial support for young investigators to go abroad for their post-doctoral training ('Science Without Borders' by the federal government). In spite of all these efforts, the current number of Brazilians physiologists working in Brazil and playing an active role as leaders at the international level is still relatively small, and this is one of our main challenges for the next few years. We are aware that to be leaders in the international scientific community will require an increase in the impact of our scientific publications in order to reach levels similar to those achieved by physiologists working in developed countries, in which physiology is well established. This challenge implies that Brazilian physiologists must be more active in the international community of physiology, and we are convinced that some of these limitations will be overcome by several large scientific meetings in Brazil over the next few years, such as the 1st PanAmerican Congress of Physiological Sciences in 2014 and the 38th IUPS World Congress in 2017. The organization of these international meetings in Brazil will be an important contribution by the SBFis to making Brazilian physiologists significant players on the international scene.

At the national level it is really important to highlight that the SBFis hosts the Multicenter Graduate Program in Physiological Sciences, in which more than 120 students are enrolled in Masters and PhD courses. The Multicenter Program is a national network scheme with accreditation and financial support by CAPES (federal agency for graduate programmes) and it involves nine associated and six traditional graduate programmes in physiology in several regions of Brazil. With this programme, SBFis is contributing to increasing the number of faculties enrolled in

graduate programmes and the number of PhDs in physiology in Brazil, and we are proud of such a great achievement by our Society.

Challenges for teaching physiology

Most PhDs in physiology in Brazil are working in the public university system, the institutions where most of the scientific activities in Brazil are developed, but the number of these highly qualified faculties is still relatively small for more than 120 public universities, and almost absent in the many private universities in Brazil. This implies that the majority of faculty members teaching physiology in Brazil are not PhDs and consequently their professional activities are not linked to any research in the physiological sciences. Therefore, we need to increase the number of PhDs in physiology in the next few years to teach and motivate a new generation of young talented students to get involved with research in physiology.

What is unique about physiology in Brazil?

There is high motivation amongst young students to get involved with physiology during their undergraduate courses, and in our annual congresses of physiology more than 70% of the attendees are graduate or undergraduate students. This is something unique and our Society and the Brazilian agencies for promoting graduate programmes and research in Brazil are aware of this potential and we will work even more to keep the enthusiasm and involvement of our students with physiology. With respect to this important issue, the prospects for physiology in Brazil are great.

Plans for IUPS 2017, Brazil

We are working hard to organize a great IUPS Congress in Rio de Janeiro, at the same scientific level as that organized by The Physiological Society in Birmingham. We also wish to use this opportunity to bring to this international scientific arena in Brazil those physiologists from the emerging economies that are not yet active players on the international scene. For this reason, we will need to encourage attendance by the senior physiologists from the developed countries at IUPS in 2017, in order to provide the right atmosphere for a meeting of physiologists from all over the world and to start a new era in which the international community of physiologists will be working together for the scientific development of our nations. Since we have a large number of students and young people involved with physiology in Brazil, we also wish to create an excellent environment to stimulate the new generations from all over the world to keep working in physiology. Rio de Janeiro is an energetic city and the perfect place for such a great IUPS Congress, which will undoubtedly have the 'Rhythms of Life'.

"There is high motivation amongst young students to get involved with physiology during their undergraduate courses"

The location of IUPS 2017: Rio de Janeiro. View of the Guanabara Bay and Sugar Loaf from the Corcovado (Christ the Redeemer).

Physiology in China

Western countries have been a lure for Chinese physiologists. With the meteoric rise of China, many research scientists are taking the opportunity to return home.

Liwei Wang & Lixin Chen
Jinan University, China

Chinese scholars returning from overseas normally have a long period of educational and work experience in the universities of advanced Western counties, and most of them keep close links or collaborations with their previous supervisors, colleagues and universities when they return to China.

They normally establish their own laboratories, research group and research programmes within a few years, with the support from the universities where they are working, and from different funding bodies and organizations. For those who are working in universities, their research groups (including research assistants, technicians and postgraduate students) are financially supported mainly by the university; this includes the salaries of all staff, as well as the tuition fees and stipends for postgraduate students. In contrast to most Western countries, the research funding from outside sources is mainly required to cover expenditures on consumable materials and scientific activities, but not the personnel salary.

Chinese physiologists can apply to a variety of research funding bodies and research programmes. Among others, the national foundations and programmes include:

- National Natural Science Foundation of China
- Chinese National Programmes for High Technology Research and Development (863 Programmes)
- Key and Major Projects of National Programmes for Fundamental Research and Development in China (973 Programmes)
- Chinese National Programmes for Science and Technology Development
- National Science Foundation for Distinguished Young Scholars
- Chinese National Science Foundation for Outstanding Scholarships

Similar provincial foundations and specific departmental research funding are also available. Research funds have been increased greatly in China in recent years. The funding for an ordinary research project supported by the National Natural Science Foundation of China has been increased from an average 300,000 RMB (£1 currently equals about 9.4 RMB) in 2009 to 700,000 RMB in 2012.

Although returning Chinese scholars have a good chance of being successful and getting promotion in China, they need time to adapt to a different administration system and working environment. They may need to spend a lot of time attending meeting and social activities, filling in forms, writing research projects and applications for funding and ordering equipment and consumable materials. They need to be patient in waiting for the completion of the complicated ordering process and the arrival of the ordered equipment. Furthermore, some of the returned Chinese scientists have higher responsibility in the administration of the schools and universities where they are working. All these activities may consume their precious time and energy, but this is not so different from academia all over the world!

Physiology in Europe: The role of FEPS now and in the near future

The benefits of coming together are plain to see. So just what is the problem in having a pan-European meeting?

David Eisner
President, FEPS

Ulrich Pohl
Past-President, FEPS

Ger van der Vusse
Secretary General, FEPS

The population of the European Union (about 500 million) is of the same order of magnitude as that of the USA (about 300 million). If anything, the USA is more spread out than is Europe; Miami to Seattle is 2732 miles, a distance which dwarfs the diameter of the EU whether measured from Cork to Athens (1,826 miles) or Lisbon to Helsinki (2090 miles).

However, the environment in which physiologists work is completely different in these two regions. The USA has one physiological society (the APS) with 11,000 members. In contrast Europe has about 30. The largest (The Physiological Society – PhySoc) has 3200 members. The other two large societies are the German (800) and the Scandinavian (950). In contrast, the smallest national societies comprise as few as 8 members. It has been evident for many years that European Physiologists often have much better contacts with colleagues in the USA rather than in other European countries. Indeed they seem to be much more likely to attend scientific meetings in the USA than in other, much nearer, European countries. One reason for this may be the much larger size of the USA meeting. The most recent Experimental Biology had 2,700 abstracts in the physiology area. In contrast, until a few years ago, the meetings of national societies in Europe were never more than 300-500. The Physiological Society's annual meeting now has about 600 abstracts, but even this is much smaller than in the USA. Larger meetings are seen as better scientific value by the scientific community.

The European situation differs from that in the USA also in the heterogeneity of activity and funding. Some countries (UK, France, Germany and Scandinavia) have very long and virtually unbroken histories of physiology research. For others, the vicissitudes of history and politics mean that physiology is mainly seen as a subject for medical education with very little research activity. It was against this background that, in 1991, the Federation of European Physiological Societies (FEPS) was founded. As its name suggests, FEPS is a federation of national physiological societies in Europe. It has grown from strength to strength and currently has 29 national societies as members with the newest (Malta) having joined earlier this year. In this sense FEPS is an "umbrella" organization. When summed, the total number of European Physiologists who are members of FEPS via their respective national societies is of the order of 8000 which is comparable with the total number of individual members of the APS. The official scientific journal of FEPS is *Acta Physiologica* (the erstwhile *Acta Physiologica Scandinavica*).

As originally constituted, FEPS organized stand-alone meetings but it soon became clear that this was simply adding to the number of meetings in an already crowded timetable. For the last 10 years, therefore, FEPS has met in conjunction with other societies. When the FEPS meeting is held with one of the individual European national societies the host society typically benefits from a much larger meeting and a higher profile for physiology in its country. FEPS supports these scientific meetings by financially supporting the FEPS key note lecture, the FEPS physiology teaching

"We suggest the establishment of a pan-European meeting. The IUPS Congress seems an ideal opportunity to start discussions"

symposium, a number of scientific symposia including the European Young Physiology Symposium (EYPS), and awarding travel grants for young European physiologists. To improve the communication between the European Physiological Societies FEPS issues FEPS-newsletters and has launched a website (www.FEPS.org) for dissemination of ideas and information.

Twenty years on from the establishment of FEPS, the landscape of European physiological societies and their meetings has scarcely changed. While there are some joint meetings between national societies, the vast majority are those of a single society. Does this matter? We think it does; all other things being equal, a meeting of 2,000 will be much more likely to have symposia and posters to interest all comers than will one of a few hundred. Our students and junior colleagues would benefit from the opportunity to meet others from the rest of Europe. There is also the hope that a big meeting will attract scientists from the rest of the world in comparable numbers to the USA whose meetings have become *de facto* 'International'. We have no desire to stop our colleagues attending these excellent meetings but, rather, wish that Europe could also provide such meetings to the benefit of all. A pan-European meeting would have a number of important advantages:

- It would be easier and less expensive for European physiologists to attend while, at the same, time being attractive to overseas colleagues.
- It would provide an ideal environment for colleagues from across Europe to meet one another and plan collaborations. This is particularly important given the increasing role of EU funding.
- It would open up a larger job market for younger scientists.
- It would make Physiology more visible in Europe and help sustain the subject as an independent discipline in European life sciences.

Our ambition is to have a single pan-European Physiology meeting. National societies could give up their own annual meeting and meet in one location. We do not see this as being a geographical problem. Members of the Scandinavian Physiological Society are used to flying between Denmark, Finland, Iceland, Norway and Sweden. In a country the size of Germany or the UK/Ireland people are well used to flying to national meetings. What could be simpler than taking a single flight or fast train to a well-connected hub somewhere in Europe? Attempts have been made to produce such a meeting. In 2006 negotiations for a Scandinavian, German and PhySoc meeting almost succeeded, but the best that could be realized was a joint Scandinavian and German meeting in association with FEPS. This year's IUPS meeting in the UK was another potential venue to include such a meeting. The Scandinavian Physiological Society and FEPS have made this the venue for their annual meetings, but this was not possible for the German Society.

What are the problems in having a pan-European meeting? There are certainly practical questions. The UK Society meets in July while the Germans favour March. These dates fit with the academic calendars in these countries. But are these issues really so important? Is Europe to be forever condemned to not being able to host a major meeting which can compare with those in the USA?

What is the way forward? We suggest the establishment of a pan-European meeting, initially every other year. As well as the usual considerations of cost, etc., the venue should be chosen for ease of travel from the rest of Europe and further afield.

Many of the leaders of the European physiological societies will be attending IUPS. This seems an ideal opportunity to start discussions.

The Physiological Society's perspective

The Physiological Society is interested in exploring options for a larger Europe-wide meeting. However, we firmly believe this needs to be along the lines of the *Experimental Biology* meeting in the USA, which engages a number of life science societies who each organise their scientific programme, but under the umbrella of a professional organiser. The caveat is that the UK and Europe have fundamentally different financial models compared with those used in the USA and care needs to be taken that any future European meeting remains cost efficient for all participating partners. The FASEB model is one which we believe would ultimately be more appealing to both participants across disciplines and funding bodies

Physiology in Japan

The Physiological Society of Japan has, historically, been strong – playing an important role nationally and internationally. But the society isn't taking its future strength for granted.

Satoshi Kurihara
President

Yoshihiro Ishikawa
Vice President (Treasurer)

Noriyuki Koibuchi
Vice President (Education)

Masato Konishi
Vice President (General Affairs)

Yoshihiro Kubo
Vice President (International Relations and Meetings)

Noriko Takuwa
Vice President (Information and Public Relations)

*Fusao Kato**
Vice President (Science and Research)

* corresponding author

The Physiological Society of Japan has, historically, been strong - playing an important role nationally and internationally. Now the society is seeking the way to transform itself from a 'medical school physiology teachers guild' to an Asian core of physiological sciences.

Accordingly, the PSJ has been a member of the International Union of Physiological Sciences (IUPS) since its founding in 1953 and has organized the IUPS World Congress twice: in 1965 in Tokyo and in 2009 in Kyoto. For the 2009 IUPS Congress, we hosted nearly 4000 researchers from around the world and it resulted in a great success under the leadership of the President, Yasushi Miyashita. The main theme of IUPS 2009 was, as many of you remember, 'the logic of life', which is the literal translation of the Japanese term for physiology – 'Seiri-Gaku'. Our choice of this theme reflects our belief that physiology provides the scientific basis for understanding the functions and mechanisms of living systems. Masao Ito (1993–1997) and Akimichi Kaneko (2005–2009) served as presidents of the IUPS, and Yoshihisa Kurachi, with the recommendation of the PSJ, is serving as First Vice President of the IUPS.

Open to the world, especially to Asia

Since its founding, the PSJ has held domestic meetings annually, except in 1944 and 1945, due to the difficulties resulting from World War II. In March 2013, we celebrated our 90th annual meeting in Tokyo, in which 960 poster presentations, 13 educational programmes and 65 symposia were held. These symposia included a Korea–China–Japan joint symposium and a joint symposium with the Chinese Association of Physiological Sciences. As such, we are proud that our annual meetings have become an important medium for amicable communications among Asian physiologists. Yasunobu Okada, a former president of the PSJ, also served as president of the Federation of Asian and Oceanian Physiological Societies (FAOPS) from 2007 to 2011 and we will host its 9th congress in Nagoya in 2019. It is worth noting that, according to our globalization policy, all presentations (with a few exceptions) at PSJ annual meetings since 2006 have been made in English. This policy has facilitated the participation of and presentations by non-Japanese researchers at our domestic meetings, and has also provided occasions for young Japanese physiologists to experience presentations and discussions in English even in domestic meetings.

Contributions to the physiologist community

The PSJ publishes two journals: *The Journal of Physiological Sciences*, an international peer-reviewed bimonthly in English, and *The Journal of The Physiological Society of Japan*, a bimonthly in Japanese distributed to the members. The former is edited by the PSJ (Editor-in-Chief, Yoshihiro Ishikawa, treasurer of the PSJ) and published by Springer-Verlag. The PSJ has also established Society Awards to support young researchers and female researchers. These awards include the Promotion Award of the Physiological Society

Choju-Giga (Animal Caricature Scrolls) – the oldest 'Manga' created in the 12th century in Kyoto, Japan. The logo of the Physiological Society of Japan (top right) uses a frog in a scene depicting medical activity by animals.

"We are proud that our annual meetings have become an important medium for amicable communications among Asian physiologists"

of Japan for Young Scientists and the Irisawa Memorial Awards. Many outstanding young researchers who have received these awards are actively contributing to the progress of physiological sciences in Japan and worldwide.

Research directions: a unique national institute – NIPS-SEIRIKEN

Faculty members, young researchers including post-doctoral fellows and graduate students from a variety of academic fields, including medicine, pharmacology, dentistry, biology, technology and sport sciences, as well as researchers in national, municipal and private research institutions constitute the largest part of PSJ members.

Of these research institutes, the National Institute for Physiological Sciences (NIPS–SEIRIKEN) in Okazaki deserves special mention, because it is unique and the largest national institute in Asia devoted to research and graduate education of physiological sciences. The NIPS, established in 1977, is an interuniversity research institute that fosters collaboration among universities for fundamental research and education into human physiology. The researchers of the NIPS investigate the functions of the human body and brain and their mechanisms through collaborative studies with domestic and foreign scientists. The NIPS also provides specialized techniques and large-scale equipment for shared use in addition to the opportunity for graduate students and young scientists to obtain training and education in physiological research.

The NIPS has three missions. The first is to conduct pioneering research at every level, from molecules to cells, tissues, organs and entire organisms, as well as organically integrating the results of this research to elucidate the functions of the body and their mechanisms. The second mission is to promote collaborative research among other organizations, including national, public and private universities nationwide, and to promote the shared use of advanced research facilities, equipment, databases, research methods and meeting facilities. The third mission of the NIPS is to nurture graduate students and young researchers, to help them become international researchers in the physiological sciences. As such, the NIPS is an extremely important medium for promoting scientific communication among physiologists belonging to various types of schools and institutes, such as the Riken Brain Science Institute.

Major research fields of the PSJ

The PSJ has a strong tradition of research into the physiology of excitable cells, such as neurons and muscles, which has continued to

A photo taken at the First Annual Meeting (1922) of the Physiological Society of Japan (PSJ) at the University of Tokyo. The PSJ is the third oldest medical science society in Japan.

the present day. Neurophysiology, cardiovascular physiology and channel physiology are among the most active research domains of the PSJ, but research in many other fields, which we do not list due to the paucity of space, is also highly active. In addition, research by PSJ members often introduces innovative technologies, including single-molecule imaging, large-scale imaging of cellular excitations, genetically regulated Ca^{2+} imaging, ultrastructural visualization of subsynaptic receptor distributions, and dynamic membrane-potential imaging in excitatory cells. The realization and application of these technologies are made possible, in part, through interactions between academia and industry, such as microscope and micromanipulator companies, and through the strong background in genetic engineering shared by many Japanese laboratories.

The research activities of the members of the PSJ are mostly supported by grants from the Ministry of Education, Culture, Sports, Science and Technology (MEXT) distributed by the Japan Society for Promotion of Sciences (JSPS). There are Neurophysiology, General Physiology, and Environmental Physiology sections to which the majority of members apply. The JSPS also provides fellowships to graduate students and postdoctoral students, including those from foreign countries. There are also private funding agencies and supporting grants from each university. A list of presentations for recent important findings by PSJ members can be found at the 'Science Topics' section of the PSJ website: int.physiology.jp/en/sciencetopics/

Commission of physiology education

Another important activity of the PSJ members is education. This involves undergraduate and graduate education in various academic institutions. Because of the increasing specialization of modern science, presentations at annual meetings of the PSJ are often incomprehensible to researchers outside each specialty area. As a consequence, researchers often choose to attend meetings of other organizations, such as the Society for Neuroscience, dedicated to their own area of interest. On the other hand, to obtain a tenure-track position at a medical school, physiologists must be able to teach a wide range of physiological subjects. Until recently, however, the PSJ has provided little opportunity during its annual meetings to acquire the required teaching skills and knowledge. To provide an opportunity to acquire the wide range of knowledge required for teaching physiology, the Education Committee of the PSJ has created an educational lecture course in physiological science and a series of model lectures in Japanese designed for undergraduates. Members of the PSJ who take part in the lecture course can earn points towards

The opening ceremony of the IUPS 2009. Traditional Kyoto 'Geiko' dancers are welcoming the participants from all over the world. Such well-conserved tradition is compatible with the leading-edge sciences in Japan.

certification as a Physiology Educator. We hope that these programmes will improve the quality of teaching in physiology, help postdoctoral fellows obtain academic positions, and increase attendance at annual meetings of the PSJ.

The current concerns and future solutions of the PSJ

The following are a few of the concerns shared by the members and the council of the PSJ:

- The decrease in the number of members. This decrease should be proportional to that in the younger population in Japan, mostly due to the retirement of large numbers of baby-boomer researchers. However, the number of members of the societies for more 'modern' biosciences, such as the Japan Neuroscience Society and the Molecular Biology Society of Japan, is increasing. We are analysing the cause of the decrease in membership and are searching for ways to make the PSJ more attractive to young researchers. An extension of the society target from 'physiology' to 'physiological sciences' would be a key for this.
- Relationships with other societies. To address this concern, we are now trying to update the society's image from 'a guild of medical school physiology teachers' to 'a community of people working in integrative physiological sciences, in Japan and elsewhere'. Doing so would also help address our first concern as mentioned above. For this purpose, we encourage joint symposia and meetings with other domestic societies, such as the Japanese Association of Anatomists and the Japanese Pharmacological Societies, and with foreign societies, especially those in Asia. We welcome proposals for such international joint symposia at our annual meetings.
- Education. As described above, we are keen to maintain the educational standards of physiology, not only in medical schools but also in other institutes for related biomedical science education and co-medical training. The aforementioned 'Physiology Educator' system introduced recently is an example of such attempt.

Under the leadership of Satoshi Kurihara, the president of the PSJ since 2012, the PSJ will, we believe, successfully address these concerns and continue to make essential contributions to the development of the physiological sciences in Japan and in other Asian countries.

The Society Website: http://int.physiology.jp/

Physiology in the United States of America

"It was the best of times, it was the worst of times".[1] The leaders of the largest physiological society in the world find physiology in the USA facing a time of great promise, but also real challenges.

Kim Barrett
86th President (2013-2014)

Susan Barman
85th President (2012-2013)

Joey Granger
84th President (2011-2012)

The American Physiological Society

As the three current Presidents of the American Physiological Society, it is an honor to share some thoughts with the readership of *Physiology News* about the status of physiological sciences on our side of 'the pond' on the occasion of the upcoming IUPS meeting. We suspect that many of our concerns about the future may resonate with physiologists worldwide. And yet, there are so many opportunities also available at the present time that it is hard not to be optimistic about the pathway forward for the discipline.

Opportunities abound

Numerous developments make this an opportune time to be a scientist focused on integrative, rather than reductionist, approaches to biomedical science and an understanding of human (and animal) diseases. First, there have never been better tools available to examine cell and organ function in the setting of living animals and humans, including studies conducted in real time. In part, these tools derive from advances in imaging, but there are many others. There are numerous examples of how wholly *in vitro* studies may be misleading when used to predict underlying mechanisms of both disease states and normal physiology. This implies that both colleagues and funding agencies should place emphasis on the incorporation of physiological thinking in all studies that have the goal of defining such underlying mechanisms.

The post-genomic era has also seen a sharply increased emphasis on studies that take as their starting point massive datasets to elucidate and predict the function of integrated systems. Examples include the use of metabolomics approaches to understanding the consequences of complex, multi-organ disease states, such as diabetes, as well as efforts to dissect the role played by the intestinal microbiota in nutrition, digestive diseases, and obesity (Patterson *et al.* 2011; Yatsunenko *et al.* 2012). Just this month, President Obama announced a new research programme dubbed the BRAIN (Brain Research through Advancing Innovative Neurotechnologies) Initiative, aimed at producing dynamic maps showing how individual neurons and the brain circuits they make up function at the speed of thought (www.nih.gov/science/brain/index.htm). This initiative is hoped to shed new light on the pathogenesis and possible treatments for conditions ranging from Alzheimer's disease and epilepsy to traumatic brain injury. Physiologists have, and will, make major contributions to these 'big data' projects, and we should consider how to amend our graduate curricula to ensure the next generation of our trainees can be equipped with the tools needed to participate.

Translational research has also taken centre stage in the United States as the federal government, funding agencies and the general public look for returns on investments in biomedical research. Physiology remains the cornerstone of effective medical care and thus our discipline, and our members, are well-placed to reap the benefits of this emphasis. Increasingly, basic scientists are collaborating with clinical colleagues, including

1 Charles Dickens (British novelist, 1812-1870), *A Tale of Two Cities*

"Translational research has taken centre stage in the United States. Our members, are well-placed to reap the benefits of this emphasis"

in the national network of Clinical and Translational Research Institutes, to bring innovations from the lab to the clinic. There have also been programmes designed to better acquaint our physiology and other basic science trainees with pressing problems encountered in patient-care settings, such as the Med Into Grad initiative of the Howard Hughes Medical Institute (www.hhmi.org/grants/institutions/medintograd.html). We have personally witnessed the personal growth and passion that develops when PhD students have the opportunity to map the goals of their thesis project to observations they make when shadowing physicians on rounds.

Finally, the American Physiological Society is in great shape as an advocate for our discipline and the next generation of physiologists. In particular, we have a robust programme of outreach and educational activities that span from kindergarten to post-docs, including our annual Physiology Understanding (PhUn) week that has reached more than 40,000 schoolchildren with activities that introduce physiological principles, and our Professional Skills Training Courses that equip our graduate students and post-docs with key career-building competencies such as writing and reviewing, networking, and interviewing skills. Further, since our last strategic plan, we have emphasized the role of our regional chapters in the wider promotion of physiology. Existing chapters have been reinvigorated and new chapters have been founded, and each stresses meetings where trainee involvement is central.

Challenges we face

Despite these myriad opportunities, there are also threats to our discipline in the United States and indeed to the biomedical enterprise in general. Particularly topical at present are the cuts to federal support for biomedical research, and especially the spectre of sequestration. It is not yet fully clear to what extent this across-the-board reduction in government spending will impact grant funding and thus the research enterprise, but early indicators are not encouraging. Scientists are reporting substantial cuts to their budgets for existing awards, and the prospect for those with applications in the pipeline are grim. We run the risk of losing a large cohort of would-be physiologists at a critical stage of their career, since they may rightfully conclude that a research career offers too many uncertainties for a well-balanced lifestyle.

The place of physiology in both medical and graduate curricula has also been evolving. Many medical and other professional schools are eschewing a curriculum that includes stand-alone courses in the basic biomedical sciences in favour of organ-based or integrated programs that stress the involvement of (for example) physicians in even pre-clinical training. While these educational models may have promising outcomes, at least based on initial experience, we run the risk that physiology will lose its identity and that physiologists will lose opportunities to contribute to professional education. At the same time, the US National Institutes of Health recently completed a taskforce report on the status of the biomedical workforce that concluded that we

Marty Frank, Kim Barrett, Susan Barman and Joey Granger

"Particularly topical at present are the cuts to federal support for biomedical research, and especially the spectre of sequestration"

need to do a better job of training graduate students for a wider range of possible career outcomes than simply becoming clones of their advisors, including jobs in industry, policy and legal settings (blogs.nature.com/news/files/2012/06/draft-report-from-the-Biomedical-Research-Workforce-Working-Group.pdf). This is also to be accomplished without extending the length of graduate training. This may run the risk of further displacing physiology content from the curriculum, particularly in interdisciplinary programmes, but does have the distinct advantage of highlighting the many possible pathways that can be followed by those who develop a physiological mindset.

We also face, at least in the United States, an apparently diminishing number of domestic students equipped to deal with quantitative science. Not only does this impact classical physiological approaches, but also our ability to participate in the 'big data' and integrative approaches discussed above. In part, the challenge may be addressed by recruiting undergraduates trained in the physical sciences and engineering disciplines to the graduate study of physiology. There are increasing examples of how such students are intrigued by complex biological questions and the opportunities to apply their backgrounds there. This also offers the advantage that all students, including those trained initially in biology, benefit greatly from sharing diverse perspectives on a research question in the lab and lecture hall. Traditionally, a relative paucity of students with quantitative backgrounds has also been addressed by recruiting trainees from overseas. However, many countries are making substantial new investments in their research enterprise and intellectual capital, such as China. Indeed, the Council of Graduate Schools recently announced the smallest growth in the number of international students seeking graduate study in the United States in eight years, driven predominantly by a decline in the number of applications from Chinese students (www.cgsnet.org/ckfinder/userfiles/files/Intl_I_2013_report_final.pdf). Further, China and other countries with similar ambitions are actively courting ex-patriot faculty to return to well-funded laboratories (www2.itif.org/2012-leadership-in-decline.pdf). In the United States, we also face self-constructed hurdles to participating fully in the global talent market, such as an immigration system that makes it difficult to retain those students in whose education we have invested. Ultimately, this may impact the vigour not only of academic research in physiology, but also the medical and translational innovations that can drive economic development. As of this writing, however, there is some hope that the US Congress may enact comprehensive immigration reform that might be expected to address some of these issues.

Conclusions

In conclusion, therefore, this is a time of great promise, but also looming challenges for physiology in the United States. We are, however, very much still 'open for business' and expect to remain a destination of choice for those seeking advanced training in the discipline from all over the world. Indeed, even with budget cuts, the United States still makes the world's largest investment in biomedical research. We also anticipate an increased level of collaboration with our international colleagues and sister societies to further the cause of physiology worldwide. A recent example is our founding, with The Physiological Society, of a new open access journal, *Physiological Reports*, that we anticipate will inject new energy into the publishing programs of both societies while showcasing increased numbers of important papers in our discipline.

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The female faces of physiology

A career in physiological research requires passion, curiosity and dedication. But, with all the passion and curiosity in the world, is it still harder to make it in the field as a woman? *Physiology News* speaks to four women who have balanced work and home-life to forge successful careers.

Siobhan Dennis

Eli Lilly & University of Bristol, UK

What was your route into physiology?

Subsequent to being enlightened about the concept of doing a PhD, by a helpful and kind post-doc who guided my final year undergraduate research project at the University of Bath, I went to Bristol University to see what they had to offer. This is where I met my PhD supervisor, Jack Mellor, who patiently explained his proposed project to me. I was naively unaware of electrophysiology at the time, but the idea that you could poke holes in cells and record changes in electrical differences (to put it simply!) fascinated me. Aside from those who have helped me in life, if it weren't for a few particular people, such as my secondary school science teacher, college biology teacher and my PhD supervisor, I wouldn't be doing what I am doing today. I admit that I stumbled into electrophysiology accidently, but I'm sure I have learnt a lesson. It is just by chance that on the day of the PhD interviews I was open minded, but this enabled me to be drawn in and to explore the unknown and from that I have started a career.

What is the most memorable moment of your professional career?

Although I am early in my career, one of my most memorable moments has been presenting my work. In 2011 I submitted an abstract for poster presentation at the BNA annual meeting in Harrogate and much to my surprise I was invited to give a talk. My talk was placed in a 'Hot Topic' session later on in the day with other presenters on a mix of research areas utilising a range of experimental techniques. Suffice to say, I didn't expect many people to show, but the fair-sized room was packed with people and post-presentation discussion was lively. It was one of the turning points of my career, when I began to feel like a 'real' scientist. People were interested in what I had to say and it helped to give me confidence to take the next step in my career.

How have you tackled the work–life balance?

Before I met my fiancé, I would happily study and stare at data into the small hours with blurry, caffeinated eyes. However, he has shown me that there is a good reason to ensure that you are tackling the work–life balance carefully. You have one life, so live it. Part of living your life is to excel at your profession and give yourself that satisfying career you want and need. The other part of living your life is to do the things you enjoy and make the most of these experiences. Being organised is everything, if you plan your day well, with the odd exception, you can often get done what you need to at work. Personally I can't let things fester, if there's a particular job coming up at work that you hate, jump on it and get it done before it causes stress. I do much outside of work including aikido, archery, filming and some form of exercise once a day, all of is impossible without organisation!

Do you think more can be done to support women working in science?

There is a clear trend: there are lots of female students, but very few women holding senior positions. Where all these women go, I'm not quite sure. It is inevitable that some are 'lost' through having a family, but it feels like there are so many female PhD students, there should be enough making it to senior positions to equal the number of senior men.

In my experience, employers don't explicitly discriminate and there is no difference in what I have been asked to do compared with members of the opposite sex. Employers are very aware of the gender division in science, but exactly how you can combat the loss of females due to families and, perhaps, lack of confidence is hard to resolve. It appears that sex discrimination exists, not necessarily due to lack of employers' efforts to hire women (as they have become more aware over the years), but perhaps just to the fact that men and women are different and end up with different responsibilities in life (regardless of whether this is right or wrong). Unfortunately, I think change will require more effort from both employees and employers than simply a commitment to fairness and equal opportunities.

Kim Dora

University of Oxford, UK

What was your route into physiology?

After completing a PhD in Biochemistry with Michael Clark in Australia, I was awarded a CJ Martin Fellowship enabling me to work at the University of Virginia in the USA, studying the microcirculation with one of the world leaders in this field, Brian Duling. I found immediately that I had an affinity for the particular research questions and the methods of thinking, and I have continued on the same path ever since. Being able to image changes in arteriolar diameter at the same time as either muscle or endothelial cell Ca^{2+} and membrane potential *in situ* and *in vitro* is very challenging, but combines many disciplines, not least physiology and pharmacology!

Without doubt, a key factor is finding an area of science you really enjoy studying. Each day the first thing that springs to mind should be how to move to the next step in understanding your data and taking it forward. To do this you must be in a supportive environment and a well-equipped laboratory. Key senior colleagues must understand your ambitions and drive, and your strengths (while tolerating your weaknesses!). I have been fortunate in my time in the UK, having the constant support of Chris Garland, whose group I joined in Bristol in 1997, but also other senior members of the cardiovascular community both in the UK and overseas. Further to this, our current head of department, Antony Galione, is completely supportive. Pharmacology in Oxford is a relatively small department, which is unusual these days. However, the positive and friendly environment this provides is a great strength, particularly in terms of research interaction. As a centre of excellence recently ranked number two in the QS world ranking of pharmacology departments, it allows people to maintain their identity, yet feel their research and teaching contribution are really appreciated. Finally, and importantly, the team within the laboratory must be harmonious and constructive. Ideas from all angles should be listened to and considered. We must each want to identify key research questions and be able to work together in attempting to answer them.

What is the most memorable moment of your professional career?

High on that list are the award of a readership while at the University of Bath and then news of my successful applications to the British Heart Foundation for a Senior Basic Science Research Fellowship (twice now). The latter supported my move and sustains my research group in Oxford. These Fellowships have provided me with the opportunity to continue my studies of conducted vasodilatation, and are now supporting me in translating this research to humans.

How have you tackled the work–life balance?

There is no doubt that for academics this is difficult. Switching off is not easy, but then I enjoy life when my research is successful. Designing experiments to test your ideas and then discovering something new is incredibly rewarding, but of course sometimes things don't go as planned and this is very frustrating! Moving to Oxford has provided the added dimension of contributing to small group teaching in college (I am a Fellow of Worcester College, and also Tutor for Women there). I have rediscovered and learnt a lot of physiology and pharmacology by interacting with students. These interactions have provided me with new ideas for my research, illustrating the mutual synergism that can occur between research and teaching, and which defines universities! I feel the breakdown of this crucial link in some universities is a real backward step.

Do you think more can be done to support women working in science?

The huge plummet in women staying in academic science (~50% at PhD/postdoc level) needs to be tackled. Clearly women are capable of performing at the highest level in all aspects of an academic career. Difficulties arise from career breaks, which I think is being tackled to some extent with initiatives from various funding bodies, but the financial and time burden of childcare is a major hurdle. One possible solution may stem from economically viable, flexible child support provision at work. Although I have not had to deal with this aspect myself, I truly think addressing this issue would help women to develop their career in research.

What are the challenges of doing physiology in different countries?

My experiences of working in the USA are very positive. This relates not only to the attitude of scientists, but also the general public. The public are really interested, supportive and proud of their universities. Therefore I found it a very productive environment, which provided excellent job satisfaction. Many of my collaborators today link back to my time in Virginia, mainly through the Microcirculatory Society, but also the American Physiological Society. Indeed, Brian Duling was president of the APS while I was in his laboratory. Their societies have excellent infrastructure and support for junior investigators, which again I think essential to encourage PhD students to become postdocs and ultimately run their own research groups.

Video interviews with our female Consulting Editors

As part of a series from *The Journal of Physiology*, Carol Robinson, Kay Davies and Frances Ashcroft share their enthusiasm for physiology and give us an insight into their research. Details can be found on page 55.

Diane Lipscombe

Brown University, USA

What was your route into physiology?

I wasn't sure what I wanted to do in school, but my family were very encouraging academically, despite none of them previously going to university. For the first few days in my first job as a lab technician at Burroughs Wellcome in Kent I just made tea, but, with encouragement from the people in the lab, I was soon running experiments. By pure chance I had ended up under the wing of the wonderful Sir James Black where I received outstanding training in organ physiology and pharmacology. It was the closest thing to what I had always thought I wanted to be: a detective! From technician, I went on to a BSc ('82) and then PhD ('86) in pharmacology at University College London.

My journey into the world of calcium ion channels started when I joined Richard Tsien as a postdoctoral associate at Yale University School of Medicine and subsequently at Stanford University Medical School. In 1992 I joined the Department of Neuroscience here at Brown where I work closely with undergraduate and graduate students, as well as postdoctoral trainees. My guiding influences come from the great people I have worked with; James Black, Humphrey Rang, David Colquhoun and Richard Tsien.

What is the most memorable moment of your professional career?

Starting my own laboratory and never knowing when discoveries would be made was very exciting. I remember sitting with my graduate student, Weifeng Xu, and we were both staring at a new finding – the culmination of three years' work – when we both suddenly realised that we'd found something new and exciting. Everything came together.

Very recently my PhD advisor Humphrey Rang visited my own lab at Brown. A student in the lab was recording synaptic events from nerve muscle junction of drosophila larvae, not so very different from the kind of recordings I did as a PhD student. This was a proud moment for me and it struck me how important our early research experiences are in shaping future research directions.

How have you tackled the work–life balance?

I have a son James, 23, daughter Kathryn, 21, two older daughters by marriage, Aimee and Jackie, and two grandsons, Wheeler and Oakley. Balance, having at least one person to support you, and looking forward, not back, are key to the work–life balance. Having a family has made me a better scientist and mentor. Although at times I felt like I was failing as both a scientist and mother, it's possible to have everything. Passion is critical and loving the challenge of experimental research, but the stability that having a family brings allowed me to reach higher and perhaps be a bit more fearless in my research. The disappointment of a rejected grant is far outweighed by the unbridled, excitable greeting from your children at the front door.

I was lucky to have happy and healthy children – and also a scientist for a husband, so priorities were always understood. Depending on who was writing an application or a paper, the other would take on the kid duties. We were lucky to have this flexibility and our success is shared, just as caring for our kids was and is a partnership.

Do you think more can be done to support women working in science?

Women have every right to have it all, be accomplished scientists and have a family, but that doesn't mean doing it alone. Without a partner with flexibility for the unpredictable schedules that children have, it is very hard to stay competitive, to travel to key meetings, and to put in the long hours often needed to run experiments and to prepare grant applications. Caring for children is, and should be, a shared responsibility. There are many things that universities and research institutions can do to support faculty with children, including offering safe and affordable childcare and reliable emergency childcare back-up services. Faculty colleagues who are flexible and supportive makes a huge difference and many countries, including the USA, could have more reasonable maternity leave policies. Salary compensation is also critical; 95% of my salary went on childcare when I had my first child. We must recognise that if these resources and support networks are not available, there is a whole group of smart female scientists that are locked out of the profession.

I do a lot of mentoring for young scientists and I say that you have to push yourself and not look at what other people do. No-one will be in your exact situation, but you need people to encourage you and stop you from over-thinking! Some people like to plan. Women will often focus on life plans and what order they should do things. I have to honestly say that I had no plan – that can be disconcerting. But I never thought I could do it all, but I have.

What are the challenges of doing physiology in different countries?

When I moved to the USA from the UK, I felt there were many more opportunities to communicate science and get funding. Science and opportunities in the USA were bigger. I think this has changed with the ease of communication, travel and data sharing. Now I don't notice many differences at all between the UK and the USA.

There are, however, big differences in the opportunities available for young scientists between the USA and UK compared to many other countries. In my role as an editor and involvement in science publishing, I know of many young, spectacular researchers in different countries, including Argentina, Mexico and China. These young scientists need better access to training, for example, to help them publish in English-speaking journals. We need to continue outreach through the major science societies to reach scientists in other countries, partner them in their development, and encourage them to go on to be great mentors. Engagement throughout the scientific process is critical. For example, editorial boards of scientific journals and society committees should have representation from the international community.

"It struck me how important our early research experiences are in shaping future research directions."

Maria Gomez

Lund University, Sweden

"Per Hellstrand became my supervisor for my PhD on smooth muscle and calcium signalling. On discussing that I liked electrophysiology, he challenged me to set up some patch clamp equipment that had just been sat in boxes!"

What was your route into physiology?

At high school in Uruguay, I had a very good biology teacher, Padre Falcone, who pushed us to our limits and created exciting laboratory lessons. Then, in my second year of medical school in Uruguay I remember an electrophysiology lecture – I was so fascinated at this exciting and busy late night session on patch clamping that I knew then I had to do something related to this.

I continued studying medicine in Sweden and realised I wanted to side step from medicine into scientific research. I went down to the physiology & biophysics department to knock on any door for advice and instead I bumped into Per Hellstrand on the stairs. He instantly offered to talk and directly after I started working in Per's physiology laboratory and he became my supervisor for my PhD on smooth muscle and calcium signalling. On discussing that I liked electrophysiology, he challenged me to set up some patch clamp equipment that had just been sat in boxes!

What is the most memorable moment of your professional career?

My career is full of memorable moments – I feel privileged to really enjoy my job and get paid to learn. Particular highlights include the viva for my PhD thesis where I had Alison Gurney from Scotland acting as examiner and she whispered in my ear that she was more nervous than I was! Also the exciting time as post-doc in Mark Nelson's laboratory in Vermont, a fantastic inspirational environment. Furthermore, it is great to climb and achieve different academic steps. I have recently become a professor and this acknowledgement provides a lot of encouragement. I also specifically remember how proud I felt when my first student got her PhD, it's even better to see someone you have helped succeed.

How have you tackled the work–life balance?

I find it helps to be active and sporty. When I was first starting up my lab it was extremely hectic and stressful and I realised I had to take a step back and enjoy the things I used to like doing, which included being physically active, taking part in a range of things including ski racing.

It is important to accept that this profession has unlimited workloads – you will never be finished and you cannot accomplish everything on a wish list. You can always write more papers and apply for more funding, but you must decide a comfortable level and work with discipline.

I have three children: Felix, 7, Vincent, 13 and Isabella, 17. Having a family has empowered me. I had my first child while doing my PhD, then went on to my postdoc in the USA when my second child was five months old. It concerns me that there is some belief that having a family takes away time that could otherwise be dedicated to your science. In reality, it gives perspective and forces you to use your limited time in the most effective way. It is great to be a professional female role model for your children. My chemist husband takes equal responsibility for the children, and it would have been impossible without this support, and lots of planning.

Do you think more can be done to support women working in science?

There is room for improvement. Social and political structures vary greatly across different countries. In Sweden there is a great system for childcare and this certainly facilitates working and having equal opportunities.

Within academia, mentoring programmes need to be offered in a structured way, especially to young women. The critical period is after their thesis, where I have noticed the gender balance changes and we lose a lot of women. Women need to know that yes it is difficult to juggle this stage of a career with starting a family, but it is possible and there is support. If you like to work in physiology and science, go for it! Everything is possible and there are no limits.

What are the challenges of doing physiology in different countries?

Here in Sweden, you receive just payment for your work. In other countries, this isn't always the case and it has a negative impact. This means that acknowledgement isn't taking place and it must be addressed.

There are lots of talented people in different countries where a science career is more difficult due to lack of funding, facilities or support. I have seen many cases where people are well trained in physiology and go away and do successful post-doc work, but then find it difficult to return to their home institution. I believe the international community would benefit if there were mechanisms to facilitate reinsertion back into home institutions, especially in countries where it is more difficult to do science. An increase in mobility would prevent the talent being drained from the developing system.

Women in Science at IUPS 2013

Three one-hour lunchtime sessions at the IUPS Congress in Birmingham, 21–26 July 2013, will explore why women are consistently under-represented in senior positions in academic science across the world and will consider how to overcome these potential obstacles, as well as highlighting some success stories.

Hosted by an international organising committee, the sessions will focus on different stages of the academic career where women may encounter difficulty in progressing:

- Early-career (why mentoring and sponsorship works) with Caroline McMillen - Tuesday 23 July
- Mid-career (juggling balls - family and physiology) with Sue Wray - Wednesday 24 July
- Career success (what glass ceiling?) with Bridget Lumb - Thursday 25 July

Sue Wray, University of Liverpool, who led the organising committee, discusses the upcoming lunchtime series:

Why did you plan these events?

The idea for the sessions emerged from a symposium held in Kyoto at the last IUPS. Junko Kimura invited several of us to compare experiences of gender and careers in physiology. It was great fun, with animated discussions. I wanted to make this female focused idea a regular feature of IUPS, because it is another mechanism to bring together physiologists from across the globe in an informal manner, to gain from each other's experiences and to have some fun networking. I think females still need some extra TLC at all stages of their career, and events that highlight and address these issues are important.

What can people expect?

In the first session, discussions will form around mentoring and introducing the idea of sponsorship to support women in the early stage of their career.

I am co-chairing the session addressing how to manage working and having family responsibility. There will be six snap-shot, informal presentations from physiologists from Nigeria, Malaysia, Brazil, Mexico, USA and Australia, followed by an audience panel discussion. We will see what factors helped and what hindered, and if there are differences across the globe. My co-chair will be Luciana Venturini from Sao Paulo, and as the next IUPS will be in Brazil, we hope that elements of the sessions will continue there.

The final session should be very exciting as we consider the topic of glass ceilings, real or imaginary. Dame Nancy Rothwell and Ole Petersen will be leading on this to make a lively session.

I've enjoyed helping put these sessions together and hope you will feel tempted to grab a sandwich and join us at one! You do not need to book and I need to stress that, of course, all IUPS delegates, not just women, are warmly invited to each session.

If you have any questions, please email policy@physoc.org.

Women in Physiology Booklet

2015 will mark 100 years of female membership of The Physiological Society. Moving towards this anniversary, The Society is developing a booklet – entitled Women in Physiology – celebrating some of our female Members, each working in different roles and at different stages of their life and career.

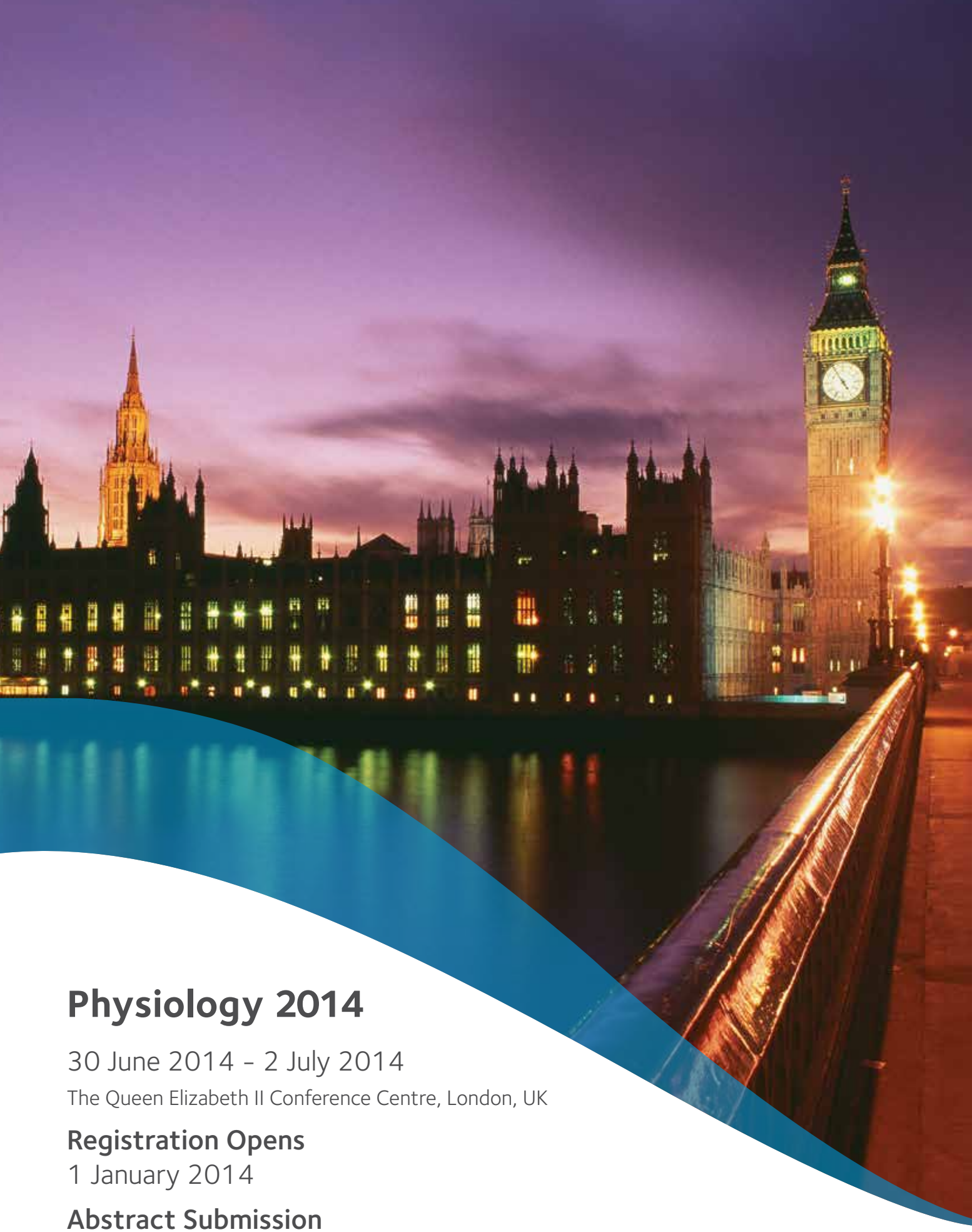
The booklet, which has been led by Sue Wray with support from The Policy Committee, will complement the sessions being hosted at IUPS, but will provide a longer-lasting legacy. The booklet will be available at the IUPS Congress and, afterwards, distributed at relevant meetings. It will, of course, also be available from The Society's website. www.physoc.org.

Women in Physiology will illustrate the varied career paths our Members have taken and share some milestones, anecdotes and experiences along the way.

"My family mean everything to me but I think that my career has genuinely made me a better mother" Maria Fitzgerald

"A lab with a door that can be locked from the inside is what I still hope for" Kristine Krug

"Despite suceeding at research, I couldn't get a lectureship (I'll tell you my thoughts over a drink)" Sue Wray



Physiology 2014

30 June 2014 - 2 July 2014

The Queen Elizabeth II Conference Centre, London, UK

Registration Opens
1 January 2014

Abstract Submission
1 March - 31 March 2014

www.physoc.org/p14

The Physiological Society

Member and lab profile: Samantha Passey Pathogenesis of Chronic Lung Diseases Laboratory, Department of Pharmacology, University of Melbourne

Samantha Passey on moving to Australia, settling in to their scientific community and becoming a Research Fellow in muscle wasting associated with lung disease.

Samantha and her husband heading out cycling on a warm Christmas morning

Moving down under

It has been over a year since I last contributed an article for *Physiology News*. In my original lab profile I described the work that we were doing in the Muscle Cellular and Molecular Physiology Research Group at the University of Bedfordshire with Mark Lewis, aiming to generate neuromuscular junctions in 3D engineered skeletal muscle.

Well, things have changed a bit since then to say the least! Not only did the muscle group move to Loughborough University where Mark is now dean of the School of Sports, Exercise and Health Sciences but I have moved to the other side of the world and am now living in Melbourne, Australia!

This article is timely in that as I write it I am coming up to the 1 year anniversary of my move down under, and it seems a good time to reflect on the ups and downs of the past year and how my life has changed since making the move.

I arrived in Melbourne on Australia and New Zealand Army Corps day, a memorial day to commemorate the first military action by Australian and New Zealand forces in the First World War on 25 April 1915. It is a national holiday and is a day of remembrance for all Australian and New Zealand military lost in battle over the years. Expecting glorious sunshine and warm temperatures, I was somewhat surprised to receive a decidedly British welcome at Melbourne's Tullamarine airport, with cool temperatures and rain alternating between heavy downpours and unceasing drizzle. Despite my soggy introduction, my first impressions of Melbourne were good; people are friendly and

helpful and the city is great, different to the UK but in some ways very similar.

Renowned for having four seasons in one day, the weather is often very changeable but in general is warmer than the UK and often very hot, reaching 44 degrees celcius on a few isolated days this summer! The climate is therefore conducive to good outdoor lifestyle and the infamous Aussie BBQs, which are a far cry from my childhood images of undercooked sausages and dad standing in the rain under the umbrella trying to coax the BBQ coals to light!

Melbourne, voted most liveable city in the world in 2012, is a very vibrant city with plenty of things going on whatever your tastes. It is a hugely multicultural city with Italian, Greek, Asian and European populations, which also means there are some great restaurants; indeed Melbourne is known for its food and cafe culture.

Since I arrived the past year has been something of a rollercoaster with plenty of ups and downs. I began work at the University of Melbourne only a few days after arriving in Australia, and although to begin with things seemed to be going well, I soon came to realise that perhaps my new position was not quite the right 'fit' for me. To cut a long story short, after much agonising I decided to leave and find another position that would hopefully be a better fit for my skills and personality. A tough decision, but ultimately the right one I think – I took a few months off to settle in to Aussie life and have now started in a new position in the Department of Pharmacology at the University of Melbourne, which I am finding very enjoyable.

It has been a bit of a rollercoaster year, and it's funny how much things have changed in just 12 months. Some things have been really hard and other things have been easier than expected. Leaving family and friends and knowing that going home to visit is not a trivial journey but a full 24 hour trek across the globe is difficult, but Skype helps tremendously with being able to see and speak to family members regularly. Other things have been much easier than I expected, such as setting up home in a new country and all the little things that have to be organised along with that. Many aspects of Melbourne life are similar to the UK and I think a little familiarity is good to help ease into life in a new country.

Looking back over the past year I am really glad that I made the decisions I made, despite the ups and downs. Moving across the world is a big step and it is daunting to think about combining the stress of moving to a new country and starting a new job. The fear of things not working out is very real. However, I now realise that even if things don't initially work out the way you want there is always a way to change the situation, nothing is set in stone and just because something isn't quite what you wanted that isn't a reason to give up, pack up and go home. I'm now settling into my new position and excited about the research and future opportunities, and for now enjoying being part of the Melbourne scientific community and building new networks here in Australia.

The research landscape in Melbourne

From a science point of view, Melbourne is well equipped for research, having a number of universities and a host of private research institutes focusing on a range of different research areas such as cancer, neuroscience and infectious diseases. The University of Melbourne campus is located in the area of Parkville just north of the main city centre, and is in close proximity to the Royal

"From a science point of view, Melbourne is well equipped for research, having a number of universities and a host of private research institutes focusing on a range of different research areas such as cancer, neuroscience and infectious diseases"

"I have found the academic environment to be very collaborative, and there are a number of funding and infrastructure initiatives developing to allow for increased multidisciplinary collaboration"

Melbourne Hospital and the Royal Children's Hospital and a number of research institutes, creating a scientific and academic hub of activity that is still close to the city centre. In addition the facilities seem to be expanding; over the road from the medical building where I am based are being built not one but two research centres, one for infectious diseases/immunology and another for cancer research.

Research funding is available from two major funding bodies, the National Health and Medical Research Council (NHMRC) and the Australian Research Council (ARC), with other smaller bodies offering research funds from local government or philanthropic sources. Fellowships are available for researchers at different stages of their careers or with different levels of postdoctoral experience, although as in the UK the competition is high and fellowships are only awarded to the best candidates. The university also offers a number of internal funding schemes, which seem to be excellent opportunities to obtain grant writing experience and utilise the support of the faculty and central university research offices in putting together a grant application. I am really looking forward to making my first steps towards obtaining research funding by utilising the opportunities to apply through these internal schemes.

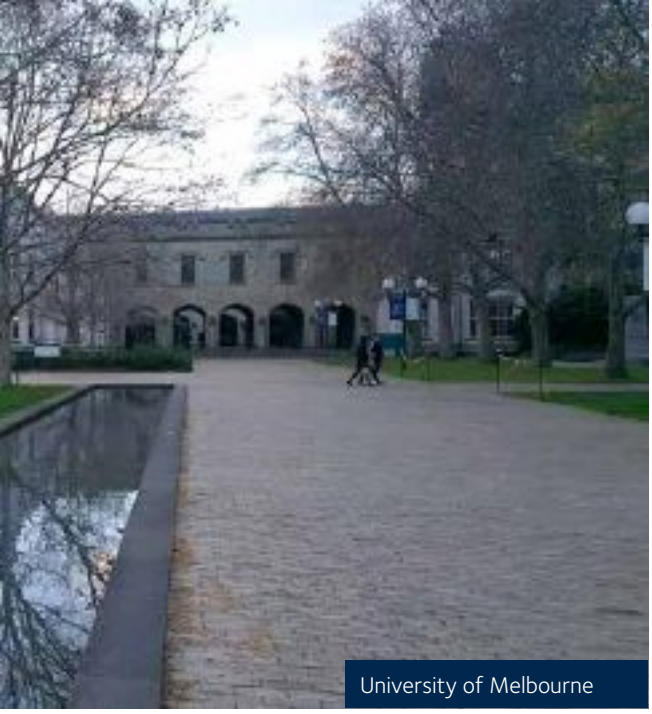
I have found the academic environment to be very collaborative, and there are a number of funding and infrastructure initiatives developing to allow for increased multidisciplinary collaboration. The proximity of the main University campus to the local hospitals is a great opportunity for enhancing translational research and building links with clinicians and clinical research groups. The scientific community is vibrant and enthusiastic, with numerous seminar series in the various departments and institutes that are open to all – it seems you could spend all week in seminars if you wanted to, but you'd never get any work done!

My research: Skeletal muscle wasting in lung disease

Currently I am working as a Research Fellow with Michelle Hansen in the Department of Pharmacology at the University of Melbourne. Our research is focused on investigating the mechanisms underlying muscle wasting associated with lung disease or Chronic Obstructive Pulmonary Disease (COPD). COPD is most commonly caused by smoking, and is a huge health burden both within Australia and worldwide. The loss of muscle mass associated with COPD has serious effects on quality of life and is an independent risk factor and predictor of mortality from COPD.

We are using a combination of *in vivo* and *in vitro* techniques to investigate potential mechanisms behind muscle wasting and to evaluate new therapeutic approaches to target skeletal muscle in COPD. The lab has established *in vivo* models of cigarette-smoke induced COPD and muscle wasting, which we are planning to use in combination with genetic knockout models and pharmacological interventions to try to tease out the details of the muscle wasting process.

The lab is well equipped to measure a range of physiological parameters in this model, including muscle endurance using a small animal treadmill, muscle strength using grip strength apparatus, and respiratory



University of Melbourne

mechanics using the FlexiVent system. In addition we have the ability to probe at the tissue, cell and molecular levels using microscopy, flow cytometry and PCR to evaluate molecular and inflammatory changes coincident with the physiological effects we measure *in vivo*. Coming from a cellular and biochemistry background I am somewhat daunted at the prospect of doing such large and long-term (up to six months) *in vivo* studies, yet excited at the opportunities to gather such a wide range of data and piece it together to generate a broader picture to answer the research questions we are tackling. Being new to many of the *in vivo* techniques the learning curve may be steep but there is good support and a wealth of experience within the lab so I am excited to be learning all these new skills!

Being part of a wider lung research group

The Hansen group fits neatly within a larger lung research group in the Department of Pharmacology. Other research areas in the Lung Disease research group include oxidative stress and macrophage activity in lung disease (Ross Vlahos), cell signalling and neutrophil/macrophage activities in lung disease (Steven Bozinovski), and lung stem cells and regeneration (Ivan Bertoncello, Jonathan McQualter).

Another important research area within the lung research programme in the department is the programme of contract research conducted by Gary Anderson and his group. The Anderson group have developed excellent links with a number of global pharmaceutical companies who seek to evaluate potential therapies in a number of established preclinical models of lung disease.

On a higher level, the research activities of the lung researchers within the department are also soon to be incorporated into the recently developed Lung Health Research Centre (LHRC). With a formal launch planned for mid-2013, the LHRC will operate as a 'virtual' institute with input from a range of departments, institutes and hospitals. The aim of the LHRC is to improve lung health through a combination of clinical and translational research, basic research and drug development. Research themes within the LHRC include chronic lung diseases such as asthma and COPD, associated comorbidities like muscle wasting and viral infections, lung cancer, lung repair and regeneration, lung immunology, respiratory medicine, sleep medicine and physiotherapy.

Opportunities

As an early-career researcher looking to build my career there are many exciting benefits offered by the LHRC, including mentorship, the opportunity to become involved in collaborative projects and boost my publication record, and the feeling of being part of a larger coordinated research effort involving highly respected and successful researchers and clinicians.

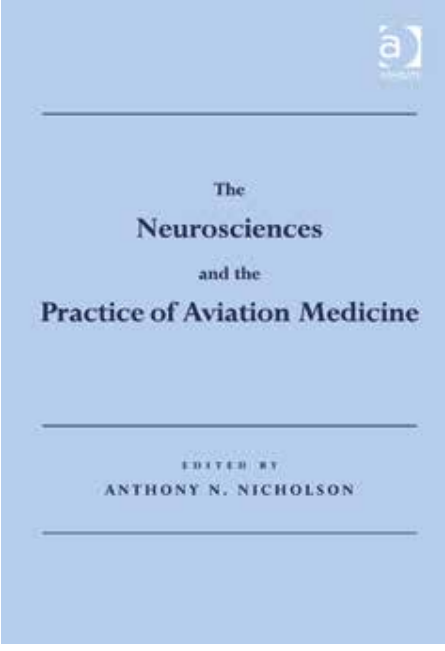
It is an exciting time to be joining the department at the birth of the LHRC, and I am looking forward to being a part of the centre in its early days and hopefully for some time to come!

"Research themes include chronic lung diseases such as asthma and COPD, associated comorbidities like muscle wasting and viral infections, lung cancer, lung repair and regeneration, lung immunology, respiratory medicine, sleep medicine and physiotherapy"

Book review:
The Neurosciences and the Practice of Aviation Medicine
Edited by Anthony N Nicholson

John Lee

The Rotherham NHS Foundation Trust, UK



Ashgate

ISBN: 978-0-7546-7292-0

The range of environments that a basically clothed human can survive in for more than a few hours is remarkably limited. It excludes most of the surface of the earth: the two thirds covered by oceans, the quarter of land which is permanently frozen, the quarter which is arid desert, the lakes and rivers, the high mountains. In fact less than a sixth of the earth's surface is available to us even with the advantage of having clothes on, and it would be much less than that without our additional technological inventions such as dwellings, fire, weapons and transport to help us get by. The truth is that most of us are completely dependent on technology most of the time. Yet by an almost universal slight of mind we also manage to take all our props for granted to the extent that they become almost invisible, and we perceive ourselves as tough, strong and sturdy masters of the planet, invincible on our upward trajectory.

In fact, upward trajectories are pretty tricky too, and we need aeroplanes, probably our most sophisticated technological inventions in common use, to allow us to survive in what, for us, are the lethally cold and hypoxic conditions that prevail a mere five miles above our heads. Planes which can access this inhospitable environment come in many different shapes and sizes, from the passenger planes with which we are all familiar, to small leisure planes, to high performance military jets, in which high acceleration as they do their stuff adds gravitational forces to the list of dangers. Although a lot of the functions of aeroplanes can be automated, not everything can be, so successful plane flights still require alert humans either at the controls, or standing by at them to take over as and when necessary.

And there lies the focus of this book. How is alertness affected by gravitational forces, or by hypoxia of greater and lesser extent? How does oxygen get into and around the body and what happens when there is less of it? How do we assess alertness, or investigate it if there seems to be a problem? How is it affected by tiredness, the time of day, or by other medical conditions such as hypoglycaemia or headache? What about fainting, or the effects of eye conditions or hearing disorders? And what about pre-existing neurological conditions which may appear quiescent, but which could be disastrous if reactivated in flight? How do we assess the risks?

Anthony Nicholson has brought together a team of 20 experts in neurology, physiology, respiratory medicine and statistics, who provide interesting and thoughtful reviews of these questions in 19 chapters. Clearly the volume will be a must-buy for anyone in the field of aviation medicine. But because hypoxia is an effect of so many common diseases in our ageing population, and because changes in and assessment of alertness are so important in many different situations – from driving or operating machinery, to staff working shifts in prisons or intensive care units – there are many elements of this book which I am sure will find a much wider readership than just the focus audience. And it certainly provides food for thought next time you settle back in your seat, a master of the planet, enveloped in the artificial environment of an aeroplane. Overall an unusual and stimulating volume.

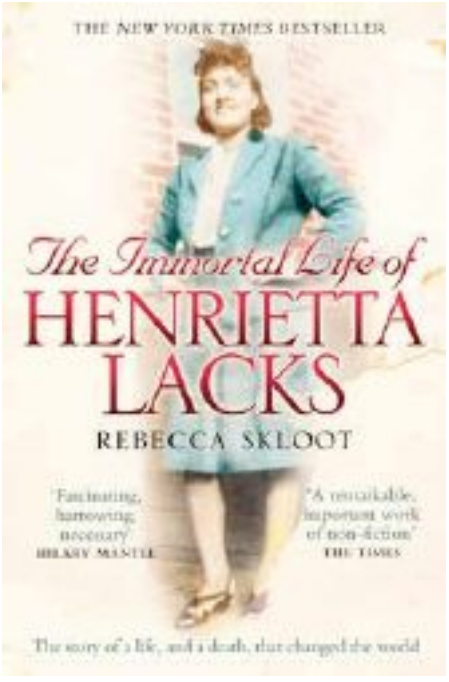
Book review:
The Immortal Life of Henrietta Lacks
By Rebecca Skloot

Sarah Hall

Cardiff University, UK

Keith Siew

University of Cambridge, UK



Pan Macmillan

ISBN 978-0-307-58938-5

Even if they've never used a HeLa cell in their own research, most physiologists probably know a colleague who has, or have read a paper reporting data from these cells. Over the decades, HeLa cells have led to important advances in gene mapping and *in vitro* fertilisation, as well as the life-saving development of vaccines for polio and cancer. Yet, despite this, some could not tell you that the acronym HeLa refers to Henrietta Lacks, an African-American woman who died of cervical cancer aged 31 and who, arguably, has contributed more to biomedical science than any other person to date. Henrietta's story and the development of the HeLa cell line are at the heart of Rebecca Skloot's first book, *The Immortal Life of Henrietta Lacks*.

Skloot's account of Henrietta's life is told with sensitivity and genuine warmth; the explanation of attempts to culture cells and the subsequent commercialisation of the cell line have sufficient scientific integrity, despite the author's lack of scientific training. Part historical account, part detective story and part ethical debate, *The Immortal Life of Henrietta Lacks* combines these narrative threads into an absorbing and challenging book that should be on every physiologist's reading list.

Henrietta was born in 1920 to a family of tobacco farmers in Virginia. After her marriage to David 'Day' Lacks, she settled in Baltimore to work and raise her family of five children. When she became ill, she went to Johns Hopkins University which, at the time, was the only place offering medical treatment without charge to the black community. In that same hospital, Dr George Gey and his team were working to develop the first human cell culture, but were finding little success. They were excited when a sample of Henrietta's cancer cells, unlike any of the other tissue samples they had tried, grew quickly and easily in the culture lab.

Unbeknown to Henrietta's family, news of this breakthrough spread throughout the scientific community as Dr Gey began distributing his 'HeLa' cells to other researchers. They were first sent to local labs, where they continued to replicate, then across the country and eventually all over the world. Widespread scientific interest in these cells rapidly birthed a multi-billion dollar industry that revolutionised medical research, and the book relays how reputations and fortunes were made, while Henrietta remained anonymous and her family unaware. It was not until some 20 years after her death that the Lacks family would learn the life-changing news of their mother's "immortal" cells and their subsequent exploitation for profit. The author's role in this aspect of the story detracts somewhat from the main focus of the book, but the family's reactions to the news reveal a heart-breaking chasm between cutting-edge science and the lives of these ordinary Americans.

Skloot has managed to capture the emotional story of Henrietta Lacks and her family, while diligently chronicling the development of a new scientific arena and documenting what could be considered the first case study of medical research ethics. A quick search of the current literature reveals almost 2000 papers using HeLa cells were published last year alone. Even if you don't read any of these papers, it is worth making time to read *The Immortal Life of Henrietta Lacks* as a complex and thought-provoking reminder of the broader context of this scientific endeavour.

R Jean Banister

1917–2013

R Jean Banister

Photo taken by Deborah Elliott, reproduced by courtesy of Somerville College, Oxford.

In 1984, Jean Banister retired from her Tutorial Fellowship at Somerville College, Oxford, to the enthusiastic plaudits of students she had inspired over four decades and the many colleagues around the world who held her in high esteem. She was the great example of the art of mentoring through the tutorial's dialectic approach. She was also a tireless champion of women's education and one of the first to represent the former women's colleges on the main university Committees. She served twice as Vice-Principal of Somerville. She cared for an immense number and range of students, giving each individual attention and so commanding affection from them all.

Former students will recall that she was one of the last to give live physiology demonstrations during lectures and will remember them long after forgetting the rest of the content.

She directed an active laboratory where a succession of graduate students learnt the excitement of research. She focused on the vascular system in the lungs. She also lectured abroad, notably in Japan at Fukushima Medical College, where one of her graduate students is a professor of pharmacology. On retirement, with her characteristic enthusiasm, she went straight off to lecture in Saudi Arabia to inspire women medical students in a part of the world where the education of women needed such support.

At Jean's retirement ceremony, the former Principal of Somerville, Daphne Park, summed her up: "She has absolute integrity and she is a perfectionist; she is also an optimist". Jean was small in figure, but large, generous and enthusiastic in mind. A great celebration in Somerville on the occasion of her ninetieth birthday revealed she had not changed – busying about almost as though she was still the Vice-Principal. Messages from those who could not attend reveal how she inspired: "Jean taught us the framework for evidence based practice more than 20 years before the term 'evidence based medicine' was first used."

In Oxford, she would be seen cycling on her rounds of activity. She also loved sports cars, particularly the succession of Porsches that she used to whisk herself up to Scotland, or even to race at Donington Park. In retirement she moved to her house 'Druimluachrach', Ardgour near Fort William, to enjoy her love of Scotland and her garden.

Jean was born in Alverstoke, Hampshire on 10 March 1917 and studied at Queen Anne's in Caversham, Berkshire. She excelled in sports and music, and first went to the Royal Academy of Music where she achieved a silver medal in the flute. The chance events of World War II possibly prompted her switch to medical science. She joined the Polish School of Medicine when it moved to Edinburgh after the German invasion of Poland in September 1939, gaining an honours degree in physiology in Edinburgh in 1948. However, her love of music never dimmed: she was also Tutor for the students of Fine Arts and Music. The performer, and the love of performance, was always there. A characteristic reply to a student or colleague would be 'have fun'. She herself was great fun. The somewhat pensive nature shown in her photograph could rapidly change into a broad, animated smile as she proceeded to explain something new, something surprising. Novelty, the joy of academic life, is what she lived for.

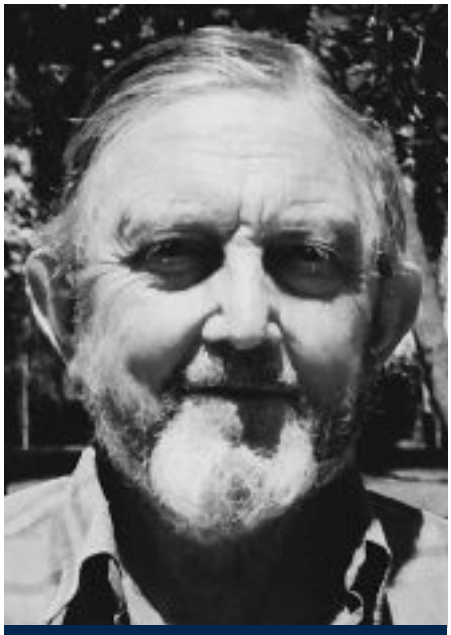
(Rachel) Jean Banister died peacefully at Druimluachrach on 15th February 2013, aged 95.

Denis Noble

This obituary is edited from the longer version available on the Society's website www.physoc.org/obituary-notices. A different version appeared in The Times*, 14 March 2013.*

Michael William Blackburn Bradbury

1930–2013



Michael Bradbury

Mike Bradbury was born in Capetown, South Africa and educated at Sherborne School, Dorset. In 1949 he was awarded an Open Scholarship to Christ Church, Oxford. He obtained an honours degree in Physiology in 1952 having been awarded *inter alia,* a Theodore Williams Scholarship in Human Anatomy. Mike completed his clinical training at St. Bartholomew's Hospital in the East End of London and graduated BM, BCh from the University of Oxford in 1956.

Mike returned to Oxford in the laboratory of RV Coxon presenting a thesis in 1962 entitled "Transfer and Distribution of Urea in the Body". Mike published widely on the blood–brain barrier and the transport phenomena across the cerebral microvasculature and also the control of the composition of the brain extracellular fluid and cerebrospinal fluid. A major opus was the publication of his monograph volume "The Concept of the Blood-Brain Barrier" in 1979 which reviewed and updated the entire rapidly-expanding field. Known as 'the blue book', on account of its striking blue dust jacket and binding, its presence was a must on the bookshelves of colleagues and research students.

After Oxford Mike returned to London to a post of Research Assistant, supported by the Medical Research Council, where he worked with and was highly influenced by Hugh Davson who was a towering figure in blood–brain barrier and cerebrospinal fluid research. In 1965 he became Assistant Professor of Physiology at the University of California and Research Physiologist Cedars-Sinai Medical Center and worked with Bill Oldendorf, a pioneer in the quantification of transport phenomena at the blood–brain barrier.

Returning to the UK in 1968 he was appointed Senior Lecturer in Physiology, St Thomas Hospital Medical School, then Reader in Physiology, King's College London, in 1972, being made full Professor in 1977. During this period he made a vigorous contribution to Departmental and College life serving as Chairman of the Integration and Steering Committee and developing a new undergraduate medical curriculum. He was active at the London University level serving both as Secretary and Chairman of the Board of Studies in Physiology, and also the Academic Advisory Boards of Science and Medicine. He became a Member of The Physiological Society in 1964 and served on the Editorial Board of *The Journal of Physiology* from 1981–1988.

During a visit by Cliff Patlak and Ron Blasberg, from the National Institutes of Health, Bethesda, Maryland, Mike provided the intellectual concept of whether it was possible to mathematically compensate for a falling concentration of solute in blood in order to more accurately calculate its rate of brain penetration. In turn, Cliff presented the solution in Copenhagen which led to Albert Gjedde first applying the analytical technique to positron emission tomography studies in animals and man. Thus the method of multi-time-point regression analysis was born. This approach remains the basis of the most accurate and sensitive methods for measuring solute uptake by the brain and is acknowledged as being the 'Gold Standard' for comparative studies of brain solute uptake (still called the Patlak plot).

When Mike retired a Festschrift was held in his honour at Kings, attended by over 100 of his colleagues and former students, a mark of his significant international reputation. The collected conference proceedings were published in a volume "New Concepts of a Blood-Brain Barrier". Mike had a sharp, open and enquiring mind. At one point, in spite of some scepticism, he was advising the Physics Department on whether it was possible for practitioners like Uri Geller to generate electromagnetic potentials which made his apparent feats possible and whether these could be measured, and was also investigating the possible mechanisms of acupuncture.

In retirement Mike used his Professor Emeritus status to the full; he was a regular visitor to the labs of colleagues for lively discussion and was an invaluable mentor and critic to a host of research students. Mike's characteristic and penetrating laugh always announced his presence. A retirement project was writing a volume on the colonization of North America. Sadly this project was not finished.

Privately Mike was a wonderful host to his friends and colleagues and also an enthusiastic yachtsman. His wife, Anne, survives him together with a daughter, Joanna, and two sons, Nicholas and Timothy. Mike died peacefully on the 9 February 2013 in Blandford, Dorset. Mike's undergraduate lectures were always lively, informative and entertaining; he will be remembered fondly by generations of medical and science students.

David Begley

Gerald Elliott

1931–2013

Gerald Elliott

Gerald Elliott, biophysicist and founding Professor of Physics at the Open University (OU), died unexpectedly in hospital in Oxford late on 6 March, aged 82.

Gerald was born on 26 January 1931 in Eltham, son of a prosperous city solicitor. However, the war badly affected his father's business and the family lost nearly everything, including their home. Fortunately Gerald was able to complete his schooling at Eltham College and win a place to read Physics at Oxford. He went to Lincoln College in 1951 after national service in the Royal Engineers.

At Oxford Gerald met many life-long friends and decided to go into scientific research, identifying 'low temperature physics, or applying physics to biology' as the cutting-edge areas. It was reading the famous 1953 *Nature* papers on DNA that tipped the balance. In 1954 Gerald joined the King's College Biophysics Group, sharing a lab bench initially with Rosalind Franklin's former PhD student Ray Gosling. He stayed at King's for most of the next 18 years.

Gerald's arrival at King's coincided with the publication of the papers that launched the sliding filament theory of muscle. One of the authors, the microscopist Jean Hanson, became Gerald's PhD supervisor as he embarked on the study of the contractile mechanism that was to preoccupy him to the end of his life. He did pioneering EM and x-ray diffraction work on molluscan, and later mammalian, muscle, including the first x-ray patterns from contracting muscle in 1962–4. He described this work, and the early King's years, in a 2007 *Physiology News* article (Issue 67, p6-10).

At the end of the 60s Gerald and family (first wife Deborah and sons Austin and Gavin) spent a Sabbatical year at Carnegie Mellon University (1968–69) and three idyllic summers at the Woods Hole Marine Biological Laboratory. Gerald then became Professor at the newly established Open University, setting up a biophysics research unit in Oxford, where he remained until retirement in 1996.

During the late 60s Gerald became interested in the forces that maintain filament spacing in the muscle lattice. He became convinced these forces must play a key part in the contractile mechanism, something that put him increasingly at odds with mainstream thinking on muscle. Gerald developed measurements of Donnan potentials with microelectrodes in skinned muscle, and in protein gels, as an empirical way to measure the net charges on proteins. In the 70s at the OU he began a parallel research programme on cornea, another filament array, applying the same concepts there with great success. After his OU retirement Gerald continued scientific work at Cardiff University, where several of his cornea post-docs and PhD students had relocated, publishing his last experimental paper in 2011 and a review setting out his thinking on muscle in 2012. He was sad that his ideas on muscle were not more widely discussed within the muscle research community, but he remained philosophical. "Time will tell" he would say.

Gerald joined The Physiological Society in 1978, but attended Society meetings for over 50 years, delivering his first communication in 1959 and his last at Dublin in 2009. He prized the meetings as a way to communicate new data and ideas. Gerald also belonged to several other scientific societies; at the time of his death he had just been elected an Honorary Member of the British Biophysical Society.

Perhaps as a consequence of his early life, family was always immensely important to Gerald, and he took great delight in his five grandchildren. He was perhaps at his happiest at the Brittany farmhouse he renovated with his second wife, Katalin, where he would entertain assorted family and an extensive selection of friends and former and current colleagues.

Austin Elliott

The Society also regrets to announce the deaths of:

Gordon Bisset
Sir Robert Edwards
J M Adam
Robin Gow Willison
Marianne Fillenz

Notices and full obituaries can be found The Society website at www.physoc.org/obituary-notices

The Journal of Physiology

In order to promote physiology to a wider audience *The Journal of Physiology* has published seven interviews with key opinion leaders. These short videos with our eminent Consulting Editors highlight the importance and excitement of physiology, and share with us some interesting aspects of their research.

We have recently filmed Carol Robinson, Jonathan Ashmore and Denis Noble, and we will be publishing these on *The Journal of Physiology* website and The Society's YouTube channel (www.youtube.com/physoctv) to coincide with relevant issues and events in the run-up to IUPS.

The interviews are freely available and we encourage their use for outreach and education by schools, university physiology departments and careers advice centres.

We will also be producing a CD containing all of these videos, so please email journals@physoc.org if you would be interested in obtaining a free copy.

Here's a summary of what we have recorded so far:

Carol Robinson tells us how she solves complex physiological problems by using physical chemistry and mass spectrometry to study cellular protein interactions.

Kay Davies describes how classical physiology and genetics have been used together to gain a better understanding of Duchenne muscular dystrophy.

Bert Sakmann talks about his current research into the neural circuits that drive simple behaviour such as decision making based on sensory inputs.

Frances Ashcroft talks about the biophysics underpinning insulin secretion and ion channel dysregulation in neonatal diabetes.

David Attwell talks about glial-neuronal interactions and regulation of central transmitters.

Peter Hunter discusses his computational physiology research on the cardiac physiome project.

Colin Blakemore reviews his work on neuronal plasticity and the visual system along with the evolving nature of physiology.

Peter Ratcliffe makes the case for oxygen sensing as a key event for many physiological processes, and the need for integrative physiology to understand molecular events.

We hope you enjoy them!

Experimental Physiology

Experimental Physiology held an Editorial Board meeting in Boston on 20 April at the Experimental Biology Meeting. To promote the journal at the meeting, an Editor's Choice 2013 virtual issue was compiled. It reflects EP's breadth of content and its commitment to publishing leading edge discoveries in integrative physiology which address mechanistic questions in the whole organism. The virtual issue can be read at http://ep.physoc.org.

Physiological Reports

Physiological Reports, our new open access journal jointly owned with the American Physiological Society, has got off to a brilliant start. The journal opened for business on 28 March and has received 78 submissions and accepted 8 manuscripts for publication so far (by 17 May). You can read the first few published articles at www.physiologicalreports.org

Editor-in-Chief, Sue Wray, said: "The journal has really got off to a great start. The quality of the accepted papers is high and the number of submissions is very encouraging. It was clear to me from early on that there was a good level of enthusiasm for the project – as an open-access journal, dedicated to physiology, *Physiological Reports* serves a real need.

"I'm looking forward to a good turnout of authors and Society Members, as well as friends of The Society, at the UK launch at IUPS on Monday, 22 July, 5-6.30pm, at stand #75."

Submit now to benefit from the waiver of article processing charges on the first 100 accepted manuscripts.

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Wiley provide initiatives to simplify payment of Open Access fees across all Society journals. Has your institution signed up? Browse the listing at www.wileyopenaccess.com/details/content/12f25e2eb76/Institutional-and-Funder-Accounts-and-Discounts.html

Next Steps: A unique careers guide for Undergraduate Bioscience students

The Physiological Society recognises the importance of careers education, information, advice and guidance. Within this remit, some activities and initiatives funded by the Education Committee are organised collaboratively as part of the Bioscience Careers group, made up of a collection of like-minded bioscience societies.

In 2011, the Bioscience Careers Group published a careers booklet aimed primarily at Undergraduate students studying for a Bioscience degree. 'Next Steps' (see Box) provides information and guidance on:

- Job seeking strategies
- Employability skills
- Postgraduate study options (inside and outside research)
- Making applications and Interview techniques

The guide also includes example CVs, information on careers in areas including teaching and medicine, and a comprehensive resource list. An online version is available at: www.societyofbiology.org/nextsteps.

Next Steps has been widely distributed at careers fairs and is frequently requested by teaching coordinators for university open days and careers events. The Bioscience Careers Group has received positive feedback from students and careers advisers alike (see Box). Due to this high demand for larger quantities, the group have set up an online ordering system, where boxes of 50 copies can be ordered at cost price, please contact highereducation@physoc.org for more information or see www.portlandpress.com/ns2012.htm

More information about the Bioscience Careers Group can be found at: www.societyofbiology.org/bioscience-careers-group

Jane Pooler, the Biology Liaison Officer at AGCAS and Careers Consultant at Imperial College London, said:

"'Nextsteps: options after a bioscience degree' is a recommended resource for all bioscience undergraduates. It provides an overview of the types of careers open to bioscience graduates and emphasises the importance of developing skills from the very start of a degree, by undertaking work experience and extra-curricular activities - thus helping to increase the employability of bioscience students".

Otto Hutter Teaching Prize 2013

Nominations are now open for the 2013 Prize.

The Society launched the Otto Hutter Teaching Prize in 2009, to recognise outstanding teachers of undergraduate physiology and to raise the profile of physiology teaching. The prize's namesake, Professor Otto Hutter, emeritus Regius Professor of Physiology at University of Glasgow, is recognised as a passionate and innovative teacher. The £1000 prize includes £500 for the winner and £500 for the host institution (the latter to support education and teaching in physiology). In addition, the recipient is invited to present a lecture at the main meeting.

Previous winners include Mary Cotter, Neil Morris and Eugene Lloyd.

For more information and to make a nomination, please visit www.physoc.org/prizes

Missing IUPS 2013?

For those poor souls unable to make it Birmingham for the IUPS Congress, we will be broadcasting the plenary sessions live online at www.IUPS 2013.org/webcast.

These include, Denis Noble on a new synthesis with evolutionary biology (17:30–18:30, Sunday 21 July) and our Annual Public Lecture, The Rhythms of Life, delivered by Russell Foster (19:30–20:30, Monday 22 July).

See the full programme of plenary sessions at www.iups2013.org/scientific-programme/prize-and-keynote-lectures.

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