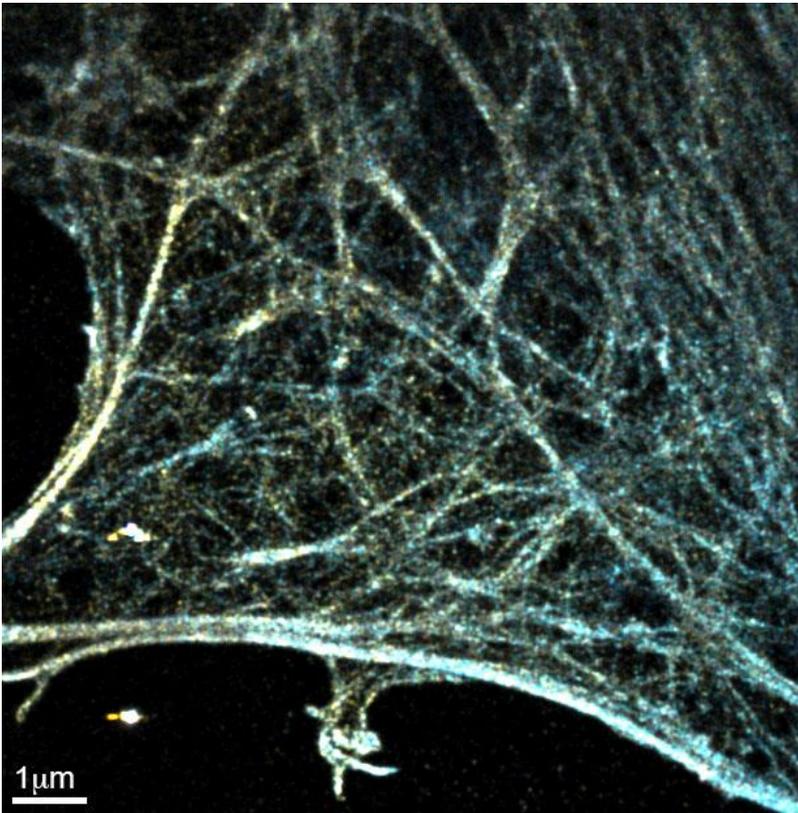


NEWSLETTER
November 2016

Issue no. 10



Cover Image: Super-resolution imaging of the Actin Cytoskeleton (supplied by Alistair Curd and Ruth Hughes in the Peckham Group, University of Leeds).

Contents

- 3. *The committee*
 - 3. *The Chair's Commentary*
 - 4. *Opinion piece*
 - 6. *Physics of Life Network*
 - 7. *Royal Society MP pairing scheme*
 - 9. *Conference report*
 - 10. *Conference calendar*
- Items for the newsletter should
be e-mailed to
m.peckham@Leeds.ac.uk

Editorial

In the November edition we would like to provide the UK biophysics community with the latest information on funding and current affairs. The Chair's comment by Prof. Jamie Hobbs takes an overview on Brexit, spending review and impact on biological physics. We are also pleased to print an opinion piece by Prof. Pietro Cicuta on his personal thoughts on Brexit. There is a report on the recent 'Physics Meets Biology' meeting in Cambridge (September 2016) and a report on the recent renewal of the Physics of Life Network intriguingly entitled 'The Revenant 2: UK Physics of Life Network'. Finally, Michelle Peckham has some reflections on taking part in the Royal Society MP Pairing Scheme. Enjoy reading, and I hope to see you at one of the upcoming conferences!

*Professor Michelle Peckham
Newsletter Editor*

The Committee

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Prof Jamie Hobbs

Honorary Secretary

Dr Susan Cox

Honorary Treasurer

Dr Pietro Cicuta

Members

Professor Michelle Peckham

Dr Rhoda Hawkins

Prof Timothy Newman

Prof Michelle Peckham

Prof Christian Soeller

Dr Rosalind Allen

Dr Marisa Martin-Fernandez

Dr Mark Wallace

De Daniel Robert

Dr Chiu Fan Lee

The Chair's commentary

We have had a bit of a pause in our group newsletter following the departure of Robert Endres from the committee – thank you to Michelle Peckham for taking up the challenge.

Since the last newsletter the political landscape has changed almost beyond recognition. Brexit is, I believe, a disaster for UK science, and in this newsletter we have a personal perspective on this from Pietro Cicuta. What it means for our science, and in particular for biological physics, is still unclear. Indeed, the total lack of preparedness of the political class for the result of their gambling with the countries future has made everything unstable. The BPG has contributed, with your help, to the IOP's response to the Science Committee's calls for input into their planning. We will continue to lobby for the best result we can get for science, and do what we can to highlight the importance of interdisciplinary science in particular in the IOP's returns to what seems to be an on going process.



On a smaller scale, since the last newsletter the spending review threw the global development and science budgets together to some extent, creating the new GCRF. This, as well as the outcome of the Nurse review and the Stern review on the REF have highlighted the importance of interdisciplinary

science with the life sciences. I am confident that the message is starting to sink in that physics can have a real impact in this arena, and am hopeful for continued developments in the internal, UK, funding landscape in our favour.

The primary business of the Biological Physics Group remains the organisation of meetings. The next year is set to be particularly busy, with IOP co-hosting the joint IUPAB EBSA congress – see <http://www.iupab2017.org> for further details – with the British Biophysical Society. This is a rare opportunity to come to a large and truly international meeting on biophysics right on our doorstep, so keep 16-20th July 2017 clear in your diaries. There will also be a number of other meetings, details to be confirmed, including the re-launch of the Understanding the Physics of Life Network following a new injection of funding from EPSRC – see further details in a piece from Tom and Martin below.

Opinion piece

The Impact of Brexit on Biophysics

Summer is almost over, as I type this today cabinet meets at Chequers for what is the first but surely not the last post-referendum meeting of this new government. Seems that free movement is lost, but who knows this could still be role playing. So much has been said and analysed already about the diverse reasons underpinning the 51.9% Brexit majority, and the challenges now to reconcile and balance these requests with the aspirations of the 48.1% minority, let alone matching to conditions set by the rest of the world. Yet so much is impossible to predict: like weather forecast our future depends on nonlinear equations; the weather is usually predicted accurately to a week or so, except these equations lead to dramatic unpredictability in very special circumstances (some very famous examples of “surprise” snowfalls and storms in both UK and USA). History, or even just the economy of a country, are at least as complex as the weather, based as they are on intrinsically susceptible agents (ourselves!)... and it seems to me we have entered a very volatile period. A lot will depend on us in the UK, but equally on decisions by the other EU countries in the next year or so on how they aim to move on. It still seems unreal to me that the future of the UK itself is now in doubt without a single specific emergency to justify questioning this all. Yet if one wants to be optimistic, it is often addressing a crisis that existing systems and arrangements are improved on, and that’s also how the EU itself originated and grew.

I do struggle to understand what’s going on, allow me an analogy. Look, there’s a better little island out there across the bay, where we can live better by ourselves! What is there exactly? Why do we have to leave here, leave our friends? It’s better there, there will be no problems, it’s even greener!

We jumped in the sea (some of us got pushed in) despite warnings of riptide, possible storms, waves, and a rise in sea levels that might slowly submerge that island out there. We have not drowned yet, obviously, as we can all swim for a bit, and it's still summer. Now, keep in mind we all have to work, eat, do everything we were doing before, and now tread water as well, for a few years. It's possible we may be all able to swim to that nice little island just out there, with the nice palm trees and cocktails... but unfortunately it's more likely we start drowning in the current, and have to be rescued by the Coast Guard. We will have to pay in that case, having ignored clear warnings. We could have stayed put, or collaborated and built a boat to go to the island safely with our friends, but we chose not to. Some of us had reasons.

Now what does this mean for science, physics, and biological physics in particular? Well, science in its very essence transcends the nation state, for decades it was even one of few bridges between the cold war blocks (think of how much bigger the differences were then in how people lived, and the immediate dangers facing everyone). We discover (and publish) globally; we have very little to gain by being peer-reviewed locally. Whether you come out winning or losing, if you consider what happens when funds get ring-fenced at smaller scales (nationally, per university, per department, per PI) the inefficiencies are obvious. This is true of science in general, but there are peculiarities in physics and I would say even more in those areas that are (a) recent, and (b) smaller scale. Soft Matter physics, and Biological Physics definitely fit these criteria. In these areas, the UK communities tend to be even more international (they grew and benefitted from the last 20 years when the UK was effectively an EU hub). The relative small scale of infrastructure also has played to enhanced motility. So in turn I think these areas are also most vulnerable now to a brain drain, and difficulties in recruitment and operation.

As a last note, as IoP BP group we have often discussed and put forward our opinions on how the gaps between RCUK councils create specific problems for us; the counterside to this is that EU funding, and particularly ERC grants, are especially necessary to us (and many on our community have successfully obtained these funds, allowing for projects that we could not have realistically proposed to any UK charity or council). So whilst it is clear to everyone that science will lose (there is just nothing in it from Brexiting, and at best on exit we can hope that EU affiliation status or alternative funding procedures are put in place), I fear that physics will be hurt more than the rest, and Biological Physics most of all.

This is depressing. It's not all over though. We have a few years of debates in front of us. It's our duty as citizens of the UK, or residents here, to make our voices heard. We are also the experts on what concerns us, and if "the people" don't want to hear "the experts" that's a choice, but it should not be because we are silent. There will be national policies that we have to try and influence; there will be more local policies (admission requirements, fees,

Language assessments) which also make free movement easier or harder, and on which we probably have much more direct power.

In other News

The Revenant 2: UK Physics of Life Network

Thought it was buried deep in the woods never to cause trouble again? Perhaps you didn't count on the revivifying powers of EPSRC and BBSRC who have jointly decided to fund a further three years of the community-based and research-building 'Network+' called *Physics of Life*. Graham Leggett and Jamie Hobbs at Sheffield have done a terrific job with the first 'PoLNet', but it was time for someone else to take a turn with the organisation. So with the support of Durham University's Biophysical Sciences Institute we have agreed to organise PoLNet2 on behalf of the community.

There will be some new aspects to this new phase of the network. The 1-day overnight research scoping workshops will still run, hosted in turn by different UK centres of Physics of Life. We will hold also comprehensive 'town meetings' to share progress, invite engagement from international scientists and discuss ways forward. However, this next stage of the Network also needs to take the community to another level: a national strategy for translating these great ideas into self-sustaining interdisciplinary research programmes, a close coordination between the community and funders, deeper involvement with biologists, a serious engagement with and by industry, and a way of keeping the function of PoLNet going beyond the network grants.

Membership of the steering committee now therefore also represents the John Innes Centre and the Crick Institute and a small but growing industrial group. Vivaly, PoLNet2 is also closely coordinating larger meetings with the Biological Physics Group of the Institute of Physics and the British Biophysical Society. Our aim is to embed the operations of PoLNet into these organisations entirely from the end of this grant. As well as workshops scoping potential research areas, there will also be support for sandpits with the more focussed aim of creating major research proposals. And in this post-Nurse Review world there is plenty of scope for working with the Research Councils in operationalising some of the Review's recommendations on interdisciplinary research.

Finally – working together as physicists and biologists is *fun*. The way we think and work is different enough to surprise, create and innovate, and similar enough to communicate and educate. Watch out for news at <http://www.physicsoflife.org.uk> and join in!

Tom McLeish, Department of Physics, Durham University (PI)

Martin Cann, School of Biological and Biomedical Sciences, Durham University) (Co-I)

The Royal Society MP Pairing scheme November 2015



This time last year, I was about to journey down to London to take part in the Royal society MP pairing scheme. This is a highly competitive scheme which encourages scientists from all disciplines, at any level to pair up with an MP (web link). Some scientists were paired with an MP, others with civil servants in relevant government departments. All of us were given a real insight into how government and parliament works, and how science policy is discussed and enacted. In particular, this was a key moment in British politics, with the advent of the 2015 Spending Review, which was due to announce spending plans for the science budget as part of its many plans for spending in different areas of government. The trip also coincided with the

release of the Nurse Review.

The trip to London lasted 4 days, 2 days of which were filled with talks and activities organised by the Royal Society, designed to give us a great introduction to how science issues are addressed by government, and by both houses of parliament including the science and technology select committees. It began with a dinner for all the scientists participating in the scheme, and a quick draw out of a hat to select people to take part in a mock Select Committee on Science and Technology on the Wednesday. On the Monday, we had a tour around the houses of parliament followed by a selection of talks from different areas of government, ending with a reception, which was attended by both Jo Johnson (Minister of State for Universities, Science, Research and Innovation) and Nicola Blackwood, who was then the chair of the Science and Technology Committee.

Tuesday and Wednesday were 'pairing' days, in which we shadowed our pair. I was paired with Chris Green, MP for Bolton West and a member of the Science and Technology Committee for the House of Commons. I was given another tour around parliament, with a different tour guide, who had a whole set of new stories to tell, but did fit in some chats with Chris during the day. I also attended a session of the Science and Technology Select committee on 'Science in emergencies' which focussed on the response to the Ebola crisis, from on the group doctors who watched events unfold to tactics used to

screen passengers that were potentially infected, at Heathrow airport and elsewhere. It was fascinating.

However, the highlight was my precious ticket to sit in the public gallery to watch Prime Minister's Questions (Cameron), swiftly followed by the Autumn Budget statement (Osborne). This was marked by the throwing of the little red book by the shadow chancellor across to Osborne, and the subtle announcement that ~£1.5 billion was being taken from the overseas development budget and added to the science budget, masking an actual drop in real science funding (the raid on the overseas development budget comes with a lot of strings attached, and the science it funds is heavily restricted). Strangely, Chris Green didn't immediately seem to grasp that this had happened, when we chatted afterwards.

The mock science select committee posed the interesting question 'Should the UK have an Office of Scientific Responsibility'. Three expert witnesses were provided. Lord Hunt of Chesterton FRS (a member of the Lords Science and Technology Committee); Jill Rutter, Programme Director at the Institute for Government and Adam Smith, a journalist on the Economist. It was a very interesting hour or so as we posed questions to each of these three witnesses. The final wrap session on the Thursday included a Q&A with Sir Mark Walport, Government Chief Scientific Advisor.

The pairing scheme also involved a return visit from the MP to the scientist. So, in April this year, Chris Green came to visit the University, see our research and we also ran a mock Science and Technology Select Committee for students and staff in Leeds (thanks to Samantha Aspinall for organising that).

Since then of course, came the Brexit vote, with the inevitable gloomy outlook for science. The STFC held an enquiry on 'Leaving the EU: Implications and opportunities for science and research' and was asking for evidence. Encouraged by the MP-pairing experience, I submitted a 2-page document that covered various impacts backed up with evidence, which, I am told, will be published. At the time of writing, the STFC is still accepting written evidence on this topic:

[\(http://www.parliament.uk/business/committees/committees-a-z/commons-select/science-and-technology-committee/news-parliament-2015/leaving-the-eu-further-call-for-evidence-launch2-16-17/\)](http://www.parliament.uk/business/committees/committees-a-z/commons-select/science-and-technology-committee/news-parliament-2015/leaving-the-eu-further-call-for-evidence-launch2-16-17/)

Overall, this was a great experience, and thoroughly recommended. If you are in London, it is free to go into the parliament, and anyone can go in and listen to any of the select committees. If you can't go in person, you can watch it on 'TV' on the web (see

<http://www.parliament.uk/business/committees/committees-a-z/commons-select/science-and-technology-committee/>)

If you want to find out more about the pairing scheme see:

<https://royalsociety.org/grants-schemes-awards/pairing-scheme/>

Given the perilous state of science and science funding, it's becoming more and more important to engage with politicians and emphasise the long term benefits and importance of funding science!

Conference report

Physics Meets Biology

12-14th September 2016, University of Cambridge

Physics Meets Biology 2016, the 5th in the biennial series of IOP Biological Physics Group conferences, was, as always, a very interesting meeting. Although previously held in Oxford, fear of the large hole currently outside the Department of Physics in Oxford drove this year's meeting to Cambridge. As in previous years, a broad range of topics was covered providing an overview of research activities at the interface between Physics and Biology. 82 delegates came to enjoy this feast of science in the beautiful setting of Clare college Cambridge. The unusually warm sunny weather made scholar's garden a particularly pleasant venue for conference dinner drinks.

Keynote talks included Joachim Spatz (Max Planck Institute for Intelligent systems, Germany) on how mechanobiology regulates collective cell migration, Naama Barkai (Weizmann Institute, Israel) on biological variability and Gero Misenbock (University of Oxford, UK) on using optogenetics to cause neurons to fire in response to light and applications of this in studying sleep.

During the conference Andrew Turberfield gave the first of this year's Tom Duke memorial prize lectures on "Building with biomolecules". He will take this talk on tour to UCL, Cardiff and Leicester this autumn. He gave a fascinating overview of the field of building nanostructures out of DNA, dazzling us with the stunning technology and intriguing us with thoughts on possible future applications.

In addition to these keynote talks there were many great invited talks, contributed talks and two active poster sessions. Three of the contributed talks were promoted to invited: Bhavin Khatri (UCL, UK) on using statistical physics to study genotype-phenotype mapping and speciation, Megan Engel (Oxford, UK) on Jarzynski bias in protein folding energy landscapes and Michael Juniper (Crick Institute, UK) on reconstituting self organisation of microtubules and kinesin molecular motors in surfactant droplets.

Delegates came mostly from the UK and elsewhere in Europe but some as far afield as South Africa and China. The broad scope of the meeting attracted those within the community and those wanting to get a flavour of the

exciting science that can happen when physics meets biology. See you there next time!

Dr Rhoda Hawkins (Sheffield University) on behalf of the co-organisers

Conference calendar



Physics of Emergent Behaviour II

From molecules to planets

9–10 July 2015, Science Museum, London, UK

Organised by the IOP Biological Physics Group

This is the second edition of the Physics of Emergent Behaviour conference, following the very successful gathering in 2013.

The aim is again to provide a highly multidisciplinary platform for physicists, biologists and mathematicians to come together to discuss experimental and theoretical approaches for studying emergent behaviour in living systems. We aim at a broad selection of topics, spanning a wide range of organisms and scales.

Speakers will combine an introduction aimed at a broad audience with results from their latest research. We expect two very stimulating days, with great opportunities for learning and networking outside our everyday niche.

Confirmed speakers

- **Robert Austin** Princeton University, USA
- **Naama Barkai** Weizmann Institute of Science, Israel
- **Anthony Bishopp** Nottingham University, UK
- **Andrea Cavagna** National Research Council (ISC-CNR), Italy
- **Iain D Couzin** Princeton University, USA
- **Stephan Grill** Max Planck Institute of Molecular Cell Biology and Genetics, Germany
- **Laurent Keller** Université de Lausanne, Switzerland
- **Vito Latora** Queen Mary University of London, UK
- **Ralph D Lorenz** Johns Hopkins University Applied Physics Laboratory, USA
- **John Toner** University of Oregon, USA

Key dates:

Abstract submission deadline:	16 April 2015
Early registration deadline:	11 June 2015
Registration deadline:	1 July 2015

Organising committee

- **Dr Robert Endres**, Imperial College London, UK
- **Dr Chiu Fan Lee**, Imperial College London, UK
- **Dr Giovanni Sena**, Imperial College London, UK

To submit an abstract or for more information about this event, please visit the conference website <http://peb2015.iopconfs.org>

Funding is provided by IOP BP, EPSRC Network Plus on 'Emergence and Non-equilibrium Systems', and the European Physical Journal.

Quantitative Methods in Gene Regulation III

7- 8 December 2015 Corpus Christi College, Cambridge

A number of recent discoveries have radically changed the picture of gene and chromatin regulation, as system-level organisational mechanisms have emerged to play a key role. This meeting, now in its third edition, aims to highlight new biological breakthroughs in such an important research area and the crucial contribution from quantitative approaches, both in experiment and modelling. It will provide a unique opportunity to bring together researchers working in such a vast, yet strategic, field in disciplines ranging from biology and medicine to chemistry, computer science, engineering, mathematics and physics.

The 2013 website gives an idea of the scope of the meeting:

<http://gene13.iopconfs.org/home>

Super-resolution Imaging Workshop

University of Leeds

July 7th 2017

Organised by Susan Cox and Michelle Peckham

Details to follow.