



# UNDERSTANDING THE Physics of Life

August 2018 Newsletter

**EPSRC**

Pioneering research  
and skills



## Physics of Life Upcoming Events

### The Future of Optical Techniques in Biology

12 September 2018

University of Nottingham, Trent Building, Senate Chamber



**Workshop organisers:** Claire Friel and Amanda Wright (University of Nottingham)

**Registration:** Fee: £20 \* Includes lunch and refreshments. **Deadline:** 9 Sep

**Abstract Deadline:** 15 August

**Student Member the Biochemical Society?** Student members of the society can apply for travel funds to attend the meeting by applying here:



**BIOCHEMICAL  
SOCIETY**

[Register for future of optical techniques here](#)

### Physics of Biological Oscillators: New Insights into Non-Equilibrium and Non-Autonomous Systems

27-30 November 2018 **SAVE THE DATE!**

Chicheley Hall, Buckinghamshire

**Workshop organisers:** Peter McClintock and Aneta Stefanovska (Lancaster University)

**Registration is OPEN.**

[Register for Physics of Biological Oscillators here](#)

## Physics of Life funding opportunities

Physics of Life have an OPEN funding opportunity available to support collaboration/grant applications on research areas that cross life and physical sciences.

*\*All funded physics of life events receive administrative organisational support*

\*Please note that Physics of Life network 2 grant end is January 2020, applications must be made in good time before this date.

## Sandpit funds

Sandpits are small discussion forums designed to gather a small group of key researchers to support a new collaboration and grant application. These are open to ALL physics of Life members. **It is not necessary to have held a PoL workshop before applying for these funds.**

Key details:

- £5k available for 2 day sandpits (funds can be spent on organisation of the event as well as funding the travel of key European or international collaborators).
- Successful collaborations seeded from sandpits can receive a further £5-10k to pump prime proof of concept research in support of grant applications.
- This is an OPEN call.
- For general enquiries related to this opportunity please email: [k.h.baker@dur.ac.uk](mailto:k.h.baker@dur.ac.uk)



Physics of Life Sandpit fund

## Physics of Life News: Recent events

### Merging Clinical, Biological & Physical Sciences for cancer research

BMA House London, 10 April 2018

Organised by Steve Smye and Jamie Hobbs in collaboration with Cancer Research UK and National Institute for Health Research (NIHR)

This workshop brought together clinicians, biologists and physical scientists to showcase successful existing collaborations and promote engagement. New ideas and collaborations focused on three key challenges in cancer research: early detection in the cancer diagnostic pathway (Rebecca Fitzgerald and Karen Page), metastasis (Steve Evans, Laura Machesky and Josef Kas) and tumour resistance using physical and biological science-based approaches (Marco Gerlinger and Sandy Anderson). The workshop ended with much discussion on future cross disciplinary opportunities.



## **Insights and Impact from the Physics of Animal Health**

University of Nottingham, 12-13 April

Organised by Cyril Rauch and Sarah Blott

The aim of the workshop was to bring together biologists, veterinary clinicians, industry professionals and physicists to discuss ways of solving important animal health problems. The programme was organised around four main topics: biological structure and its impact on disease (Pat Harris, Daniel Rayneau Kirkhope and Cyril Rauch), scanning and sensor technologies for characterising phenotypes (Malcolm Bennett and Jasmeet Kaler), modelling of disease epidemiology (Gianni Lo Iacono, Paul Barrow and Stephen Dunham), and prediction of outcomes of genetic selection or evolution based on physics models (Tom McLeish, John Hickey, Olivier Hanotte and Sarah Blott). Workshop discussion sessions identified 3 following key areas as topics for further research: physical biology of the hoof, mechanogenetics and virus structure.

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## **Biophysics of Epigenetic and Chromatin Dynamics**

Higgs Centre for Theoretical Physics, University of Edinburgh, 16-17 April

Organised by Davide Michieletto, Chris Brackley, Davide Marenduzzo

This workshop brought together experts in the field of epigenetic and chromatin dynamics. The meeting gathered a mix of experimentalists, theoreticians and computational modellers in order to holistically address the problems of how cells can establish a robust yet plastic identity. The opening talk was given by Prof. Sneppen, a theoretical physicist who opened the field of quantitative epigenetics more than 10 years ago. Key experimental contributions were given by Prof. Rippe, Dr Ogyiama, Prof Howard and Prof. Allshire who spoke about epigenetic mechanisms for cellular identity in mammals, flies, plants and yeast respectively. Theoretical models were discussed by Dr Vaillant, Prof Orlandini and Dr Teif who presented the state of the art on epigenetic and chromatin modelling. The concluding talk was given by Prof. Bickmore, internationally renowned for her work on enhancer-promoter interactions and regulatory mechanism of gene transcription in humans. The workshop was very well attended and gathered more than 90 researchers from the UK, Europe and overseas.

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## **Multiscale Mechanics in biology: current challenges and potential solutions for healthcare applications**

Weetwood Hall, Leeds, 15-16 May

Organised by Lorna Dougan

This workshop focussed on multiscale mechanics of biological systems which has emerged as an exciting area of research and provides enormous opportunities for innovative multidisciplinary basic research and technological advancement. Current experimental and theoretical tools for exploring the mechanical properties of biological soft matter, including proteins, polymers, membranes, fibrous networks, cells and tissues were discussed (Vasileios Vavourakis, Cornelis Storm, Daniel Frankel and Laurent Blanchoin). The possibilities of understanding biological systems which span multiple scales, both spatial and temporal, and the challenges involved in bringing this knowledge together into a single multiscale understanding were explored (Gijsje Koenderink and Ewa Paluch). Example success stories, where knowledge of the physics at each length scale has resulted in novel approaches to solving clinical challenges, were also given (Robert Ariens and Ruth Wilcox). Further focused workshop discussion within each of these areas enabled researchers to identify current challenges and future collaborative project opportunities.



## Physics of Life Summer School: New Approaches to Biomolecular structure, dynamics and Function

Durham University, 16-20 July 2018

The first Physics of Life network 2 summer school took place at Durham University, Grey College in July. The school saw 48 interdisciplinary researchers come together to learn about a variety of topics including: Multi-scale modeling (Gerhard Gompper), Epigenetics (Martin Howard), NMR (Anastasia Zhuravleva), X-ray/synchrotron technologies (Ehmke Pohl), with live DLS experiments (demonstrated by Dave Hall and Katherine McAuley), Biophysics of Evolution (Bhavin Khatri), High resolution microscopies (Rob Pal) and Protein dynamics (Sarah Harris). Interactive lectures and sessions on interdisciplinarity were also delivered by Tom McLeish, Martin Cann, Olwyn Byron and John Girkin. Social fun in the evenings included; a dinner in Durham Castle, a night where table tennis champions were made and impromptu games of interdisciplinary football and frisbee. The network will be organising a second summer school anticipated to take place in July 2019.



## Other activities of interest

- [Mechanics of Slender Structures in Physics, Biology and Engineering: From failure to functionality](#) 27-29 August, 2018, ULB, Brussels, Belgium
- [Discrete Models and Formal Verification in Biology](#), 29-31 August 2018,

Murray Edwards College, Cambridge

- [Physics of Cells: From Biochemical to Mechanical \(PhysCell 2018\)](#), 2-7 September 2018, The Majestic Hotel, Harrogate.
- [Systems Biology: Making Sense of Complexity Symposium](#), 3-4 September 2018, UCL
- [Physics Of Living Matter Symposium 13th Edition](#), 11-12 September 2018, Marseille, France
- [From soft matter to cell biophysics: GDR CellTiss Annual Days Workshop in honor of Françoise Brochard-Wyart](#), October 1-3, 2018, Nomade Lodge, La Chapelle -Gauthier, France
- [International Workshop on Self-assembly and Hierarchical Materials in Biomedicine: Drug Delivery, Tissue Engineering, Sensing and Safety Issues](#) 8-10 October 2018, San Sebastián, Spain
- [Various Upcoming EMBO workshops](#)

If you would like to advertise an event of interest to Physics of Life members, please email: [k.h.baker@dur.ac.uk](mailto:k.h.baker@dur.ac.uk).

[Visit Physics of Life Website](#)

