



# Topical Research Meeting on Physical Principles of Biological and Active Systems

6–7 January 2016

University of Edinburgh, Edinburgh, UK

<http://ppbio.iopconfs.org>



Biology is a place where two major themes that currently lie at the frontier of condensed matter physics converge: first, the idea that “more is different” – that is, that interactions in complex systems at one scale lead to fundamentally new emergent principles at a larger scale – and second that a proper understanding of nonequilibrium fluctuations is crucial for scientific progress.

This meeting will bring together physicists from around the world to share the intellectual challenges they face in this emerging area.

## Venue

The conference will be held at the John McIntyre Conference Centre, situated on the Pollock Halls Campus, University of Edinburgh.

For further information on the conference venue, visit

<http://ppbio.iopconfs.org/venue>.

## Keynote speakers

This meeting will feature a series of keynote presentations from senior figures in the physics of biological and active systems:

- Robert Austin (Princeton)
- Tobias Bollenbach (IST Austria)
- Ray Goldstein (Cambridge)
- Jean-François Joanny (Institut Curie)
- Rhoda Hawkins (Sheffield)
- Cristina Marchetti (Syracuse)
- Ben Simons (Cambridge)
- Joel Stavans (Weizmann Institute)

## Call for abstracts

In addition to the keynote talks, participants will have the opportunity to contribute to focus sessions. A small number of contributions will be selected as short oral presentations in these sessions. Other contributions are to be presented as posters for the duration of the topical meeting.

Contributions relevant to the physical principles of biological and active systems falling outside these three topical areas may also be submitted as poster presentations. We particularly encourage submissions from – and may give priority to – early career researchers (PhD students and postdoctoral researchers).

## Key dates

Abstract submission deadline	<b>30 September 2015</b>
Early registration deadline	<b>11 November 2015</b>
Registration deadline	<b>10 December 2015</b>

### • Focus Session 1. Antimicrobial resistance

**Chair:** Dr Bartek Waclaw

The session will provide a forum to discuss recent applications of physics to biological evolution and antimicrobial resistance (AMR). The topics will include (but do not have to be restricted to) new single-cell imaging methods in AMR research, physical methods of quantifying AMR, experimental and mathematical models of the evolution and transmission of AMR, and statistical characterization of AMR fitness landscapes.

### • Focus Session 2. Collective dynamics of motile organisms

**Chair:** Prof Davide Marenduzzo

This section will be focussed on multiscale descriptions of suspensions of self-motile active particles or organisms, and their emerging collective behaviour. The topics will include (but not be restricted to): statistical mechanics of bacterial suspensions; hydrodynamics of active gels and active fluids; models for cell motility and for collective behaviour in cells and cell suspensions; collective behaviour in systems of dividing cells or bacterial colonies.

### • Focus Session 3. Subcellular statistical physics

**Chair:** Prof Martin Evans

The session will be focussed on the subcellular arena where nonequilibrium conditions and stochasticity are the norm. The topics will include (but not be restricted to): active transport in biological systems; gene regulation; number fluctuations at small concentrations of messenger molecules; biochemical networks and their dynamics; search processes and their efficiency; modelling of intra- and intercellular signalling.