Programme

Monday 24 June 2013

10:00	Registration and refreshments
10:50	**Opening remarks** R G Endres, Imperial College London, UK
	Chair: R G Endres, Imperial College London, UK
11:00	**(invited) Noninvasive inference of the molecular chemotactic response using bacterial trajectories** M Vergassola, Institut Pasteur, France
11:30	**Cooperative effects between cells in model tissues** A-S Smith, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany
11:50	**(invited) Excitable signal relay and collective behaviors in social amoebae** T Gregor, Princeton University, USA
12:20	**Cell shape and behaviour in accurate chemotaxis** L Tweedy, Imperial College London, UK
12:40	Lunch
	Chair: G Sena, Imperial College London, UK
14:00	**Emergent behaviour of microorganisms spreading in the soil labyrinth** F J Perez-Reche, University of Aberdeen, UK
14:20	**(invited) Brachyury and the genetic control of the velocity and steerage of cells during gastrulation** A Martinez Arias, University of Cambridge, UK
14:50	**Growth regulation via mechanical feedback in the Drosophila wing imaginal disc** C M Aegerter, University of Zürich, Switzerland
15:10	Break and refreshments
	Chair: A-S Smith, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany
15:40	**(invited) The physics of microbial mating decisions** P Swain, University of Edinburgh, UK
16:10	**Hydrodynamic synchronisation and metachronal waves on the surface of the colonial alga Volvox carteri** M Polin, University of Cambridge, UK
16:30	**(invited) The physics of emergent computation in stomatal networks** D Peak, Utah State University, USA
17:00	**Interaction between structural and pigmentary colors in Phelsuma Lizards** J Teyssier, University of Geneva, Switzerland
17:20	Break
18:00	**Poster session and drinks reception**
20:00	Buffet dinner

Tuesday 25 June 2013

09:00 Registration and refreshments

Chair: M Turner, University of Warwick, UK

09:30 **Tracking individuals shows spatial fidelity is a key regulator of ant social organization**
D P Mersch, University of Lausanne, Switzerland

09:50 **(invited) Emergence of complex structure through co-evolution: The Tangled Nature model of evolutionary ecology**
H J Jensen, Imperial College London, UK

10:20 **First experimental proof of Fisher and Kolmogorov's prediction on the speed of traveling wavefronts in ecology**
A Giometto, École Polytechnique Fédérale de Lausanne, Switzerland and Eawag: Swiss Federal Institute of Aquatic Science and Technology, Switzerland

10:40 Break and refreshments

Chair: B Fabry, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

11:10 **(invited) Social decision-making by ant colonies**
N R Franks, University of Bristol, UK

11:40 **The dynamics of homing pigeons - Lyapunov analysis and collective behaviour**
M Shiraishi, Waseda University, Japan

12:00 **(invited) Signatures of swarming and synchronization dynamics in groups of growing plants**
M Ciszak, CNR-Istituto Nazionale di Ottica, Italy and University of Florence, Italy

12:30 Lunch

Chair: A Martinez Arias, University of Cambridge, UK

14:00 **(invited) Collective motion in penguin colonies**
B Fabry, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

14:30 **Collective motion through collective decision-making**
R P Mann, Uppsala University, Sweden

14:50 **(invited) Realistic long-ranged interactions and density regulation in flocks and swarms**
M Turner, University of Warwick, UK

15:20 Break and refreshments

Chair: D Chialvo, CONICET (National Research Council), Argentina

15:50 **(invited) Context-dependent hierarchies in animal societies**
T Vicsek, Eötvös University, Hungary

16:20 **One is solitude, two is company – the effect of social interaction on individual behaviour in ants**
A B Sendova-Franks, University of the West of England, UK

16:40 **Study of micro-swimmer suspensions by Lattice-Boltzmann numerical simulations**
F Alarcón, Universitat de Barcelona, Spain

17:00	**(invited) Fluid dynamics and self-organization of cytoplasmic streaming** R E Goldstein, University of Cambridge, UK
17:30	Break
19:30	*Poster prize presentation* Conference dinner

Wednesday 26 June 2013

09:00	Registration and refreshments
	Chair: H J Jensen, Imperial College London, UK
09:30	**(invited) Collective properties of multi-task learning in neuronal networks** L de Arcangelis, Seconda Università degli Studi di Napoli, Italy
10:00	**Bacterial electrical spiking in biofilm sociobiology** E Masi, DISPAA-Department of Agrifood and Environmental Science, University of Florence, Italy
10:20	**(invited) The brain at the edge** D Chialvo, CONICET (National Research Council), Argentina
10:50	Break and refreshments
	Chair: G Aquino, Imperial College London, UK
11:20	**Stability, instability, and 'tipping points' in the dynamics of socially determined behaviour** J J Bissell, University of Durham, UK
11:40	**(invited) Collective behaviour and collective cognition** J Krause, Leibniz-Institute of Freshwater Ecology and Inland Fisheries (IGB), Germany
12:10	**Closing remarks** G Sena, Imperial College London, UK
12:20	Lunch and conference end

Poster programme

P.01 Phase transition of the foraging model
H Andrade, Universidade Federal de Pernambuco (UFPE), Brazil

P.02 Precision of sensing and decision making with memory in fluctuating environments
G Aquino, Imperial College London, UK

P.03 The dispersion of swimming algae in laminar and turbulent flows
O A Croze, University of Cambridge, UK

P.04 Emergent strategies for adaptation in biological systems: a physics perspective
G De Palo, Imperial College London, UK

P.05 Propagating front of non-motile and non-chemotactic bacteria
C Douarche, Université de Paris Sud, France

P.06 Swarm model for the huddling behavior of Emperor penguins
R Gerum, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

P.07 Emergent properties of a tissue-like printed material
A D Graham, University of Oxford, UK

P.08 Evolution of drug resistance in drug concentration gradients
P Greulich, University of Cambridge, UK

P.09 Stochastic fate of stem cells: homeostasis vs. tumour development
P Greulich, University of Cambridge, UK

P.10 Cluster interpretation of escape efficiency in emergent evacuation
N Hatakenaka, Hiroshima University, Japan

P.11 Growth and transport in fungal networks
L Heaton, University of Oxford, UK

P.12 Evolutionary stochastic dynamics of speciation and a simple genotype-phenotype map for protein binding DNA
B Khatri, National Institute for Medical Research, UK

P.13 Predicting nonlinearity of tumour spheroid growth in HGF media: a data-driven multi-species continuum model
A Konstorum, University of California, Irvine, USA

P.14 Emergence of cell colony dynamics from proliferating particles with Lennard-Jones like interactions
P Krauss, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

P.15 The influence of focal adhesion kinase on collective cell migration
J Lange, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

P.16 Malaria parasite motility on rigid substrates: still it moves...
G Massiera, Université de Montpellier 2, France

P.17 Accuracy of cellular responses in decision making
G Micali, Imperial College London, UK and Dipartimento di Fisica, Università degli Studi di Milano, Italy

P.18 Decision making during zipper-like forespore engulfment in B. subtilis
N Ojkic, Imperial College London, UK

P.19 Pattern formation in Dictyostelium discoidium depends on the properties of the substrate
K H Prabhakara, Cornell University, USA and Max-Planck Institute for Dynamics and Self-Organisation, Germany

P.20 Eukaryotic flagella: emergence of form, maintenance of synchrony
K Y Wan, University of Cambridge, UK

P.21 *Poster presentation withdrawn*

P.22 Understanding cell lineage patterns and emergent properties of tumour drug resistance
R J Errington, Cardiff University, UK

P.23 Complex dynamics in the swimming motion of a gyrotactic micro-organism in rotational flow
S Furlan, University of Cambridge, UK

P.24 Stretchable nanoparticle conductors with self-organized conductive pathways
Y Kim, University of Michigan, USA