

From Chaos to Complexity



6-8 July 2011

Programme (Talks in B3.03 until Thursday 11am, then in MS.02)

Wednesday 6 July

All morning: registration B1.37

12:30-13:45 Lunch, The Street, Mathematics Institute

13:45-13:55 **Claude Baesens** (Maths, Warwick)

Welcome & Introduction

14:00-14:25 **Sheldon Newhouse** (Maths, Michigan)

On the existence of chaos in the Lorenz systems

14:30-14:55 **Michal Misiurewicz**
(Maths, IUPUI, Indianapolis)

Entropy of hypercubes

15:00-15:25 **Daniel Goroff**
(Alfred P. Sloan Foundation, New York)

The origins of chaos theory

15:30-16:00 Tea in Mathematics Institute Common Room

16:00-16:25 **Joël Sommeria** (LEGI, CNRS, Grenoble)

Emergence of coherent flows in fluid turbulence

16:30-16:55 **Fabrice Doveil** (LPIIM, CNRS, Marseille)

*Observation of Hamiltonian dynamics
and chaos control in wave-particle interaction*

17:00-17:25 **Rui Dilão** (Nonlinear Dynamics, IST, Lisbon)

*Mathematical complexity theory in systems biology:
several success stories and new problems*

17:30-17:45 **Yi-Chuan Chen**
(Maths, Academia Sinica, Taiwan)

Family of Julia sets as orbits of differential equations

17:50-18:00 Break

18:00 Drinks and Dinner, Mathematics Institute Common Room

Thursday 7 July

08:50-09:05 **Gabriela Gomes** (FCG-IGC, Lisbon)

*Heterogeneity in antibody range and the evolution of
influenza viruses*

09:10-09:25 **Vasileios Basios**
(Nonlinear Phenomena, ULB, Brussels)

*Non-standard aggregation patterns emerging in
complex systems*

09:30-09:55 **Antonio Politi**
(Sistemi Complessi, CNdR, Firenze)

Collective phenomena in neural networks

10:00-10:25 **Ram Ramaswamy** (Hyderabad)

*Synchrony in stochastic dynamical systems:
applications to cellular phenomena*

10:30-11:00 Coffee in Mathematics Institute Common Room

11:00-11:25 **Paul Rapp** (USUHS)

*Dynamical analysis and complexity measures in
neuropsychiatry*

(cont.)

- 11:30-11:55 **Jean-Pierre Eckmann** (Maths & Physics, Geneva) *Rattling and Freezing in a Model of 1d Heat Conduction*
- 12:00-12:25 **Giancarlo Benettin** (Maths, Padova) *The Fermi--Pasta--Ulam--Problem: main ideas, recent results, open questions*
- 12:30-14:00 Lunch in Mathematics Institute Common Room
- 13:45 Group photo
- 14:00-14:25 **Robert May** (Zoology, Oxford) *Stability and complexity in model banking systems*
- 14:30-14:55 **Raphaël Douady** (Economie, CNRS, Paris 1 & Riskdata) *Financial crisis dynamics: Attempt to define a market instability indicator*
- 15:00-15:25 **Bernard Legras** (Météorologie Dynamique, ENS, Paris) *Complexity and Climate*
- 15:30-16:00 Tea in Mathematics Institute Common Room
- 16:00-16:25 **Dimitry Turaev** (Maths, Imperial) *On space-time chaos in driven Ginzburg-Landau equation*
- 16:30-16:55 **Lai-Sang Young** (Courant, New York) *Dynamics of neuronal networks modeling visual cortex*
- 17:00-17:25 **Maurice Courbage** (Matière et Systèmes Complexes, Paris 7) *On synchronisation of coupled neural spiking-bursting maps*
- 17:30-17:45 **Bastien Fernandez** (CPT, CNRS, Marseille) *Coupled map lattices beyond uncoupled regimes*
- 17:50-18:20 Break
- 19:00 Dinner at Saxon Mill for invited speakers (*) (Transport leaves Radcliffe House at 18:20 promptly) including **Gérard Iooss** (Maths, Nice) *Les Houches 1981* (Return transport to campus provided)

Friday 8 July

- 09:00-09:15 **Thomas Gilbert** (ULB, Brussels) *Order statistics and the Lyapunov spectra of some classes of high-dimensional billiard systems*
- 09:20-09:35 **Brian Ryals** (Courant, New York) *Dynamics of N particles in a line segment*
- 09:40-09:55 **Ben Mestel** (Open, Reading & INI, Cambridge) *Renormalization in quasiperiodic dynamics*
- 10:00-10:25 **Paul Glendinning** (Maths, Manchester) *Emergence of polysynchrony in adaptive networks*
- 10:30-11:00 Coffee in Mathematics Institute Common Room
- 11:00-11:25 **Gene Wayne** (Maths, Boston) *A dynamical systems approach to metastability*
- 11:30-11:55 **Jean-Marc Gambaudo** (Maths, Nice) *Quasicrystal ground states*
- 12:00-12:25 **Yves Pomeau** (Physique Statistique, ENS, Paris) *Statistical mechanics with gravitational interaction*
- 12:30-14:00 Lunch in Mathematics Institute Common Room
- 14:00-14:25 **Michael Berry** (Physics, Bristol) *Fast and Slow*
- 14:30-14:55 **Massimo Campanino** (Maths, Bologna) *Asymptotic behaviour of connection and correlation functions outside the critical point*
- 15:00-15:25 **Ana Noronha** (Ciência Viva & Nonlinear Dynamics, IST, Lisbon) *Nonlinear dynamics for the public*
- 15:30-16:00 Tea in Mathematics Institute Common Room
- 16:00-16:25 **Johannes van Zeijts** (Credit Suisse, New York) *From KAM theory to particle accelerators, to the complexity of option trading*
- 16:30-16:55 **Jürg Heldstab** (INFRAS, Zürich) *From chaos to environment*
- 17:00-17:25 **Robert MacKay** (Maths & Complexity, Warwick) *Hyperbolicity in mechanics, cosmology and emergence*
- 17:30 Closing remarks and Skype session
- 17:50 Break
- 18:15 Les Houches 1981 reunion in D1.07
- 19:30 Dinner and Celebration at Radcliffe House for invited speakers (*)

(*) There will be a charge for accompanying persons.