Dr Rosemary Dyson

Lecturer in Applied Mathematics

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About

Rosemary Dyson is a Lecturer in Applied Mathematics and part of the Systems Science for Health initiative. She applies the principles of mathematical modelling to mechanical problems in biological and industrial contexts, generating novel insights into the systems involved, as well as new mathematical techniques. As such her work is inherently highly collaborative, involving frequent interactions with experimentalists.

She coordinates the Mathematics in the Plant Sciences Study Group series, week-long events where assembled mathematicians work on problems brought by plant scientist. Rosemary is always interested to discuss the potential for cross-disciplinary collaboration whether in the context of the study group or her own research.

Qualifications

- MMath (Mathematics, Oxford 2003)
- DPhil (Mathematics, Oxford 2007)

Biography

Rosemary Dyson graduated with an MMath from the University of Oxford in 2003. She went on to complete a DPhil within the Oxford Centre for Industrial and Applied Mathematics under the supervision of Dr Peter Howell and Dr Chris Breward on “Mathematical modelling of curtain coating”. This project was sponsored by ArjoWiggins via a Smith Institute industrial CASE award.

In 2007 she started as a postdoctoral research fellow at the Centre for Plant Integrative Biology, University of Nottingham where she was part of a large interdisciplinary team in which she was responsible for developing mechanical models of plant growth. These models form part of the “virtual root” currently under development at CPIB. She took up a Lectureship within the School of Mathematics at the University of Birmingham in 2011 as part of the System Science for Health initiative, and is also a member of the Centre for Systems Biology.

Teaching

- Single Honours Mathematics (G100, G103, G141)
- Mathematics Majors: Mathematics with Business Management (G1N2); Mathematics with Engineering (J920); Mathematics with Philosphy (G1V5)
- Joint Honours Mathematics: Mathematics & Computer Science (GG14); Pure Mathematics & Computer Science (GGC4); Mathematics & Sport Science (GC17); Mathematics & Music (GW13); Mathematics & Philosophy (GV15)
- Theoretical Physics and Applied Mathematics (FG31)
- Mathematics Minors: French Studies and Mathematics (GR11); German Studies and Mathematics (GR12); Natural Sciences (CFG0, FCG0)

Research

RESEARCH THEMES

Mathematical modelling particularly applied to medicine, plant science, tissue engineering & industrial coating, Biomechanics, thin liquid films and fibre-reinforced fluids.

RESEARCH ACTIVITY

- Systems Science for Health
- Multiscale models of plant root growth
- Cell – extracellular matrix interactions
- Models for pollen tube growth
- Mechanical anisotropy
- Fluid flows within tissue engineering constructs
- Modelling curtain coating for the paper industry

Other activities

- Co-ordinator of the Mathematics in the Plant Sciences Study Group series
- Affiliate member of the Centre for Plant Integrative Biology

Publications

Dyson R.J. and Jensen O.E. (2010) A fibre-reinforced fluid model of anisotropic plant root cell growth. Journal of Fluid Mechanics 655:472-503.

Dyson R.J., Brander J., Breward C.J.W., Howell P.D. (2009) Long-wavelength stability of an unsupported multilayer liquid film falling under gravity. Journal of Engineering Mathematics 64:237-250.

Shipley R.J., Jones G.W., Dyson R.J., Sengers B.G., Bailey C.L., Catt C.J., Please C.P., Malda J. (2009) Design criteria for a printed tissue engineering construct: A mathematical homogenization approach. Journal of Theoretical Biology 259:489-502.

Whittaker R.J., Booth R.J.S., Dyson R.J., Bailey C.L., Parsons Chini L., Naire S., Payvandi S., Rong Z., Woollard H., Cummings L.J., Waters S.L., Mawasse L., Chaudhuri J.B., Ellis M.J., Michael V., Kuiper N.J., Cartmell S. (2009) Mathematical modelling of fibre-enhanced perfusion inside a tissue-engineering bioreactor. Journal of Theoretical Biology 256 : 533-546.