ECMTB 2016

10th European Conference on Mathematical & Theoretical Biology
and SMB Annual Meeting

ESMTB

Society for Mathematical Biology

CMMB
Centre for Mathematical Medicine and Biology

The University of Nottingham
UNITED KINGDOM · CHINA · MALAYSIA

11-15 July 2016, Nottingham

@ecmtb2016

ecmtb2016.org

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WELCOME TO NOTTINGHAM AND THE 10th ECMTB!

Welcome to the 10th European Conference on Mathematical and Theoretical Biology, and the Society for Mathematical Biology Annual Meeting, hosted by the Centre for Mathematical Medicine and Biology (CMMB) at the University of Nottingham.

The CMMB aims to promote the application of mathematics and statistics to the biomedical and life sciences, and to stimulate multi-disciplinary research within the University and beyond. The CMMB has historically placed considerable emphasis on developing and supporting the mathematical and theoretical biology community, from initiating Maths in Medicine and Maths in Plant Sciences Study Groups, to co-ordinating various UK and International networks. We are now delighted to welcome so many delegates to ECMTB 2016 in Nottingham—with over 800 attendees, we look forward to plenary lectures, awards for both accomplished senior researchers and aspiring graduate students, a range of contributed talks, symposia and vibrant poster sessions.

We hope that you enjoy your stay in Nottingham—rich with heritage, surrounded by picturesque countryside and famous as the 'Home of Robin Hood', Nottingham is also a modern lively city with tourist attractions that range from some of England's oldest pubs and labyrinths of hidden caves, to contemporary highlights such as the National Videogame Arcade.

Nottingham is also one of only six designated Science Cities in the UK, and has a rich and varied scientific pedigree. This includes Francis Willoughby who initiated (with John Ray) taxonomy, wrote the first account of football, and whose family seat is Wollaton Hall (a short walk from the conference venue); and famous Nottingham Mathematicians Ada Lovelace and George Green whose respective contributions to the theoretical understanding of computing and electricity and magnetism still resound today. Further afield, Isaac Newton's birthplace is at Woolsthorpe Manor, where the legendary apple tree still stands.

We are therefore sure that you will enjoy your time in Nottingham and find the meeting and the wider activities available rewarding and enjoyable.

I'd like to finish by thanking wholeheartedly the team that made the conference possible, the Local Organising Committee, the Scientific Committee, ESMTB and SMB, our sponsors, but most of all Daisy Carter, David Hawker, Elizabeth Booth and Katie Gill, whose administrative support has been invaluable (as many of you will already have discovered!).

Markus Owen
Chair, Local organising committee

SCIENTIFIC COMMITTEE

Linda Allen, Ellen Baake, Jim Cushing, Andreas Deutsch, Odo Diekmann, Susanne Ditlevsen, Amina Eladdadi, Stephen Eglen, Yoh Iwasa, Eva Kisdi, Santiago Schnell, Artie Sherman, Jonathan Sherratt, Vitaly Volpert.

LOCAL ORGANISING COMMITTEE

Markus Owen (Chair), Daniele Avitabile, Leah Band, Bindi Brook, Stephen Coombes, Etienne Farcot, John King, Reuben O'Dea, Rüdiger Thul, Jonathan Wattis

GENERAL INFORMATION

HOW TO USE THIS BOOKLET

Use the tabs on the right hand side to find the programme overview, social activities, abstracts for plenary talks, and listings for each day's parallel sessions. Each two-hour block is collected in a two-page spread, so you can view the whole session at a glance.
All sessions are headed XX-DD-AP-NN (where XX=MS/CT/PS for Minisymposia / Contributed talks / Posters; DD=date; AP=AM/PM; NN is a number).

NAME BADGE

Please keep your name badge with you at all times during the conference. **Your badge is your ticket for lunch each day, any booked excursions, the conference dinner (if booked) and also gives free tram travel in Nottingham (11–15th July).**

Any special dietary requirements are listed and are also highlighted by the colour of the reverse. Please show this to serving staff at lunch and the conference dinner (if attending).

VENUE

All talks will take place in the Science Area of the University Park Campus (see the maps inside rear cover, highlighting important locations and rooms). Plenary lectures will take place in the Coates Road Auditorium (Building 51, Campus map) and be screened live to the overflow rooms (Pope C14 & C16; Building 27). Student volunteers will be on hand to direct you.

Wifi is available throughout the conference venue buildings via eduroam, and the University of Nottingham open guest network, 'UoN-Guest'. In addition, desktop PCs will be available in ESLC C13 (Building 54) for delegate use.

PRESENTATIONS AND POSTERS

For both contributed talks (15+5 minutes) and Minisymposium presentations (25+5 minutes) the additional 5 minutes are for questions and speaker changeover. **So that delegates may take advantage of the parallel sessions, chairs have been asked to adhere strictly to timetable.** Signs will be used to indicate 5 minutes remaining (green), 2 minutes (yellow) and stop (red).

Each room is equipped with a computer and data projector. Rooms will be available prior to each session: **speakers are encouraged to test functionality prior to their session**.

All posters are allocated to one of two sessions in Pope A13/14:

Tuesday 17:30–19:30: display poster from Monday morning, remove it at the end of the session.

Thursday 17:30–19:30: display poster from Wednesday morning, remove it before you leave.

Prizes will be awarded for the best posters.

REFRESHMENTS AND LUNCH

Refreshments (10:00, 15:30) and lunch (12:30) will be served in the ESLC Atrium and Pope A13/A14. Meat and vegetarian packed lunches will be available at each location; specific (named) packed lunches for those who have indicated special dietary requirements will be provided in the ESLC Atrium.

HELP AND INFORMATION

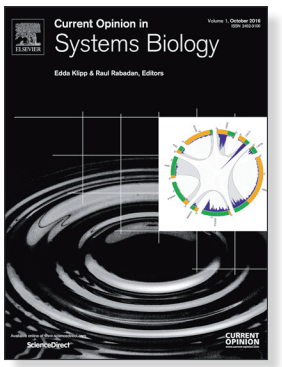
The conference reception desk, located in the ESLC Atrium, will be staffed 9:00–17:30 throughout the conference to provide help and information. Additionally, student volunteers will be happy to assist with queries, as will any members of the local organising committee; we can also be contacted via email: `ecmtb2016@nottingham.ac.uk`.

University Security can be contacted 24 hours a day on 0115 9513013 (ext 13013 internally).

Updates and further announcements (including any schedule amendments) will be made via email, and on the conference webpage: `www.ecmtb2016.org`.

Discover the Latest Research in Mathematical Biology

ELSEVIER



Current Opinion in Systems Biology

Co-Editors-in-Chief: E. Klipp, R. Rabadan

Current Opinion in Systems Biology is a new invited systematic review journal that aims to provide specialists with a unique and educational platform to keep up-to-date with the expanding volume of information published in the field of Systems Biology.

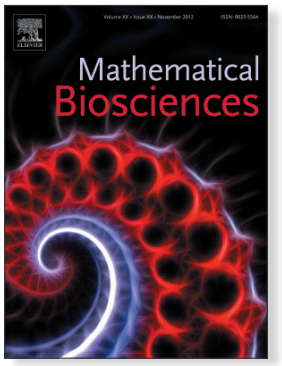
For more info on the aims and scope: **elsevier.com/locate/coisb**

Journal of Theoretical Biology

Co-Editors-in-Chief: D. Kirschner, Y. Iwasa, L. Wolpert

The leading forum for theoretical papers that give insight into biological processes. It covers a very wide range of topics and is of interest to biologists in many areas of research.

For more info on the aims and scope: **elsevier.com/locate/yjtbi**

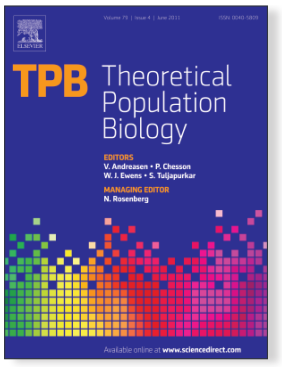


Mathematical Biosciences

Editor-in-Chief: E.O. Voit

This leading international journal publishes research and expository papers on the formulation, analysis and solution of mathematical models in the biosciences.

For more info on the aims and scope: **elsevier.com/locate/mbs**



Theoretical Population Biology

Editor-in-Chief: N. Rosenberg

An interdisciplinary journal, *Theoretical Population Biology* presents articles on the theoretical aspects of the biology of populations, particularly in the areas of ecology, genetics, demography, and epidemiology.

For more info on the aims and scope: **elsevier.com/locate/tpb**

These journals all support open access.

elsevier.com

PROGRAMME OVERVIEW

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
9:00		Registration	Plenary: Leah Edelstein-Keshet	Plenary: Ruth Baker	Plenary: Johan van de Koppel	Plenary: Hisashi Ohtsuki Poster prizes
10:00		Refreshments	Refreshments	Refreshments	Refreshments	Refreshments
10:30		Registration	Minisymposia/ Contributed talks	Minisymposia/ Contributed talks	Minisymposia/ Contributed talks	Minisymposia/ Contributed talks
11:00		Opening				
11:30		Plenary: Julia Gog				
12:00						
12:30		Lunch	Lunch / Meet the BMB editors (ESLC Atrium)	Lunch / ESMTB General Assembly (ESLC A9)	Lunch / SMB General assembly (ESLC A9)	Lunch
13:00	Pre-conference workshop (ESLC A9) (Registration open 12:00–14:00 and 17:00-19:00)					
13:30		Minisymposia/ Contributed talks	Minisymposia/ Contributed talks	Excursions/ Free time	Minisymposia/ Contributed talks	Winfree Prize: John Rinzel
14:00						
14:30						Reinhart Heinrich awards: Aurélie Carlier, Juan Carlos López Alfonso, Linus Schumacher
15:00						
15:30		Refreshments	Refreshments		Refreshments	
16:00		Segel prizes: Tim Rogers (best paper), Jake Taylor-King and Hayley Warsinske (best student papers)	Plenary: Sander van Doorn	Public Lecture: Philip Maini	Plenary: Adélia Sequeira	Close & Refreshments
16:30						
17:00				Excursions/ Free time	JTB presentation to Lewis Wolpert	
17:30			Posters, Reception	Buses leave for Kelham Hall	Posters, Reception sponsored by Elsevier / Journal of Theoretical Biology	
18:00		Reception, BBQ (Trent Building)				
18:30						
19:00				Conference dinner at Kelham Hall		
19:30			Dinner if in Halls of Residence		Dinner if in Halls of Residence	

Use the tabs on the right hand side to find abstracts for plenary talks, and listings for each day's parallel sessions.

All plenary lectures take place in the Coates Road Auditorium (and are streamed to Pope C14/16).
Contributed sessions and Minisymposia are in the rooms indicated.
Poster sessions take place in Pope A13/14. See maps inside rear cover.

Refreshments and lunch are served in ESLC and Pope A13/14.

SOCIAL PROGRAMME

RECEPTIONS

Monday 11th July 18:00–21:00
Opening reception and barbecue (Terrace and Senate Chamber, Trent Building; Building 11, Campus map).

Tuesday 12th & Thursday & 14th July 17:30–19:30
Reception and poster sessions (Pope A13/14).

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CONFERENCE DINNER & EXCURSIONS: Wednesday 13th July

The conference dinner will take place at Kelham Hall, a 45 minute bus ride from University Park.
Buses will leave University Park (from East Drive, see Campus map) from 17:40; last bus leaves at 18:00.

Buses will leave Kelham Hall (returning to University Park) at 22:00 (one bus) and 23:00.

©Kelham Hall

Kelham Hall Tour

Run by local expert historians, the Kelham Hall tour will uncover the history and secrets of this Victorian stately home, built in 1863, and set within 44 acres of parkland.
Bus leaves from East Drive at 13:50.

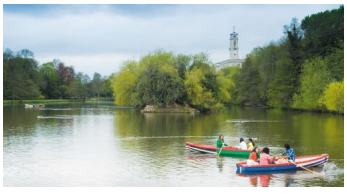
Southwell Workhouse Tour

Southwell Workhouse is the most complete workhouse in existence, and was built in 1824 as a place of last resort for the destitute. Southwell Minster, the stunning Cathedral of Nottinghamshire, is nearby.
Bus leaves from East Drive at 13:00.

©Experience Nottinghamshire

LOCAL ACTIVITIES & EXCURSIONS: Wednesday 13th July 12:30 onwards

Set in extensive greenery and around a boating lake, University Park also contains museums, art galleries and a number of smaller gardens which offer great spaces to relax (see additional guide in your conference pack).



©University of Nottingham

Within walking distance of the University is Wollaton Hall and Deer Park. This stunning Elizabethan hall was also featured as Wayne Manor in the Batman movie The Dark Knight Rises.

An entrance to the park is marked by an arrow on the Campus map.

©Experience Nottinghamshire

The city of Nottingham and the surrounding county also boasts a wide range of other activities. Full details are given in the Visitor Guide, which also includes a city map. Local knowledge is provided by the Pub & Bar guide, produced by Nottingham PhD students, available at http://www.ecmtb2016.org/pub-guide/.

Conference attendees are also eligible for exclusive discounts at various bars, restaurants and attractions (see sheet in conference bag).

Nottingham City Excursions: ***If you have booked any of the following excursions, you are responsible for getting to the venue on time.*** Remember that you can use your name badge for free tram travel. Relevant tram stops are indicated below and all venues are marked on the ECMTB 2016 Google map at http://www.ecmtb2016.org/travel-accom/.

Galleries of Justice

Voted England's Best Small Visitor Attraction of the Year 2014, the Galleries of Justice, based at Nottingham's old courthouse and gaol, provides a unique and entertaining way to explore the history of crime and punishment.
Tram stop: Lace market

©Galleries of Justice, Experience Nottinghamshire

Green's Windmill and Science Centre

This windmill was owned and operated by the mathematical physicist George Green (1793-1841). In the Science Centre you can discover his remarkable story and achievements.
Tram stop: Lace market; then 0.8 mile walk or no. 43 bus

©Experience Nottinghamshire

National Videogame Arcade

At the NVA you can explore three floors of playable exhibitions, showcasing the art and technical brilliance of video games, past and present.
Tram stop: Lace market

©Anthony Hopwood

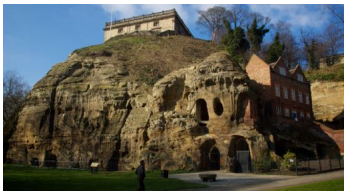
Robin Hood Tour

This thorough and fun exploration of the legend is told against the theatrical backdrop of the City. As you visit places associated with Robin Hood, you will also see the town's key sites of interest and learn about its history and culture.
Tram stop: Old Market Square; 0.1 mile walk to Council House

©Experience Nottinghamshire

Nottingham Castle and Cave Tour

Visit the historic site at the heart of the Robin Hood legend and starting point for the English Civil War. Award-winning cave tours tell this history.
Tram stop: Old Market Square; 0.3 mile walk to Castle



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PLENARY SPEAKERS - Coates Road Auditorium

Julia Gog (University of Cambridge) - *Monday 11th July, 11:30–12:30*
Some challenges in mathematical modelling of infectious diseases

Mathematicians have long been intrigued by the challenge of capturing epidemics in dynamic models. In addition, these models are valuable as a tool for exploring the underlying biology and are becoming used increasingly in shaping policy for control strategies. However, the inherent complexity of infectious disease means that there is plenty still to be done. Here we will look at some of the current active research themes, including constructing tractable models for the dynamics of multiple strains of an infectious disease (needed for an evolving pathogen), and spatial models for the spread of disease across a country. I hope this talk sketching out some of the key challenges in disease modelling will be of interest to a wide range of mathematical biologists.

Leah Edelstein-Keshet (University of British Columbia) - *Tuesday 12th July, 9:00–10:00*
From sub-cellular signalling to multi-cellular behaviour

In this talk, I will review recent research in my group that spans molecular, cellular, and multicellular behaviour. First, I will describe our work on the dynamics of signalling proteins (such as Rac and Rho) that coordinate the polarity, shape, and migration of a eukaryotic cell. I will provide examples of the link between theory and experiment, and how mathematical models provided insights into the mechanisms underlying observed behaviour. Finally, I will briefly describe recent work on collective cell migration in a developmental context.

Sander van Doorn (University of Groningen) - *Tuesday 12th July, 16:00–17:00*
Phenotypic versus mechanistic models of complex-trait evolution—insights on the genotype-phenotype problem from a computational reconstruction of bacterial chemotaxis

Deciphering the molecular basis of adaptation is a major challenge in post-genomic biology. Phenotypic models provide a way to describe evolution without having to deal with the complexity of the genotype-phenotype mapping, but such models are ill-equipped to predict the molecular-level response to selection. An alternative strategy is to explicitly model molecular mechanisms and then rely on computational methods to reconstruct the phenotypic effects of mutations in biomolecular interaction networks. We have applied this evolutionary-systems-biology approach to the signal-transduction network responsible for chemotaxis in *Escherichia coli*. This small network has been characterised in extraordinary detail, yet relatively little is known about eco-evolutionary aspects of chemotaxis, such as how the network has been shaped by selection and to what extent natural populations may fine-tune their chemotactic behaviour to the ecological conditions. The model was applied to estimate the resource accumulation rate (used as a proxy for fitness) of wildtype and a large number of potential mutant genotypes, including mutants whose behaviour is known from the literature. Observed differences in the fitness distribution between genotypes were used as a basis for reconstructing adaptive walks in genotype space for populations exposed to different environmental conditions, and we studied the recovery of chemotaxis by compensatory mutations in a knockout mutant with low chemotactic efficiency. I will evaluate the costs and benefits of using these computational approaches relative to phenotypic models of evolution, and discuss the challenges in scaling up to larger networks in higher organisms.

Ruth Baker (University of Oxford) - *Wednesday 13th July, 9:00–10:00*
Cell biology processes: model building and validation using quantitative data

Cell biology processes such as motility, proliferation and death are essential to a host of phenomena such as development, wound healing and tumour invasion, and a huge number of different modelling approaches has been applied to study them. In this talk I will explore a suite of related models for the growth and invasion of cell populations. These models take into account different levels of detail on the spatial locations of cells and, as a result, their predictions can differ depending on the relative magnitudes of the various model parameters. To this end, I will discuss how one might determine the applicability of each of these models, and the extent to which inference techniques can be used to estimate their parameters, using both cell- and population-level quantitative data.

Public lecture
Philip Maini (University of Oxford) - *Wednesday 13th July, 16:00–17:00*
Can mathematics help us understand biology?

Have you ever wondered what the grey squirrel invasion of the UK, the spread of cancer in the body, the stripes on a zebra all have in common? The answer is, they can all be described by mathematics! In this talk, we will see how mathematics can be used to understand how species use various strategies to invade and how patterns can form. Mathematics can help us to understand basic biology and could potentially lead to new therapeutic cures.

Johan van de Koppel (Royal Netherlands Institute for Sea Research) - *Thursday 14th July, 9:00–10:00*
A multidisciplinary approach to pattern formation in ecosystems

Most examples of self-organized spatial patterns in ecosystems are based on Alan Turing's activator-inhibitor principle, where pattern formation is driven by spatial variation in biological growth conditions. I will highlight a new mechanism of pattern formation in ecosystems that is based on animal movement, and is akin to the physical principle for phase separation, known to explain pattern formation in alloys such as steel or bronze. Using models and experiments, I will argue that both processes can occur simultaneously, and interact to determine the resilience of ecosystems to disturbances and changing environmental conditions.

Adélia Sequeira (Instituto Superior Técnico) - *Thursday 14th July, 16:00–7:00*
Recent progress in the mathematical modelling of the early stages of atherosclerosis

Cardiovascular diseases, such as heart attack and stroke, are responsible for more mortalities than cancer in developed countries. One of the major underlying causes for these events is atherosclerosis, a slow and complex disease that leads to the formation and eventual rupture of atherosclerotic plaques affecting large and medium sized arteries in the systemic circulation.

Atherosclerosis is a chronic inflammation that starts when a high concentration of low-density-lipoproteins (LDL) move from the blood into the intima of the vessel wall, changing the permeability of the endothelial layer that leads to subsequent deposition of lipids in the intima, inducing a series of biochemical events and the formation of an atherosclerotic plaque. Clots are usually formed, carried in the bloodstream and can block the coronary vessels, the cerebral arteries, or even reduce or block blood supply to the legs. This is a silent disease with a long preclinical period that only produces symptoms when the artery is harshly narrowed and the obstruction occurs, resulting in severe complications.

Mathematical modeling and numerical simulations are important tools for a better understanding of atherosclerosis and subsequent development of more effective treatment and prevention strategies. The associated mathematical models lead to complex systems of nonlinear partial differential equations of flow, transport, chemical reactions, interactions of fluid and elastic structures, movement of cells, coagulation and growth processes, and additional complex dynamics of the vessel walls. Several theories have been developed to describe the pathogenesis of atherosclerosis but none of them can explain the whole process due to the large number of factors and different time scales involved, and more realistic and comprehensive mathematical models still need to be derived.

In this talk we present a short review of some existing mathematical models for atherosclerosis. Special attention is given to a novel approach that captures essential features of the early stage of atherosclerosis development.

Hisashi Ohtsuki (The Graduate University for Advanced Studies (SOKENDAI)) - *Friday 15th July, 9:00–10:00*
Let a thousand of norms bloom; evolutionary analysis of social norms that maintain indirect reciprocity

Indirect reciprocity refers to a mechanism where a cooperator receives reciprocation from a third party who knows his/her good reputation. Empirical studies suggest that people care about own reputation as well as others' and conditionally adjust their behavior. By helping others you can earn a good reputation. With a good reputation you can receive help from others. Therefore a good reputation is a currency for cooperation.

But the question arises as to how this currency is issued. A rule to assign reputation, namely a social norm, prescribes what behavior is deemed good and what behavior is deemed bad in the society. Under an inappropriate social norm reputation becomes untrustworthy and cooperation collapses. In the forest of numerous social norms that bloom as a theoretical possibility, I have conducted an exhaustive search to find ones that stably maintain cooperation as an evolutionarily stable strategy. My results reveal common characteristics of successful social norms, which provide an implication of how evolution has shaped our moral judgment.

I also present a recent extension of the theory to consider the effect of observability of interactions in indirect reciprocity. In reality we face public and private situations. In public situations your behavior is observed by others but in private situations you may be unnoticed. In such a case a hypocritical strategy that cooperates with others in public situations but not in private situations could prevail. I show, however, that an honest strategy that cooperates with others irrespective of the situations is evolutionarily stable for a wide parameter region, even if the observability in private situations is low. This unexpected result is explained by strategic reputation building by individuals.

John Rinzel (New York University) - *Friday 15th July, 13:30–14:30*
SMB Winfree Prize: Auditory streaming and the cocktail party problem

When experiencing an ambiguous sensory stimulus (e.g., the faces-vase image), subjects may report random alternations (time scale, seconds) between the possible interpretations. I will describe dynamical models for neuronal populations that compete for dominance through mutual inhibition, influenced by slow adaptation and noise. In highly idealized formulations network units are percept specific without direct representation of stimulus features. Our psychophysical experiments and modeling involve perception of ambiguous auditory stimuli (try the link below). The models incorporate feature specificity, tonotopically organized inputs and receptive fields, so that perceptual selectivity is emergent rather than built-in. Our model addresses the effects of selective attention, distractors and deviants as well as the transient build-up phase of sound source segregation as when entering a cocktail party.

http://auditoryneuroscience.com/topics/streaming-galloping-rhythm-paradigm

LEE SEGEL PRIZES - Coates Road Auditorium

SMB Lee Segel Prize, Best Paper in the Bulletin of Mathematical Biology
Tim Rogers (University of Bath) - *Monday 11th July, 16:10–16:40*
Stochastic pattern formation: the linear noise approximation and beyond

Alan Turing's seminal work on morphogenesis introduced the world to the idea of spontaneous pattern formation, and provided mathematicians with a simple deterministic linear framework to study this phenomenon. In particular, Turing showed us how to predict for which parameters we can expect a pattern to appear, and what its typical length scale will be. It has recently been realised, however, that for systems affected by stochastic fluctuations, patterns can persist well into the regime where Turing predicted there should be none. In this talk I will show how the linear theory can be adapted to analyse these stochastic patterns in the weak-noise, or early-onset regimes. I will also present a stronger methodology based on time-scale separation that allows us to go beyond the linear regime and make predictions about large amplitude patterns.

Co-authors: Tommaso Biancalani, Alan McKane.

SMB Lee Segel Prize, Best Student Paper in the Bulletin of Mathematical Biology
Jake Taylor-King (University of Oxford) - *Monday 11th July, 16:40–17:00*
From Birds to Bacteria: Tractable Approaches to Generalised Velocity Jump Processes

There are various cases of animal movement where behaviour broadly switches between two modes of operation, corresponding to a long distance movement state and a resting or local movement state. In this talk, I will give a mathematical description of this process, adapted from Friedrich *et al.* (2006). The approach allows the specification any running or waiting time distribution along with any angular and speed distributions. The resulting system of partial integro-differential equations are tumultuous and therefore it is necessary to both simplify and derive summary statistics. We derive an expression for the mean squared displacement, which shows good agreement with experimental data from the bacterium *Escherichia coli* and the gull *Larus fuscus*. Finally a large time diffusive approximation is considered via a Cattaneo approximation (Hillen, 2004). This leads to the novel result that the effective diffusion constant is dependent on the mean and variance of the running time distribution but only on the mean of the waiting time distribution. We also consider the Levy regime where the variance of the running distribution tends to infinity. This leads to a fractional diffusion equation for superdiffusive Levy walks and can be solved analytically. Our theory opens up new perspectives both for the systematic derivation of such equations, and for experimental data analysis of intermittent motion. I will also briefly discuss recent developments (by other researchers) within the field of velocity jump processes.

Project collaborators: Rainer Klages, Sergei Fedotov, E. Emiel Van Loon, Gabriel Rosser, S. Jon Chapman, and Robert A. Van Gorder.

SMB Lee Segel Prize, Best Student Paper in the Bulletin of Mathematical Biology
Hayley Warsinske (University of Michigan) - *Monday 11th July, 17:00–17:20*
Using hybrid multi-scale approaches to understand fibroblast dysregulation: a story of increasing complexity

Fibroblasts play a crucial role in the wound healing process; dysregulation can result in pathologic remodeling and disruption of important tissue architecture resulting in fibrosis. Fibrosis is responsible for 40,000 deaths annually in the USA. The disease is driven by excessive fibroblast proliferation and differentiation, and by the death of surrounding epithelial cells. Excessive response to pro-fibrotic mediators (such as TGF-β1) as well as insufficient response to anti-fibrotic mediators (such as one known as PGE2), has been credited with enabling fibroblast dysregulation. We use a systems biology approach that integrates mathematical and computational models with *in vitro* and *in vivo* data over relevant biological scales to identify mechanisms responsible for fibroblast dysregulation. Using a hybrid, multi-scale computational model we study mechanisms involved in fibrosis at the molecular, cellular, and tissue scales. We developed an ordinary differential equation model capturing the signaling mechanisms of fibrotic mediators to assess dysregulation at a single cell level. Achieving homeostasis in our molecular model requires a balance of positive and negative regulatory signals. Understanding fibrotic pathology requires a multi-cellular environment so we created a hybrid multi-scale model that describes fibroblasts and epithelial cell behavior in a virtual co-culture system. With this model we demonstrate that intervention strategies combining potential therapeutics targeting both fibroblast regulation and epithelial cell survival can promote healthy tissue repair better than singular strategies. A multiple component intervention strategy is important at both the molecular and cellular scales and may be essential to protect against disease.

Co-authors: Shanna Ashley, Amanda Wheaton, Kevin Kim, Jennifer Linderman, Beth Moore, Denise Kirschner

REINHART HEINRICH PRIZES - Coates Road Auditorium

ESMTB Reinhart Heinrich prize
Aurélie Carlier (Maastricht University) - *Friday 15th July, 14:40–15:00*
To heal or not to heal? Multiscale modelling of angiogenesis during normal and impaired bone regeneration

Bone is a truly remarkable and interesting tissue. It not only provides the human adult skeleton support and protection for various organs in the body, the collection of 206 bones also stores minerals, produces blood cells and allows movement. Moreover, unlike other adult biological tissues, bone is the only tissue that can heal without the production of scar tissue. Unfortunately, the conditions for spontaneous bone healing are not always present, leading to a delayed union or a non-union in 5 to 10% of all cases (e.g. annually this comes down to over 6 million fractures in the USA alone). In this talk, I will present how computational models can contribute to an improved fundamental understanding of fracture non-unions and establish optimal patient-specific therapeutic strategies. More specifically, we have extended an existing bioregulatory model of fracture healing with an intracellular module of Dll4-Notch signaling in order to capture the ingrowth of new blood vessels through sprouting angiogenesis. Moreover, the influence of oxygen on the behavior of skeletal cells and the fracture healing was also determined. The multiscale computational model was tested against previously published experimental results and an extensive sensitivity analysis was performed on the newly introduced parameters. Finally, the multiscale model was applied to three cases of impaired bone healing, i.e. the occurrence of non-unions in critical size defects, bone graft healing in a compromised host environment and impaired healing of bone fractures in NF-1 patients. In conclusion, the results demonstrate the potential of an integrative *in vivo-in silico* approach to advance the current understanding of bone regeneration as well as design effective treatments for complex orthopaedic conditions.

ESMTB Reinhart Heinrich prize
Juan Carlos López Alfonso (Technische Universität Dresden) - *Friday 15th July, 15:00–15:20*
Modeling and optimization of radiotherapy treatment plans

In spite of the great efforts made over many years in the fight against cancer, improving the treatment, whence the prognosis of this disease remains one of the biggest challenges in medicine nowadays. Technical and methodological advances during the last century have allowed radiation oncologists to achieve local tumor control in a considerable number of patients diagnosed with solid tumors. However, locoregional recurrence and treatment of disseminated tumors remain a formidable problem in many situations. For these reasons, it is necessary to improve currently used diagnosis, planning and therapeutic techniques. In this talk I will present different mathematical models and computer-based procedures developed to assist clinicians in the decision-making process whereby radiotherapy treatment plans are designed and selected. More precisely, a multi-parameter variational problem will be first formulated and numerically solved, whose solutions provide optimal radiation dose distributions satisfying standard clinical and technical requirements. Then, an agent-based model of heterogeneous tumor growth based on specific biological and radiobiological assumptions will be presented, and tumor responses to different homogeneous and heterogeneous radiation dosimetries will be described. Finally, a dose-volume histogram based decision-support system for dosimetric comparison of radiotherapy treatment plans will be introduced. A discussion of the modeling results, and on possible future research directions, makes then the final content of this presentation.

ESMTB Reinhart Heinrich prize
Linus Schumacher (Imperial College London) - *Friday 15th July, 15:20–15:40*
A mathematical exploration of principles of collective cell migration

In collaboration with experimental biologists, we consider how population heterogeneity, microenvironmental signals, and cell-cell interactions facilitate cells to collectively organise and navigate during their migration. To this end, we use computational simulations in combination with *in vivo* imaging under genetic and surgical perturbations. In the neural crest, an important migratory cell population in vertebrate embryo development, we present evidence that only a few cells undergoing chemotaxis can sufficiently guide group migration in a cell-induced, or self-generated, chemoattractant gradient. We further develop and test the hypothesis that cells dynamically adopt leader or follower states based on the presence of a chemoattractant gradient. Our computational work guides the choice of new experiments, aids in their interpretation, and probes hypotheses in ways the experiments cannot.

Monday 11 Jul 13:30

MS-11-PM-01 Challenges in Mathematical Modelling and Simulation of Inflammation - M. Neuss-Radu	Pope C14
Mathematical modelling of the lymph node structure and function	G. Bocharov
Mathematical modelling and simulation of the evolution of atherosclerotic plaques	M. Neuss-Radu
Atherosclerosis as an inflammatory disease: Mathematical modeling and numerical simulations	T. Silva
The role of hypoxia in inflammation	W. Jäger

MS-11-PM-02 Contemporary Approaches in Epidemiological Modeling of Infectious Diseases - F. Agusto	Pope C15
Identifying the Time-dependent Transmission Rate for Influenza	A. Mummert
Modeling the impact of climate variables on malaria transmission	K. Okosun
Modeling Contact Tracing and Targeted Control in Outbreaks	C. Browne
Intermittent Preventive Treatment and Drug Resistant Malaria	O. Prosper

MS-11-PM-03 Dynamics of stochastic molecular systems - R. Perez-Carrasco	Pope C16
The importance of transient and stochastic effects in determining boundaries between regions of gene expression during pattern formation	K. Page
Memory effects in biochemical networks as the natural counterpart of extrinsic noise	P. Sollich
Stochasticity in multistable systems	M. Ibanes
Swarming models with attractive-repulsive effects: a review	J. Carrillo

MS-11-PM-04 Mathematical modeling of cancer radiotherapy - H. Enderling	Pope C17
The influence of the micro-environment on radiotherapy response	D. Grimes
Role of radiation-induced non-targeted effects in radiation protection and therapy	M. Chaplain
The Genomic Adjusted Dose: A Novel Platform to Personalize Radiation Therapy	J. Scott
Models of the response of heterogeneous tumours to radiotherapy: a spatially-resolved model vs. spatially-averaged models	T. Lewin

MS-11-PM-05 Modelling Human Papillomavirus (HPV) infections - S. Alizon	Pope C18
Bridging the Gap in HPV Research: From Biological Mechanism to Population Level Data	M. Ryser
Modelling the ecology and evolution of Human papillomavirus	C. Murall
Understanding the epidemiology and potential effects of HPV multisite infections	R. Meza
A Mathematical Model of Cell Proliferation in Epithelial Tissue Due to Human Papillomavirus Infection	A. Miller

MS-11-PM-06 Multiscale Biology: Applications and Methodology - H. Byrne	Pope C19
Interactions of Cell- and Tissue-Scale Mechanics in Asthmatic Airways	B. Brook
Multiscale Modeling of Angiogenesis	R. Merks
Multiscale modelling of crop systems in the context of climate change and food security	F. Ewert
Multiscale regulation of coronary blood flow	D. Beard

MS-11-PM-07 Networks in Ecology and Evolution - L. Hindersin	ESLC A9
Stem cells: stochastic calculus on networks	N. Komarova
Modelling evolution in structured populations using multiplayer games	M. Broom
Spread of livestock endemic diseases on contact networks	E. Vergu
Multivariate social evolution under limited dispersal	C. Mullon

MS-11-PM-08 Spatial patterning at the single cell level - A. Dawes	ESLC B1
Par and Rho protein localization and regulation of cortical flow	A. Dawes
Chemotactic gradient sensing in fibroblasts: re-evaluation of mechanisms in an ARP-less world	J. Nosbisch
Connecting coarse- and fine-grained volume excluding models of diffusion	C. Yates
Stochastic and deterministic models of protein segregation	M. Sturrock

MS-11-PM-09 Spatial population models with nonlocal terms: recent advances and new challenges - V. Volpert	ESLC B2
Generation of Turing patterns in spatio-temporal prey-predator models with nonlocal interaction	M. Banerjee
Patchy invasion of alien species in nonlocal models of population dynamics	S. Petrovskii
Inside Dynamics of Integrodifference Equations	N. Marculis
Revisiting the Stability of Spatially Heterogeneous Predator–Prey Systems Under Eutrophication	J. Farkas

MS-11-PM-10 Tumor-Immune Dynamics and Virotherapy - A. Eladdadi	Chemistry X1
Oncolytic Potency and Reduced Virus Tumor-specificity in Oncolytic Virotherapy. A Mathematical Modelling Approach	R. Ouifki
Mathematical Model of Tumor-Immune Surveillance	K. Mahasa
Mathematical modelling of viral oncolysis: a PEG-modified adenovirus conjugated with herceptin	A. Jenner
Foreseeable Changes in Lymphocyte Phenotype May Shape Patient Responses to Immunotherapy	S. Hanson

MS-11-PM-11 Understanding brain function: insights from network science - R. O'Dea	Chemistry X2
The Human Connectome in Health and Disease: Organization and Development of Hierarchical Brain Networks	M. Kaiser
The role of networks in seizure generation	M. Goodfellow
A Multiplex view of brain networks	M. Chavez
Structure-function clustering in multiplex brain networks	J. Crofts

CT-11-PM-01 Bacterial populations – Biofilms	ESLC B7
Modelling large-scale structures in bacterial biofilms.	F. Davidson
Modelling the role of planktonic cells in early biofilm development	J. Ward
Travelling Waves in a model of cellulolytic biofilms	H. Eberl
Exploring dormancy in M. tuberculosis using a hybrid discrete-continuum cellular automaton model	R. Bowness
Modelling chemotactic motility of invading species in biofilms	M. Mattei
Modelling dispersal phenomena in multispecies biofilm	L. Frunzo

CT-11-PM-02 Biochemical networks 1	ESLC B8
A Bayesian Approach for estimating hidden variables in ODE based systems biology models	B. Engelhardt
Computationally efficient inference methods for biochemical reaction networks	D. Warne
Designing Dynamical Systems with Data: Spatiotemporal Processes in Glucose Transport	A. Coster
Formal derivation of dynamical coarse-grained models from biochemical reaction systems	W. Abou-Jaoude
Reversing Boolean Gene Regulatory Networks	C. Chaouiya
Molecular finite-size effects in stochastic models of equilibrium chemical systems	C. Cianci

CT-11-PM-03 Cancer 1 & Miscellaneous	ESLC B14
Hematopoietic control and the cancer microenvironment	D. Park
Mathematical study of long-term treatment effects on Chronic Myeloid Leukemia.	A. Besse
The dynamics of plasma cell accumulation in Multiple Myeloma	M. Mohr
Mathematical Model of Epithelial Tissue: linking patterns of cellular division with tissue topology	A. Abdullah
3D Discrete-Continuum Modelling of Microcirculatory Blood Flow	P. Sweeney
Inferring model errors and unmeasured system states from incomplete models: The dynamic elastic net.	M. Kschischo

CT-11-PM-04 Developmental biology 1	ESLC C1
Revealing the dynamics of neural stem cells in the adult hippocampus	F. Ziebell
Statistics, mathematical models and quantitative data as a tool to understand development & regeneration	F. Rost
Is cell migration or proliferation dominant in the formation of linear arrays of oligodendrocytes?	B. Hughes
Lateral Inhibition-Induced Pattern Formation Controlled by the Size and Geometry of the Cell	S. Seirin Lee
Mathematical Modelling of Lymphatic System Development	K. Wong
Modeling the role of synchronized Hes1 oscillations in the developing chick limb skeleton	T. Glimm

CT-11-PM-05 Ecology 1	Pope A1
A hysteresis-like effect for insect control strategies	W. Just
Modelling the Impact and Control of an Infectious Disease in a Plant Nursery with Infected Plant Material Inputs	A. Bate
Asymmetric competition causes multimodal size distributions in spatially structured populations	M. Eichhorn
Density-dependent selection on mate-finding Allee effects	L. Berec
Effects of dispersal and plant genotype on a cyclic herbivore population	C. Cobbold
Facilitation of plant invasions via neutral hybridisation	J. Bouhours

CT-11-PM-06 Epidemiology 1 – Inference	Pope A17
A systematic approach to model selection for epidemic predictions: the relative importance of age and household structure	L. Pellis
Gaussian process approximations of the stochastic SIR model.	E. Buckingham-Jeffery
Parameter estimation in the Chikungunya model using a distribution approach	N. Verdière
The 'Small Data' Problem in Infectious Disease Epidemiology	T. House
Identifiability and Parameter Estimation for Dengue Transmission Model – with Mosquito and Human Population Data in Taiwan	Y.-H. Kao
Connecting models with data: identifiability and parameter estimation of multiple transmission pathways	M. Eisenberg

Tuesday 12 Jul 10:30

MS-12-AM-01 Advances in Mathematical Neuroscience - D. Avitabile	Pope C14
Plasticity in mathematical models of neural network	C. Clopath
Cortical waves in excitatory neuronal networks	G. Faye
Coarse grained analysis of patterned activity in a minimal neural network	K. Wedgwood
Bistable perception with a quasiperiodic forcing	A. Guillamon

MS-12-AM-02 Computational modeling of cell-biomaterial interactions - A. Carlier	Pope C15
High Throughput Materials Discovery with Polymer Microarrays	M. Alexander
Can cells read Braille? Surface topography as a tool to evoke cellular responses	A. Carlier
Computational modelling approaches to correlate biological response with polymer properties for large datasets	A. Hook
Using computational approaches to unravel the mechanical aspects of cell-matrix interactions	T. Heck

MS-12-AM-03 Epidemiology and the Environment - A. Mummert	Pope C16
The Role of the Environment in Infectious Disease Dynamics	A. Brouwer
Disease and disaster: minimising outbreaks of environmentally transmitted diseases after natural disasters	K. Gaythorpe
SIR-Network model: epidemics dynamics in a city & climate variations	S. Boatto
Modeling adaptation in waterborne disease intervention compliance	M. Hayashi

MS-12-AM-04 Heterogeneity, evolution and drug resistance in cancer - J. Clairambault	Pope C17
Non-genetic cancer cell plasticity	A. Pisco
Phenotype-structured models in cancer	C. Pouchol
Mathematical modeling of clonal heterogeneity in acute leukemias	T. Stiehl
Identification of neutral tumor evolution across cancer types	B. Werner

MS-12-AM-05 How to Heal? Models of Injury, Illness, and Treatment - R. Segal	Pope C18
Modeling Cancer-Immune System Dynamics and Treatment	L. de Pillis
Early inflammatory events in solid organ transplantation	J. Day
Mathematical model for antigen stimulation and co-signalling in eliciting an anti-tumour killer T response	C. Zheng
Towards a Personalized Model of Wound Healing	R. Segal

MS-12-AM-06 Mathematical Pharmacology - G. Derks	Pope C19
Receptor rebound in target mediated drug disposition (TMDD) models	G. Derks
Mathematics for New Cancer Treatments	J. Yates
Methods of Model Reduction for Quantitative Systems Pharmacology	T. Snowden
Assimilating cross-sectional genotype data into viral dynamics models to estimate fitness characteristics of HIV-1	W. Huisinga

MS-12-AM-07 Modelling plankton ecosystems: revisiting paradoxes and long standing open questions - A. Morozov	ESLC A9
Pattern formation in niche space: giant trophic cascade in non-linear size-spectrum model explains observed "dome structure" in plankton spectra	A. Rossberg
Propagating pulses of high plankton density - What can excite an excitable system?	M. Bengfort
Effects of noise in the dynamics of complex planktonic systems: matching models and data	D. Valenti
Modelling infochemical interactions in tritrophic plankton dynamics	E. Codling

MS-12-AM-08 Multiscale modelling and experiment in cell and tissue biomechanics - B. Brook	ESLC B1
Smooth Muscle Cell Contraction: Coordinated cell elasticity, adhesion and cytoskeletal remodelling	G. Meininger
Mathematical Modelling of Cellular Response to Chemical and Mechanical Cues, as a Tool to Direct the Design of Tissue-Engineered Peripheral Nerve Repair Conduits	R. Shipley
Biomechanics in a travelling wave analysis of a growing cell population	P. Murray
Mathematical models for tissue engineering: problems in deformable and reactive porous media	S. Waters

MS-12-AM-09 New trends in game-theoretical studies on the evolution of cooperation - T. Sasaki	ESLC B2
Extortion and generosity in repeated games	C. Hilbe
Private information in indirect reciprocity	I. Okada
Alternation of dominant social norms on the evolution of indirect reciprocity	H. Yamamoto
Comparison of different learning processes in indirect reciprocity	S. Uchida

MS-12-AM-10 Spatio-temporal models for cellular processes - M. Neuss-Radu	Chemistry X1
Homogenisation of diffusion on surfaces and applications in cell biology	M. Peter
Effective Models for Spatial Heterogeneous Cellular Processes Including Metabolic Channeling	M. Gahn
Mathematical modelling and simulation of photosynthesis in a plant leaf cell	P. Yonthanthum
Simulation of a two-scale homogenized model for metabolic processes in plant cells	T. Elbinger

MS-12-AM-11 Topics in Biomathematics Education 1 - W. Heuett	Chemistry X2
Biocalculus: Is it better?	C. Diaz Eaton
Exploring Transmission of Infectious Diseases on Networks with NetLogo	W. Just
Mathematics and Medicine: Can their star-crossed love flourish?	F. Adler
Statistics in the Life Sciences: A Common Ground for Math and Biology Students	W. Heuett

CT-12-AM-01 Bacterial populations	ESLC B7
A mathematical model of the human gut microbiota in its environment	S. Labarthe
Mathematical modelling of the population dynamics of Pseudomonas aeruginosa upon the exposure to antibiotics.	C. Spalding
Models of diauxic growth	D. Chu
Next-generation operator in spatially structured gut microbiota	J. Ripoll
Pervasive Selection for Cooperative Cross-feeding in Bacterial Communities	S. Germerodt
The diffusivity of the environment impacts on the fitness of quorum sensing deficient mutants	A. Mund

CT-12-AM-02 Biochemical networks 2	ESLC B8
Time-delayed effects in RNA interference	K. Blyuss
Mathematical Modelling of the Gene Regulatory Network Controlling Glucocorticoid Secretion in Rats	E. Zavala
Control of gene expression via poly(A) tail metabolism during the serum response	G. Thorn
Linear signal transmission in the Epidermal Growth Factor Receptor	D. Oyarzún
New aspects of the core p53-Mdm2 feedback from mathematical perspective	J. Elias
Modelling of the RAF-MEK-ERK pathway in hepatocellular carcinoma cells exposed to sorafenib	A.-S. Giacobbi

CT-12-AM-03 Cancer 2	ESLC B14
Low-grade gliomas: from histological data to the mathematical model	M. Badoual
Modelling Chemotherapy Drug Release from a Novel Polymer Drug Delivery System	L. Curtin
Predicting Glioblastoma Survival Across Chemotherapy Regimens	F. Grady
A Multiscale Analysis of Drug Transport and Response for a Multiphase Tumour Model	J. Collis
Image analysis to capture immune cell infiltration in systems medicine	N. Schaadt
Multiscale modeling of immune cell infiltration in the breast lobular epithelium based on cyclic changes of epithelial cell turnover	J. Lopez Alfonso

CT-12-AM-04 Developmental biology 2	ESLC C1
Modeling inheritance of cell cycle characteristics in mammalian cells	M. Dolbniak
3D geometrical models of liver tissue uncover zonation patterns of different liver cell types within the liver lobule	M.-N. Hernán
Modelling and inference for mRNA localization in Drosophila	J. Harrison
Villification of the Turing reaction-diffusion model	S. Shoffner
The sub cellular and cellular consequences of Wnt signalling in the intestinal crypt	H. Byrne
Nuclear self-organisation in syncytial embryos	C. Dunlop

CT-12-AM-05 Epidemiology 2 – Livestock	Pope A1
A multiscale model of the spread of Bovine Viral Diarrhea Virus (BVDV) in a heterogeneous and dynamic bovine metapopulation	L. Qi
Complex responses to movement-based disease control: when livestock movements help	J. Prentice
Controlling an infection in one host species drives the pathogen to adapt to another host	D. Balaz
Estimation of key parameters of a multiscale model of paratuberculosis regional spread in dairy cattle	G. Beaunée
Spread and control of enzootic cattle diseases: a data-driven multiscale modelling framework to prioritize complex regional strategies	P. Ezanno
Modelling pathogen levels in farmed shellfish before and after depuration	P. McMenemy

CT-12-AM-06 Evolution 1	Pope A17
Evolution in a photosynthetic symbiosis	A. Dean
Evolution of density-dependent wing polyphenism in insects	T. Kamioka
Evolution of floral cue of reward for pollinators	K. Ito
Evolution of interspecific trait-matching mutualism under directional selection in trait space	A. Yamauchi
A random graph model of speciation	F. Bienvenu
A tipping point in parapatric speciation	R. Yamaguchi

Tuesday 12 Jul 13:30

MS-12-PM-01 Analysis of stochastic multi-scale and hybrid models - J. Calvo	Pope C14
A hybrid agent-based model for bacterial chemotaxis - from signaling to pattern formation	F. Matthäus
A multi-scale hybrid model of endothelial cell polarisation and migration in response to blood flow	M. Bernabeu
Stochastic Effects and Numerical Artefacts in Hybrid Models in Biology	T. Plesa
Stochastic chemical systems with abundant species: spatial and non-spatial model reduction.	S. Smith

MS-12-PM-02 Barrett's Esophagus: biology, etiology, and cancer risk - K. Curtius	Pope C15
Bayesian inference of Barrett's esophagus tissue age using a molecular clock	K. Curtius
Functional clonal heterogeneity during esophageal cancer progression	M. Jansen
Characterising the genomic and molecular progression of Barrett's oesophagus and applications to clinical detection strategies	E. Gregson
Measuring and modelling evolutionary clonal dynamics in Barrett's Oesophagus to predict cancer risk	T. Graham

MS-12-PM-03 Biofilms: disinfection and removal - J. Ward	Pope C16
Biofilm Disinfection - Sensitivity, Uncertainty, and Treatments	A. Jarrett
Cell to Cell Signalling in Bioflims	J. Dockery
Effect of mechanical cleaning on biofilms with phenotypic resistance	B. Szomolay
Going with the flow: The effects of fluid dynamics on biofilm colonization.	N. Cogan

MS-12-PM-04 Biological invasions – theory and modelling - S. Petrovskii	Pope C17
Pinned states and traveling waves for the Kirkpatrick-Barton system	J. Miller
Anomalous invasion speeds in highly polymorphic populations	V. Keenan
Genetic and demographic consequences of fast propagation	J. Garnier
Invasion Speeds in Highly Variable Landscapes: Multiple Scales, Homogenization and the Migration of Trees	J. Powell

MS-12-PM-05 Design and Dynamics of Biochemical Networks for Systems & Synthetic Biology - A. Mannan	Pope C18
First passage time approach to modeling timing phenomena in single-cells	A. Singh
Stochastic reaction networks with absolute concentration robustness	G. Enciso
Multicellular feedback control of synthetic bacterial consortia	G. Fiore
Analysis and Design of Gene Regulatory Circuits for Bacterial Metabolism	A. Mannan

MS-12-PM-06 Evolutionary dynamics in cancer cell populations: multiscale modelling, simulation and analysis - T. Lorenzi	Pope C19
Cross-diffusion in structured models of cancer invasion	A. Gerisch
Viral and immune therapies for cancer	R. Eftimie
Population dynamics and therapeutic resistance: mathematical models	A. Lorz
Mathematical modeling of clonal competition and emergence of resistance in acute leukemias	A. Marciniak-Czochra

MS-12-PM-07 Inspiring young generations with Mathematical Biology - A. Occhipinti	ESLC A9
Linear systems for metabolic models	C. Angione
Treating cancer with linear regression	A. Occhipinti
Infectious mathematics in UK schools	J. Gog
Playing with mathematical biology	A. Iuliano

MS-12-PM-08 Mathematical approaches in immunoepidemiology - J. Heffernan	ESLC B1
On immunoepidemiological structures and delays	G. Röst
Determining the roles of innate and adaptive immunity in controlling influenza viral infection	J. McCaw
Modeling the impact of antigenic variation on persistence and infectivity of P. falciparum	L. Childs
Boosting and waning: on the dynamics of immune status	O. Diekmann

MS-12-PM-09 Quantitative and Systems Pharmacology - C. Gadgil	ESLC B2
Application of Quantitative Systems Pharmacology (QSP) in drug discovery and development	P. van der Graaf
QSP providing a quantitative link between target engagement and clinical outcomes	V. Damian
Quantitative Systems Pharmacology (QSP) model for immunogenicity of therapeutic proteins	P. Vicini
A modular view of QSP: Application to a simple model for antipsychotic therapy	C. Gadgil

MS-12-PM-10 The Physics of Plants (A): Microscale modelling of plant growth - M. Ptashnyk	ESLC B7
Multiscale Modelling of Plant Root Growth	R. Dyson
A molecular model of entrainment for the plant circadian clock	J. De Caluwé
Multiscale modeling reveals how gibberellin regulates plant growth under stressed conditions	L. Band
The role of cell shape/geometry in controlling cortical microtubule (CMT) self-organisation on plant cell cortex	B. Chakrabortty

MS-12-PM-11 Within host virus dynamics - H. Dahari	ESLC B8
Analyzing dynamics of Malaria Pathogenesis	F. Graw
Multiscale modeling of hepatitis B virus kinetics in humanized chimeric mice during treatment with lamivudine and/or pegylated interferon-alpha-2a	L. Canini
Intracellular modelling of Hepatitis C Viral Infection	E. Herrmann
Modeling Ebola Virus Dynamics: Implications for Therapy	S. Iwami

CT-12-PM-01 Biochemical networks 3	ESLC B13
Species elimination and derivation of kinetic rates for chemical reaction networks	E. Tonello
Diffusion Driven Oscillations in Gene Regulatory Networks	C. Macnamara
Dynamic robust adaptive control of maximal specific flux in microbes	B. Planqué
Mathematical modelling of oxidative stress for risk assessment in toxicity	A. Middleton
Mathematical models of glycoprotein production within cell culture	A. Lambert
Polarity activation by a polarity inhibitor	A. Csikasz-Nagy

CT-12-PM-02 Cancer 3 – Carcinogenesis	ESLC B14
Cancer risk: evolution, ecology and bad luck	R. Noble
Mathematical modelling indicates that cancer genome sequencing reveals only the earliest events in cancer development	M. Williams
Prisoner's Dilemma in Cancer	J. West
Should tissue structure suppress or amplify selection in cancer mutations?	L. Hindersin
Simulation of patient-specific gastric stem cell population dynamics during gastric carcinogenesis.	R. Walker
Using multicellular modelling and simulation to identify mechanisms for changes in cell behaviour in early stages of colorectal cancer.	J. Osborne

CT-12-PM-03 Ecology 2	ESLC C1
In silico substrate dependence increases community productivity, threatens biodiversity	A. Daly
Territorial pattern formation from aggressive direct interactions	J. Potts
Numerical bifurcation of nonlinear delay models: the pseudospectral discretization approach	F. Scarabel
The Sudden Collapse of Honey Bee Colonies	R. Booton
Travelling wave solution and dynamic regimes of nonlinear age-structured predator-prey model of di-trophic food web modules	V. Akimenko
Dynamics of CRISPR/Cas-based gene drives for population replacement	M. Vella

CT-12-PM-04 Epidemiology 3 – Malaria	Pope A1
The dilution effect in ecological epidemiology	M. Roberts
Sterilization does not always harm: reproduction-survival trade-off and dynamics of infectious diseases	E. Vodrážková
Modelling the effect of temperature on the seasonal population dynamics of temperate mosquitoes	D. Ewing
Hysteresis and Chaos in a class of unforced ordinary differential Malaria Models with vector demography	M. Teboh-Ewungkem
The Transmission Dynamics of a Within-and Between-Hosts Malaria Model	F. Agusto
Modelling WIld and Introduced Wolbachia Strains in an Insect Population	P. Johnston

CT-12-PM-05 Evolution 2	Pope A17
Fixation probabilities in the Moran model with selection via duality	S. Hummel
A model of trait evolution with assortative mating.	R. Wieczorek
Haplotype block dynamics for hybrid populations	T. Janzen
An extension of the classification of evolutionarily singular strategies in Adaptive dynamics	B. Boldin
Hosts end up destabilizing horizontally transmitted mutualism by resampling new symbionts after discrimination	Y. Uchiumi
Lack of ecological context can create the illusion of social success in Dictyostelium discoideum	R. Martinez-Garcia

CT-12-PM-06 Immunology	Pope C1
Deciphering the Counterplay of Aspergillus fumigatus Infection and Host Inflammation by Evolutionary Games on Graphs	S. Timme
Modeling the Development of the Hair Disorder Alopecia Areata and Incorporating Hair Cycle Dynamics	A. Dobreva
Modeling the dynamics of neonatal immunity	A. Reynaldi
Modeling the host-pathogen interactions of macrophages and Candida albicans using game theory and dynamic optimization	S. Dühring
Understanding host immunity in resistance management and rational design of antibiotic treatment	E. Gjini
When the allergen immunotherapy is effective?	A. Hara

Tuesday 12 Jul 17:30

PS-12-PM-01 Bacteria – Biochemical networks	Pope A13
1. Stochastic modelling of binary switching in bacterial genes and estimation of fitness parameters	R. Howitt
2. Holistic modeling of the biofilm anode and microbial electrochemical cells	A. Marcus
3. Using Biodiversity Measures to Summarize Antibiotic Resistance	S. Chalise
4. Mathematical Modeling of Cyanobacterial Dynamics in a Chemostat	F. El Moustaid
5. Mathematical modelling of sporulation in Bacillus subtilis colonies as free boundary problem	P. Stocker
6. Analysis and design of genetic control circuits for metabolism	D. Oyarzún

PS-12-PM-02 Biochemical networks	Pope A13
7. Robustness of bistable gene regulatory circuits under epigenetic regulation: noise-enabled bifurcations in optimal transition path theory	N. Folguera-Blasco
8. An ensemble Kalman filter approach to estimate parameters of biochemical networks	M. Apri
9. Hopf bifurcation in spatially homogeneous and inhomogeneous autocatalysis models	G. Guo
10.	.
11. Mathematical modelling of threading of cellulose	M. Andersen
12. Overload breakdown in models of photosynthesis	A. Rendall

PS-12-PM-03 Biochemical networks	Pope A13
13. Identification of Potential Genes via unconventional method in Microarray Gene Expression	S. Nazimuddin Fazal
14. Multistationarity in chemical reaction networks might be governed by regulation	G. Neumann
15. A Bayesian Approach for estimating hidden variables in ODE based systems biology models	B. Engelhardt
16. Flux Balance Analysis of human platelet energetic metabolism	T. Shepelyuk
17. Oscillations for non monotonic negative feedback genes networks	J.-L. Gouzé
18. Suppression of gene-expression noise by negative feedback in burst frequency and burst size	P. Bokes

PS-12-PM-04 Biochemical networks – Biological movement – Cancer	Pope A13
19. Stochastic modelling of the interaction between protein and decoy binding sites on the DNA	M. Hojčka
20. Wanted: The Best Models For Systems Biology	E. Voit
21. Property conservation between continuous and discrete models	R. Schwieger
22. Acoustic gaze control for obstacle-avoidance navigation by an autonomous vehicle inspired by a bat bio-sonar	Y. Yamada
23. Dynamics of an active undulation of centipede locomotion	Y. Hayase
24. Analysis of primary tumour growth and metastasis formation of human small cell lung cancer cells xenografted into immunodeficient mice using computer simulation	B. Hoffmann

PS-12-PM-05 Cancer	Pope A13
25. Development of multidrug resistance phenotypes in cancer cells and its mathematical modelling considering the processes of selection, induction and transfer	A. Álvarez-Arenas Alcamí
26. Mathematical and experimental analysis of fate after “cell competition”	S. Nishikawa
27. Mechanistic response of immunotherapy	E. Simbawa
28. Is cell competition relevant in acquiring chemotherapy resistance?	M. Bodzioch
29. Tumour growth and drug resistance: an evolutionary view with perspectives in therapeutics	J. Clairambault
30. A mathematical model for the alignment of Cancer-Associated Fibroblasts at the Tumour Margin	E. Wershof

PS-12-PM-06 Cancer	Pope A13
31. Modeling the Dynamics of High-Grade Serous Ovarian Cancer Progression for Transvaginal Ultrasound-Based Screening and Early Detection	D.-A. Botesteanu
32. Validation of an Anisotropic Diffusion Model for Glioma Spread	A. Swan
33. The Role of Aneuploidy in Colon Cancer	A. Araujo
34. Multiscale model of cancer invasion and extracellular matrix interaction	A. Ponce Bobadilla
35. An ecological resilience perspective on tumor growth and treatment	A. Fassoni
36. Understanding Platinum Sensitivity in Metastatic Ovarian Cancer: The key roles of stroma and metabolism	C. Daniels

PS-12-PM-07 Cancer – Cell biology	Pope A13
37. Computational analysis of tumor oxygenation in vascularized tumors with applications to breast cancer	T. Fredrich
38. A Mathematical Model of Planar Cell Polarity	M. Akiyama
39. Estimation of the lag time for fibril elongation	S. Schnell
40. Modelling the spatio-temporal dynamics of extracellular microRNAs	A. Grau Ribes
41. BLEBBING: reversing the effects of ageing	T. Woolley
42. Interplay Between Intracellular Ca2+ Oscillations and Ca2+-stimulated Mitochondrial Metabolism	B. Wacquier

PS-12-PM-08 Cell biology	Pope A13
43. Characterising stochastic calcium oscillations in heterogeneous single cells	A. Tilunaite
44. Complex oscillation patterns in immature inner hair cells	H. Baldemir
45. Calcium Frequency Regulation of Ion Channel Gene Expression	V. Yildirim
46. Analysis of inheritance mechanisms of mammalian cell	M. Dolbniak
47. Anomalous Intra-Cellular Diffusion - A PDE Approach	Á. Mateos González
48. Quantifying cell dynamics with labeled populations	M. Gabel

PS-12-PM-09 Cell biology – Developmental biology	Pope A14
49. Mathematical Modeling of Stem Cell Dynamics in Fish	D.-P. Danciu
50. A dynamic model of protein translation	J.-H. Trösemeier
51. Mathematical model of hematopoietic system with myeloid-restricted progenitors with long-term repopulating activity	S. Iwanami
52. Delayed stochastic simulation modeling of stalled transcription in prokaryotes	S. Sharma
53. Modelling the polarization, migration, and neuromast deposition in the zebrafish posterior lateral line system	C. Zmurchok
54. Modelling the postnatal dermal maturation process during skin development	A. Pisco

PS-12-PM-10 Ecology	Pope A14
55. A controlled mathematical model for population dynamics in infested honeybees colonies	C. Jerry
56. Exploring vector-borne infection ecology in multi-host communities: a case study of West Nile virus	G. Marini
57. Growth Dynamics for Pomacea maculata	L. Zhao
58. Multiplicity of coexistence equilibria in a 2-parasitoids 1-host model	F. Pfab
59. Optimal placement of watercraft inspection stations	S. Fischer
60. Self-sustained phase asynchrony in trophic metacommunities	F. Guichard

PS-12-PM-11 Ecology – Education	Pope A14
61. Inside Dynamics of Integrodifference Equations	N. Marculis
62. Spores, salmon and streams: A modelling approach for salmonid Ceratomyxosis in the Klamath River System	V. Schakau
63. Patterns of Self-organization in Argentine Ants	M. Vela-Pérez
64. Theoretical study of cryptic and mimic chemical strategies in parasites of ant	S. Satoi
65. Anomalous invasion speeds in highly polymorphic populations	V. Keenan
66. Design and development of new products: a crash in biomathematics	J. Pires

PS-12-PM-12 Epidemiology	Pope A14
67. Using a household model of Yaws infection to analyse data and inform control strategies	L. Dyson
68. Modelling the Increasing Burden of HCV in Pakistan: The Crucial Need to Act!	A. Lim
69. Optimal Vaccination Strategies and Rational Behaviour in Seasonal Epidemics	P. Doutor
70. Stochastic epidemic SIRS models: properties and global stability	M. Ferrante
71. Human African Trypanosomiasis (Sleeping Sickness) Transmission and Domestic Animals	M. Burke
72. Modelling human gastrointestinal illness	E. Buckingham-Jeffery

PS-12-PM-13 Epidemiology	Pope A14
73. Information Content of Household-Stratified Epidemics	T. Kinyanjui
74. The influence of prevention among homeless people on decrease of incidence of tuberculosis in general population.	M. Bodzioch
75. A Model of Dengue Hemorrhagic Fever Incidences in Semarang City, West Java, Indonesia	E. Soewono
76. Optimal control for a vector-borne infection with immigration of infective: Malaria in Nigeria as a case study	E. Iyare
77. Spreading of healthy mood in adolescent social networks	E. Hill
78. Branching process approach for epidemics in a dynamic partnership network	A. Lashari

PS-12-PM-14 Evolution	Pope A14
79. Evolution of juvenile and post-reproductive mortality: a frequency-dependent model	S. Giaimo
80. The evolution of sheep immunity in response to nematode infection	C. Orlendo
81. Coalescent trees: infering genealogical models and mutation rate	A. Siri-Jégousse
82. Evolutionary optimal fragmentation modes in populations composed of unstructured groups	Y. Pichugin
83. Fixation probability in a haploid-diploid population	K. Bessho
84. Host-parasite coevolution with multiple types	H. Schenk

PS-12-PM-15 Evolution – Imaging – Plants – Methodology	Pope A14
85. Protected polymorphisms and evolutionary stability of patch-selection strategies in stochastic environments	A. Hening
86. The reason of sexual reproduction	M. Douge
87. Virulence management: the evolution of virulence in two models with recovery	R. Fan
88. Automated identification of Congolese wood species	J. Baetens
89. On mathematical substantiation of agent-based models	V. Perminov
90. A Bayesian approach to parameter identification: Application to mathematical biology	E. Campillo-Funollet

PS-12-PM-16 Methodology – Misc – Multiscale	Pope A14
91. Numerical methods for random ordinary differential equations and their applications in biology	Y. Asai
92. Stochastic Partial Functional Differential Equations with Delay	P. Pang
93. Rectification of Shot Noise Analysis for Nonlinear Photoreceptor Models	Z. Song
94. Effect of phase lag phenomena on thermal treatment modalities within living biological tissues	P. Kumar
95. How mathematical modeling of biological processes can serve the development of high performance IVD systems?	L. Drazek
96. 3D Discrete-Continuum Modelling of Microcirculatory Blood Flow	P. Sweeney

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MS-13-AM-01 Asymptotic behaviour and inverse problem for discrete and continuous population dynamics - M. Doumic	Pope C14
Modelling and Inverse problems for protein oligomer dynamics	A. Armiento
Modelling amyloid protein self-assembly	W.-F. Xue
Fixation in large populations: a continuous view of a discrete problem	M. Souza
Exact solutions and higher order asymptotics for a cell division equation	B. van Brunt

MS-13-AM-02 Cell-based models of tumor ecology and evolution - A. Voss-Böhme	Pope C15
The consequences of phenotypic plasticity on tumor growth and dissemination	A. Voss-Böhme
Model-based evaluation of spontaneous tumor regression in pilocytic astrocytoma	T. Buder
The role of cell-decision making on tumor development	H. Hatzikirou
Mathematical challenges in tumour clonal evolution: from single cell phylogenies to fitness landscapes?	J. Kuipers

MS-13-AM-03 Mathematical Biology and Robotics - S. Seirin Lee	Pope C16
Biology and the Control of Soft Robots	B. Trimmer
Synthetic approach to understand adaptive social behavior in insect	H. Aonuma
What are bats really thinking? Learning future engineering from bat echolocation	S. Hiryu
Towards the Construction of Dialogical Control	R. Kobayashi

MS-13-AM-04 Mathematical modeling of biological movement: from nonlinear dynamics to spatial patterns - A. Shaw	Pope C17
Modelling collective cell motion	P. Maini
Condition-dependent vector movement drives the spread of plant pathogens	A. Shaw
Towards a general theory for modelling animal movement patterns in ecology	M. Lewis
Analyzing in situ cellular motion in experimental animal glioma models.	S. Massey

MS-13-AM-05 Modeling Spatiotemporal Calcium Dynamics - H. Berry	Pope C18
Control of Ca2+ influx and calmodulin activation by SK-channels in dendritic spines	K. Tsaneva-Atanasova
Identifying feedbacks from the noise	M. Falcke
How does the Shigella bacterium usurp Ca2+ signaling in host cells? A combined experimental and modeling approach	G. Dupont
Studying Ca2+ dynamics and vesicular release in small presynaptic boutons	Y. Timofeeva

MS-13-AM-06 Modelling socio-economic aspects of resource management - Y. Iwasa	Pope C19
Social sciences and ecology combined for natural resource management	Y. Iwasa
Cooperation in coupled natural-human systems: its emergence and importance	J. Watson
Games of corruption in preventing the overuse of common pool resources	J. Lee
Control of invasive Spartina in San Francisco Bay: Multiple objectives and bioeconomics	A. Hastings

MS-13-AM-07 Perceptual and Cognitive Dynamics - J. Rankin	ESLC A9
Neural dynamics of perceptual decision making	K. Wong-Lin
Hierarchical and modular nature of multistable perception	M. Mattia
Is the neurometric build-up function the appropriate tool to study auditory perception?	R. Curtu
Predictive coding model: perceptual inference implemented through neural dynamics	R. Bogacz

MS-13-AM-08 Recent Developments in Immuno-Epidemiological Modeling - M. Martcheva	ESLC B1
Extending nested models of epidemic dynamics and host immune response	A. Pugliese
Competitive exclusion in a multi-strain immuno-epidemiological flu model with environment transmission	X.-Z. Li
Modeling the Evolution and Ecology of Heterogeneous Viral Strategies in Virus-Microbe Systems	H. Gulbudak
On the principle for host evolution in host-pathogen interactions	M. Martcheva

MS-13-AM-09 Stochastic modelling of biological systems - C. Cianci	ESLC B2
Stochastic spatial modelling of cellular position determination	C. Beentjes
Effects of bursting noise in gene regulatory networks	Y. Lin
Stochastic thermodynamics of biological processes	A. Woller
Tune the topology to create or destroy patterns	T. Carletti

MS-13-AM-10 The Physics of Plants (B). Organisms and systems - L. Dupuy	Chemistry X1
Development of a discrete element method to estimate the Force distributions probed by a growing root in a granular soil	M. Fakih
Modeling the driving of the active tropic motion of aerial plant organs	M. Bruno
Root growth inside a pore	E. Kolb
Curved and Twisted Biological Forms	W. Silk

MS-13-AM-11 The role of mathematical modelling in tackling antimicrobial resistance - S. Jabbari	Chemistry X2
Do bacteria use quorum sensing to fight viruses? Prospects of phage therapy as an alternative to antibiotics	J. Pérez-Velázquez
Models of zinc resistance in the laboratory and spread of antibiotic resistance in slurry tanks	D. Stekel
Modelling the effect of antibiotic use on the stability of drug resistance	R. Peña-Miller
Resistance is futile: Predictive modelling of a novel anti-adhesion bacterial therapy	P. Roberts

CT-13-AM-01 Cancer 4 & Miscellaneous	ESLC B7
Mathematical modeling of angiogenic tumor growth and treatment	A. Kolobov
Quasi-Stable evolutions in a computational multicellular system: The non mutational origin of cancer and aging	Y. Lou
Exploiting Tumour-Stroma Dynamics to Limit Drug Resistance in Molecularly Targeted Tumours	N. Picco
Inferring Routes to Resistance: A neural network approach to uncovering altered signaling networks in cancer	E. Kim
Modelling micro-vascular transport in tumours using intra-vital imaging data	J. Grogan
Dynamic networks and network dynamics	J. Pitchford

CT-13-AM-02 Ecology 3 – Epidemiology 4	ESLC B8
Effects of herbivory and nutrient recycling on plant community structure and dynamics	T. Namba
Riding the Tiger, a bioeconomic model of disease induced booms and busts in the Asian shrimp market	A. Kleczkowski
Scaling-up pest foraging behaviours to the agricultural landscape—a reaction-advection-diffusion model applied to crop protection.	Y. Bourhis
Infectious disease modelling and public health policy. Is a vaccine against neonatal GBS disease cost-effective?	K. Giorgakoudi
Mathematical Model for “Vertical Transmission” of Obesity	K. Ejima
Understanding the impact of climate change on tick-borne infections	A. Worton

CT-13-AM-03 Evolution 3	ESLC B14
Evolution of longevity, age at last birth and sexual conflict with grandmothering	M. Chan
On evolutionary branching in spatial models	K. Parvinen
On the coevolution of local adaptation and patch-type dependent immigration	H. Weigang
Population genetic PDE models of dispersal and spatially varying selection	R. Buerger
Reconstructing LGT Networks: Phylogenetic networks capturing the asymmetry of lateral gene transfers	J. Pons Mayol
Social evolution in finite structured populations: a model-independent formula for Hamilton’s R and Tarnita’s σ.	F. Débarre

CT-13-AM-04 Fluids 1 & Miscellaneous	ESLC C1
The impact of spatial heterogeneity on the distribution of airway liquid	F. Xu
Filament Based Lamellipodium Model (FBLM) modeling and numerical simulations	N. Sfakianakis
No flows in vein: blood flow in tunicate tubular hearts	N. Battista
Finite element methodology for the coupled numerical modelling of the aortic valve’s dynamics and the hemodynamics in the full aorta	A. Laadhari
Dynamical regimes of blood platelets’ adhesion to surfaces under shear flow	A. Belyaev
Insect flight with bristled wings	L. Miller

CT-13-AM-05 Multiscale	Pope A1
Multiscale Modelling in Vascular Disease	A. Hoekstra
Mathematical modelling of intervertebral discs	S. Franks
Inter-subject variability in cardiac electrophysiology: Insights from combined experiments and simulations	B. Rodriguez
Multiscale modeling of diffusion in a crowded environment.	L. Meinecke
Efficient implementation of the Immersed Boundary Method for simulating epithelial dynamics	F. Cooper
Stochastic gene expression in growing cell populations	P. Thomas

CT-13-AM-06 Neuroscience 1 – networks	Pope A17
Finite size effects and rare events in balanced cortical networks with plastic synapses	J. Dunworth
Localised Travelling Waves in a Network of Integrate-and-Fire Neurons	J. Davis
A novel method for computing response functions on complex neuronal networks with branching dendrites	Y. Lu
Dendritic mosaic formation and the influence of balance	N. Iannella
Collocation Methods for Solving Two-Dimensional Neural Field Models on Complex Triangulated Domains	R. Martin
Next generation neural mass modelling	A. Byrne

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MS-14-AM-01 Bacterial quorum sensing and mathematical modelling - J. Pérez-Velázquez	Pope C14
Quorum sensing: From microbial genetics to sociology	M. Schuster
An experimental test of signalling theory using bacteria	S. Diggle
Spatial modelling of bacterial systems with Quorum sensing	C. Kuttler
Using mathematical modelling to understand how the gut can prevent C. difficile from reaching “quorum-sensing” active levels	S. Jabbari

MS-14-AM-02 Cancer modelling: discreteness and heterogeneity - G. Ascolani	Pope C15
Analyzing emergent behaviour in cellular automaton models of cancer invasion	A. Deutsch
Two theoretical modelling approaches for hybrid descriptions of tumour growth and metastases	A. Colombi
Mutations and migration in tumor progression	G. Ascolani
Mathematical modelling of nuclear topological changes in cancer	P. Liò

MS-14-AM-03 Ecological Pattern Formation - J. Sherratt	Pope C16
Resilience of banded vegetation on slopes	E. Siero
Gradual Regime Shifts in the Fairy Circles of Namibia	Y. Zelnik
Monitoring of patchy population distributions: Is their dynamics always what it seems?	N. Petrovskaya
Revealing new patterns in spatial population models with cyclic competition	M. Adamson

MS-14-AM-04 Mathematical and Systems Immunology - M. Ferrarini	Pope C17
Using branching processes to model differentiation of effector and memory CD8+ T cells	A. Pandit
How many T cell receptor clonotypes does a body maintain?	G. Lythe
Information processing of time-integrated TCR-mediated signals during thymic selection	S. Khailaie
What are the rules of T cell fate in humans in vivo?	P. Costa del Amo

MS-14-AM-05 Mathematical Modeling of Infectious Disease Control - J. Belair	Pope C18
Resource limitations in the control of vector-borne diseases	J. Belair
Treatment, Screening and Vaccination: HPV considerations	J. Heffernan
Spatial aspects in vaccination	J. Arino
The evolutionary ecology of antimicrobial de-escalation	X. Huo

MS-14-AM-06 Mathematical Oncology: Impacting the Clinic - A. Anderson	Pope C19
Dynamics of oncolytic virus spread within tumors	D. Dingli
Proliferation saturation index predicts OPX GTV reduction to prospectively identify patients for adaptive radiotherapy	H. Enderling
Phase I trials in melanoma: A framework to translate preclinical findings to the clinic	E. Kim
Protracted metronomic therapies to target low-grade gliomas malignant transformation	A. Martínez-González

MS-14-AM-07 Operators in Biology - G. Webb	ESLC A9
Reaction-diffusion operators in biological applications	V. Volpert
Convection and linear determinacy	E. Crooks
Dynamical processes on networks and their asymptotics	J. Banasiak
A mathematical model of CT scans for lung cancer diagnosis	G. Webb

MS-14-AM-08 Recent advances in mathematical modelling of gene regulatory circuits - K. Blyuss	ESLC B1
Analytical approximations for spatial stochastic gene expression in single cells and tissues	R. Grima
Interplay of stochasticity and intelligence in synthetic genetic networks	A. Zaikin
Multi-stable dynamics of non-adiabatic genetic Repressilator	E. Volkov
The role of time delays in cell differentiation	Y. Kyrychko

MS-14-AM-09 Slow-fast Dynamics in Neuroscience - S. Fernández-García	ESLC B2
Canards, folded singularities and bursting dynamics	M. Desroches
Canard Mediated (De)Synchronization in Coupled Phantom Bursters	E. Köksal Ersöz
Spike-adding canard explosions in a minimal piecewise-linear Hindmarsh-Rose square-wave burster	S. Fernández-García
Multiple scales in spatially-extended neural networks	D. Avitabile

MS-14-AM-10 Spatially explicit modelling in biology - J. Baetens	Chemistry X1
Stochasticity and mobility affect the self-organization of competing species and their associations	T. Reichenbach
Molecular systems biology – models and insights. Modelling molecular systems using an agent-based supercomputing platform	M. Holcombe
Cellular automata for transmission of vector borne diseases	S. El Yacoubi
Cell surface mechanics: from cells to robots	A. Marée

MS-14-AM-11 Topics in Biomathematics Education 2 - W. Heuett	Chemistry X2
Integrating Bioinformatics into a High-School Science Curriculum: Using Jmol to Enhance Comprehension of Protein Structure and Function	A. Yarden
Citizen Science as a Transformative Agent in Mathematical Biology Education	J. Jungck
Weaving together biology and mathematics for pharmacokinetics education	J. Koenig
Yeast and the Struggle for Existence: A Laboratory Experience in Mathematical Biology	M. Lewis

CT-14-AM-01 Bacterial populations - Cell division - Miscellaneous	ESLC B7
Optimising Antibiotic Usage to Treat Bacterial Infections in the Presence of Resistant Bacteria	I. Paterson
Diverse drug-resistant tuberculosis survives for long periods in continuous culture	D. Ayabina
Optimal Control of the Treatment of Chlamydia trachomatis Within-host	M. Akinlotan
Cell Division and the Mechanical Tissue Environment	A. Nestor-Bergmann
Solutions to a Bessel type pantograph equation arising in a cell growth model	A. Zaidi
Resolving clusters in microscopy images using template rotation expectation maximization	C.-M. Svensson

CT-14-AM-02 Cancer 5 – Invasion	ESLC B8
Novel multiscale computational modelling and analysis for cancer invasion: exploring the role of adhesion and matrix-degrading enzymes in tumour progression	D. Trucu
On a degenerate haptotaxis model for cancer cell invasion	A. Zhigun
A 3D cell-based model of ECM invasion facilitated by filopodia, ECM degradation, and cell deformation	M. Palm
Modelling interactions involved in breast cancer cell invasion using a 3D individual-cell-based model	H. Knutsdottir
Investigating the environment dependent invasive response to mechanistic cellular interactions in computational models of organotypic and spheroid assays	R. Jenkins
On a go-or-grow multiscale model for tumor invasion with therapy	C. Stinner

CT-14-AM-03 Epidemiology 5 – Sexually Transmitted Diseases & others	ESLC B14
Modelling the impact of a national scale-up of interventions on hepatitis C virus transmission among people who inject drugs in Scotland.	H. Fraser
Impact of Information on Infectious Diseases when Treatment is available	A. Yadav
Impacts of disease avoidance for populations affected by sexually transmitted diseases	M. Theuer
Adding education to “test and treat”: can we overcome drug resistance?	M. Al-arydah
Evaluating feasible and ethical allocation strategies for Treatment as Prevention resources using mathematical optimization	D. Gerberry
Optimal allocation of female sex workers HIV prevention interventions across different Avahan settings: using mathematical modelling to balance size and HIV prevalence	J. Panovska-Griffiths

CT-14-AM-04 Evolution 4	ESLC C1
Strength in numbers: demographic noise can reverse the direction of selection	G. Constable
The evolution of host defence against parasites and predators	J. Toor
The evolution of relative assessment in status dependent strategies	Y. Tachiki
The evolution of the interplay of peer and pool punishment	T. Sasaki
The Structure of the Genotype-Phenotype Map Prevents Evolutionary Loss of Bet-Hedging — Implications for Therapy	D. Nichol
Understanding the formation of ring species from a population based model	V. Miró Pina

CT-14-AM-05 Neuroscience 2	Pope A1
Stochastic modelling of neuronal calcium channel flickering and spatial distribution of vesicles in a central glutamatergic synapse	J. Lind
Analytical strategies for the nonlinear estimation of conductances	C. Vich
Neural responses to stimulus pairs as probability mixtures of responses to single stimuli	S. Ditlevsen
Neuronal response latency in the presence of spontaneous activity	M. Levakova
Dynamics of auditory perception: source segregation, perturbations and bistability	J. Rankin
Empirically Constrained Network Models for Contrast-dependent Modulation of Gamma Rhythm in V1	M. Zachariou

CT-14-AM-06 Physiology 1 – Hormones	Pope A17
Modelling the effects of the cholesterol-rich food intake on the hypothalamic-pituitary-adrenal (HPA) axis dynamics	A. Stanojevic
Mathematical assessment of the effect of diabetic deficiencies on ultradian regulation of glucose	B. Huard
An integrated model of the response of the inflammatory-endocrine system exposed to endotoxin	J. Ottesen
A Delay Differential Equation Model of Follicle Waves in Women	J. Selgrade
Follicular maturation in cows: mathematical models and data	A. Lange
A K(ATP) Channel Independent Bursting Mechanism for SUR1-/- Pancreatic Beta-Cells	V. Yildirim

CT-14-AM-07 Plants 1	Pope C1
How geometry of the leaf venation network influences sugar loading and export	H. Rademaker
Interplay between stress, fibre deposition, and reorientation in plant cell growth	J. Chakraborty
Multiscale modelling and analysis of plant cell wall and tissue biomechanics	M. Ptashnyk
Organization of vascular pattern in plant roots	N. Mellor
The Explosive Seed Dispersal of C. hirsuta	D. Moulton
A two scale mathematical model for simulating plant growth and crop development.	J. Dodd

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MS-14-PM-01 From Images to Models: The role of image data in systems biology - C.-M. Svensson	Pope C14
Three-dimensional quantitative analysis of multicellular spheroids at the cellular level	S. Fischer
Cell tracking, morphogenetic strain rates & Myosin fluorescence quantification - towards epithelial mechanical inference in vivo	G. Blanchard
Image based modelling of problems in cell motility	T. Bretschneider
Multiscale modeling of liver regeneration	S. Hoehme

MS-14-PM-02 Logical modelling of cellular networks - D. Thieffry	Pope C15
Identification of logical models for signaling pathways: towards a systems biology loop	A. Siegel
On the number and structure of Boolean functions compatible with a regulatory network topology	P. Monteiro
Logical model revision using model checking	P. Traynard
Phenotypes of perturbed Boolean networks	H. Klarner

MS-14-PM-03 Long-living transients in ecology - A. Hastings	Pope C16
Delay induced long-living transients as an alternative mechanism of ecological regime shifts	A. Morozov
Bifurcations, extinctions and long-living transients in the dynamics of ocean plankton-oxygen system as a response to the global climate change	Y. Sekerci
A dynamical systems framework for exploring resilience	M. Zeeman
Human population dynamics: the importance of transients for future population predictions	C. Dooley

MS-14-PM-04 Mathematical models for the growth and regression of atherosclerotic plaque - M. Myerscough	Pope C17
Development of Patient-Specific Multi-Scale Models to Understand Atherogenesis: Comparison with In Vivo Data	V. Diaz-Zuccarini
A Biochemical and Mechanical Model of Injury-Induced Intima Thickening	P.-W. Fok
A model for smooth muscle cell migration and collagen cap formation in atherosclerotic plaques	M. Myerscough
A 3D fluid-structure interaction model for blood flow in an atherosclerotic artery	N. El Khatib

MS-14-PM-05 Modelling and analysis of collective cell behaviour in development - A. Fletcher	Pope C18
Towards a model of growth and patterning in the vertebrate neural tube	P. Guerrero
Emergence of oligarchy in collective cell migration	L. Schumacher
Combining cell-based tissue simulations and quantitative experimental data to study conditions for biased epithelial growth	A. Stopka
Mechanical Regulation of Tissue Growth and Shape Formation	M. Tozluoglu

MS-14-PM-06 Numerical methods for surface PDE problems in biology - C. Venkataraman	Pope C19
An invariant region-preserving method for reaction-diffusion systems on surfaces	M. Frittelli
Cell tracking optimal control model with efficient computational algorithms	F. Yang
Emergence of interface instabilities in a mechanical model of tumour growth	T. Lorenzi
Cross-diffusion-induced patterns on evolving surfaces	R. Barreira

MS-14-PM-07 Recent perspectives on mathematical epidemiology - R. Smith?	ESLC A9
The viral spread of a zombie media story	R. Smith?
Leading indicators of mosquito-borne disease elimination	S. O'Regan
Seasonality of RSV and bronchiolitis in the different climatic regions of Western Australia	A. Hogan
Incorporating real-world heterogeneity and complexity into stochastic epidemic models, and capturing the expected time course	R. Wilkinson

MS-14-PM-08 Stochasticity in collective behaviour of cells - F. Woodhouse	ESLC B1
Exact calculations of reduced diffusivity for a stochastic random walk through a crowded, heterogeneous environment	M. Simpson
Stochastic fate choices of stem cells during tissue morphogenesis	E. Hannezo
Controlling directional fluctuations in collective bacterial swimming	J. Dunkel
Stochastic cycle selection in fluctuating active networks	F. Woodhouse

MS-14-PM-09 The games that cancer cells play - D. Basanta	ESLC B2
Evolutionary dynamics of acid and VEGF production in tumors	A. Kaznatcheev
The bone metastatic prostate cancer ecosystem	D. Basanta
Modeling the Spatiotemporal Evolution of Immune Escape Strategies Using Evolutionary Game Theory	A. Anderson
Evolutionary stable strategies in phosphate-dependent tumor growth: Modeling the Growth Rate Hypothesis	J. Nagy

MS-14-PM-10 The interplay of chromatin conformation and function - A. Karolak	Chemistry X1
Atomistic molecular dynamics of mononucleosomes as a tool for comparative epigenetics	T. Bishop
Multiscale simulations of DNA and nucleosome core particles	A. Lyubartsev
Interplay of nucleosome positioning, covalent modifications and transcription factor binding	V. Teif
Effects of changes of nucleosome positioning and internucleosomal interactions on small and large chromatin chains	G. Wedemann

MS-14-PM-11 Wolbachia dynamics in mosquito species - J. Farkas	Chemistry X2
Models to assess how best to replace dengue virus vectors with Wolbachia-infected mosquito populations	S. Tang
Modelling control of mosquito dengue vectors by supplanting them with Wolbachia-infected populations	R. Cheke
Predicting Wolbachia invasion dynamics in Aedes aegypti in competitive food-limited environments	P. Hancock
Set a thief to catch a thief: can we make use of parasites to control vector-borne diseases?	N. Britton

CT-14-PM-01 Cancer 6 – Invasion, Multiphase, Therapies	ESLC B7
Phase-field tumour growth modelling: Thermodynamic consistency and stable schemes	K. van der Zee
Modeling of stochastic clonal effects in relapses following AML and MM chemotherapy	R. Jaksik
Modelling ATR inhibition dynamics to guide scheduling of novel therapeutics	C. Fornari
Why “one-size-fits-all” therapies modulating blood vessel occlusion can fail to control tumor invasion: insights from a mathematical model	A. Köhn-Luque
Analysis and Numerical Simulations of a Two Dimensional Two-Phase Model of Avascular Tumour Growth based on Moving Frame Steady States	A. Genovese de Oliveira
A Mathematical Model and Numerical Simulations for an Epithelial-Mesenchymal-like Transition in Cancer Invasion	N. Kolbe

CT-14-PM-02 Epidemiology 6	ESLC B8
Characterising pandemic impact from data collected during first few hundred studies	A. Black
Timing an epidemic intervention to maximise the probability of epidemic fade-out	J. Ross
Estimating the efficacy of a candidate dengue vaccine	L. Mateus
The impact of the newly licensed dengue vaccine in endemic countries	M. Aguiar
A dynamical model of Middle East respiratory syndrome coronavirus (MERS-CoV) outbreak in the Republic of Korea, 2015	E. Jung
Evaluation of Combined Strategies for Controlling Dengue Fever	A. Lloyd

CT-14-PM-03 Fluids 2 – Active cells	ESLC B14
Stability analysis of an active suspension of rod-like particles in a Couette flow	C. Holloway
The trapping in high-shear regions of slender bacteria undergoing chemotaxis in a channel	R. Bearon
Collective pulsing behavior in xeniid corals: studying the effects of background flow on pulsing kinematics and near-field velocities	J. Samson
Hydrodynamic evolution of sperm swimming	K. Ishimoto
Taylor’s swimming sheet in a fibre-reinforced fluid	G. Cupples
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CT-14-PM-04 Physiology 2	ESLC C1
A Mathematical Model of Lung Airway Growth Mechanics: Application to a Murine Experimental Model of Asthma	M. Hill
Reaction-diffusion waves in the model of blood coagulation	T. Galochkina
Cardiac bidomain conductivities and their effect on defibrillation voltages	B. Johnston
Modelling microtubule disorganisation during neurodegeneration	S. Pearce
Investigating the effects of cognitive stress on the cardiorespiratory synchronization with synchrogram and empirical mode decomposition analysis	M. Angelova
Real cardiovascular problems, resolved by mathematics and realized by knitting in Nottingham	T. Lundh

CT-14-PM-05 Plants 2 & Miscellaneous	Pope A1
Mechanisms of early establishment of bacterial population in the rhizosphere	L. Dupuy
Multiscale mechanical models for multicellular plant tissues	J. Fozard
Stability Analysis of Network Motifs for Arabidopsis Flowering Gene Regulatory Network	E. Haspolat
Mathematical models of the Unfolded Protein Response (UPR) in plant cells.	J. Yu
Long time behavior for some continuous polymerization models	C. Juan
Understanding the mechanism of snakes’ scaffold-based locomotion from the viewpoint of TEGOTAE-based control	T. Kano

CT-14-PM-06 Spatial & Stochastic modelling	Pope A17
Individual-based modelling of chemostats versus biofilms	J.-U. Kreft
Lattice-free three-dimensional fungal growth modelling with environmental interactions	G. Vidal-Diez de Ulzurrun
Spatio-temporal behavior of the Eurasian eagle-owl : An individual-based approach	S. Van Nieuland
Homogenization of a directed dispersal model for animal movement	B. Yurk
Modelling the spread of parasitoid wasps from point release	C. Strickland
Geometric analysis of fast-slow models for stochastic gene expression	F. Veerman

CT-14-PM-07 Virus dynamics	Pope C1
A mechanistic model to explore the effect of ribavirin in Lassa infection	P. Carrillo-Bustamante
Antibody Escape Kinetics of Equine Infectious Anemia Virus Infection	E. Schwartz
Individualized DAA treatment duration for cure via modelling of early HCV kinetics	H. Dahari
Optimal Control for HBV Treatment	J. Forde
The role of antibody during SIV infections in rhesus macaques	S. Ciupe
Quantifying the extent of cell-to-cell transmission for the spread of hepatitis C virus	P. Kumberger

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PS-14-PM-01 Bacterial populations	Pope A13
1. Population dynamics of the predatory Bdellovibrio bacteriovorus bacteria	D. Baker
2. Dynamic allocation as a stoichiometric control mechanism in bacterial cells	O. Nev
3. Optimising antibiotic dosage regimes against bacterial infections	A. Hoyle
4. Investigation of Optimal Antibiotic Timing in Disinfecting Bacterial Population	N. Acar
5. A hybrid multi-scale model of tuberculosis maps bacterial metabolic scale dynamics to host tissue scale infection outcomes	D. Kirschner
6. Excitable dynamics of quorum sensing modulates rhamnolipid production in Pseudomonas aeruginosa	C. Alfiniyah

PS-14-PM-02 Cancer – Ecology	Pope A13
7. Enhancing dendritic cell immunotherapy for melanoma using a simple mathematical model	J. Chimal
8. Acidic Niche Neutralize Macrophage Anti-Tumor Response	C. Gatenbee
9. Modelling the role of Macrophages in Cancer.	N. den Breems
10. A Mathematical Model for the interaction of three populations: pollinators, plants and herbivores.	M. Sosa Diaz
11. The dynamics of colonic crypt dysplasia: effects of Wnt signalling mutations and contact inhibition	D. Ward
12. The minimization of mutation rate may explain low-dose hypersensitivity	B. Madas

PS-14-PM-03 Ecology	Pope A13
13. Derivation of niche from competitive exclusion	Y. Suprunenko
14. Management of tropical forests with agroforestry and profit sharing	Y. Kubo
15. Spatial incoherence in the Maximum Entropy Theory of Ecology	S. Cornell
16. Anisotropic diffusion models for wolf movement	A. Bianchi
17. Food quality affects prey coexistence under shared predation	M. Raatz
18. The shape of trade-offs determines long- and short-term maintenance of functional diversity	E. Ehrlich

PS-14-PM-04 Ecology – Epidemiology	Pope A13
19. Power law jumps and power law waiting times, fractional calculus and human mobility in epidemiological systems	N. Stollenwerk
20. Trait- and density-mediated effects of parasitized predators in eco-epidemiological models	F. Hilker
21. Improving measles incidence inference using serological data	J. Prada
22. Information Content of Household-Stratified Epidemics	L. Pellis
23. Mathematical modelling of influenza A (H5N1) epidemics in Bangladesh	E. Hill
24. The Effects of Human Population Movements to Malaria Spread in Kenya	S. Kim

PS-14-PM-05 Epidemiology – Evolution	Pope A13
25. The impact of the newly licensed dengue vaccine in endemic countries	M. Aguiar
26. From Ecology to Evolution of Host and Vector-Borne Pathogen in a Structured Immuno-epidemiological Model	H. Gulbudak
27. The tuberculosis model based on China data	H. Cao
28. Better Mates and the Effect of Showing-Off: An Agent-Based Model of the Evolution of Large-Game Hunting in Hunter-Gatherer Communities	S. Loo
29. Mathematical modeling of the development of a generalist in viral evolution	A. Nurtay
30. Simulating the evolution of habitat boundary polymorphism	I. Karonen

PS-14-PM-06 Evolution – Fluids	Pope A13
31. Steady State Thermodynamics in Population Dynamics	Y. Sughiyama
32. The effect of asynchronous and synchronous update rules on cooperation in the public goods game on the two-layer multiplex	J. Allen
33. The evolution of maternal effects	R. Hoyle
34. Modelling noise-induced escape problems in networks	J. Creaser
35. Mechanistic model for self-propelled gyrotactic cells in a channel	M. Alqarni
36. Fully implicit methodology for the numerical modelling of a highly non-linear red blood cell's problem	A. Laadhari

PS-14-PM-07 Fluids – Immunology	Pope A13
37. A Sigmoid Functional Response Suggesting 'Co-operation' Emerges When Cytotoxic T Lymphocyte Start Killing Fresh Target Cells	S. Gadhamsetty
38. Bistability analysis of the gut metabolome and proteome interactions in view of dysregulation leading to inflammatory and other altered pathological states	G. Neumann
39. Mobility of blood cells in a fluid flow near wall with a micro-scale roughness	A. Belyaev
40. A co-evolutionary race between hosts and viruses drives NKR polymorphism	P. Carrillo-Bustamante
41. An Agent-Based Approach to Model the Effects of FTY720 on Helicobacter-Induced Colitis	S. Evans
42. Systems approaches into mathematical modelling of T-cell immunity	B. Szomolay

PS-14-PM-08 Immunology – Multiscale – Neuroscience	Pope A13
43. Investigating the mathematical interconnection between antigen stimulation, CD28 co-stimulation and checkpoint proteins in eliciting an anti-cancer killer T response	C. Zheng
44. A multiscale multiphase model for nutrient limited tissue growth	E. Holden
45. Incorporating cell forces into a multiphase model for collagen gel mechanics	J. Reoch
46. Circuit Diagram for the Human Mind	D. McGrath
47. A resonant integrate-and-fire network model for grid cell dynamics	M. Bonilla Quintana
48. Influence of coupling in a network of bistable Hindmarsh-Rose neurons	V. Lanza

PS-14-PM-09 Neuroscience – Physiology	Pope A14
49. Exploring Sleep-Wake Dynamics	M. Bailey
50. Hemoglobin regulation modeling and unsupervised learning algorithms	F. Duparc
51. Collocation Methods for Solving Two-Dimensional Neural Field Models on Complex Triangulated Domains	R. Martin
52. Reduced dynamics of pattern formation in a mean-field cortical model	A. Gokce
53. Lumped Parameter Modelling of Lymphatic Pumping	J. Moore
54. Physical and Mathematical Veterinary Medicine	C. Rauch

PS-14-PM-10 Physiology	Pope A14
55. A Theoretical Model for Bronchial Thermoplasty Therapy in Asthma	I. Chernyavsky
56. Drug Monitoring via the Skin	J. Jones
57. A chaotic bursting-spiking transition in a pancreatic beta-cells system: observation of an interior glucose-induced crisis	J. Duarte
58. A Model of the Cardiovascular-Respiratory System and its Control in Response to Different Types of Ergometric Workload	P. Calderon
59. A model-based investigation of the link between metabolism and electrical activity in pancreatic α-cells	H. Romero Campos
60. Effective control of glycemia using a Simple Discrete-delay Model	C. Gaz

PS-14-PM-11 Physiology – Plants	Pope A14
61. A Mathematical Model for Ghrelin: Energy homeostasis and appetite control	J. Pires
62. Numerical investigation of the effect of diabetes on the ultradian rhythms in glucose-insulin system	A. Bridgewater
63. Akt Translocation in Response to Insulin	C. Gray
64. Mathematical Models of Hyperoxia-induced Retinal Degeneration	P. Roberts
65. A Modular Analysis of the Auxin Signalling Network	E. Farcot
66. In the Zone, Quantifying Leaf Development at the Cellular Level	R. Carter

PS-14-PM-12 Plants	Pope A14
67. Mathematical models of the Unfolded Protein Response (UPR) in plant cells.	J. Yu
68. Models of protein multimerization in the auxin transduction pathway	C. Lavedrine
69. Pattern formation and modulation in a hyperbolic vegetation model for semiarid environments	G. Consolo
70. Tree Hydraulics: 2D axisymmetric porous medium model analysis and simulations	B. Janbek
71. Effect of Environmental Conditions of Tree Physiology	G. Ledder
72. Hormonal signaling in root nodule primordium initiation	E. Deinum

PS-14-PM-13 Plants – Spatial modelling	Pope A14
73. Multiscale modelling of nutrient uptake by plant roots	J. Köry
74. Phase response of plant circadian clocks leads to robust metabolic rhythms under seasonal variations in day length	T. Ohara
75. Deterministic and stochastic modelling of the hormone Brassinosteroid (BR) signalling pathway in plants	H. Allen
76. Assessing accuracy of a plant-microbe resource-exchange model	T. Clark
77. In Silico Modeling of Stomatal Patterning in Arabidopsis thaliana	C.-C. Antonovici
78. Mathematical model for spreading slime mold on 2D-mesh	K. Ito

PS-14-PM-14 Spatial modelling – Stochastic models	Pope A14
79. Stability analysis of coupled bulk-surface reaction-diffusion systems	M. Alhazmi
80. Investigating the role of physical properties in cellular competition using the Cellular Potts Model	E. Vendel
81. On the study of the shadow-system of the Gierer-Meinhardt system	N. Kavallaris
82. A strong second order tau leaping method for stochastic systems in genetics	T. Stutz
83. The effects of intrinsic noise on the behaviour of bistable cell regulatory systems under quasi-steady state conditions	R. de la Cruz
84. Quantifying the Sensitivity of HIV-1 Viral Entry to Receptor and Coreceptor Expression	B. Mistry

PS-14-PM-15 Stochastic models – Tissue mechanics – Virus dynamics	Pope A14
85. Tissue morphogenesis and stress in multicellular spheroids	E. Littlejohns
86. On the impact of HAART on HIV-1 Virulence Evolution	D. Hodgson
87. Numerical schemes for solving the multiscale model of HCV dynamics	D. Barash
88. Estimating the number of HIV-1 to infect target cells in nonrandom co-infection	Y. Ito
89. Quantifying CCR5 molecules associated with HIV-1 entry	Y. Kakizoe
90. What is the optimal length of HIV Remission?	D. Cromer

PS-14-PM-16 Virus dynamics & Miscellaneous – Cancer, Biofilms	Pope A14
91. Mathematical model of immune response to hepatitis B	F. Fatehi Chenar
92. Experimental evolutionary game dynamics between fibroblasts, crizotinib-resistant and crizotinib-sensitive non-small lung cancer	J. Scott
93. Stability analysis and parameter space classification for Schnakenberg reaction diffusion model	W. Sarfaraz
94. Initial factors determine the formation of mushroom-shaped structures in Pseudomonas aeruginosa biofilms	J. Dehghany

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MS-15-AM-01 Computational Auditory Neuroscience - S. Coombes	Pope C14
Extraordinary coincidence detectors underlie sound localization	J. Rinzel
Localising sounds in the real world	D. Goodman
Stochastic mode-locked spiking responses of stellate cells to periodic stimuli and implications for population coding in the ventral cochlear nucleus	S. Coombes
Single neuron dynamics and the consequences for spike timing codes in the auditory brainstem	C. Sumner

MS-15-AM-02 Drug delivery modeling: from intracellular processes to tissue-scale effects - K. Rejniak	Pope C15
Quantitative intravital image-based modeling of targeted nanoparticle delivery and cellular uptake	A. Karolak
Modeling of nanotherapy tailored to the heterogeneous tumor microenvironment	L. Curtis
Role of cellular and intra-cellular heterogeneities in multidrug resistance: a multiscale model	G. Powathil
Analysis of cell lineage in the microenvironment-driven emergence of drug resistance	K. Rejniak

MS-15-AM-03 Ecology and evolution of infectious diseases - B. Boldin	Pope C16
A general model for multiple infections with applications to HPV	S. Alizon
The evolution of hosts and parasites in complex communities	A. Best
Vaccine-driven evolution of parasite virulence and immune evasion in age-structured population, with special reference to pertussis	V. Bernhauerova
Evolutionary suicide of pathogens	E. Kisdi

MS-15-AM-04 Linking experimental basis, mathematical modelling and numerical computation to unravel multi-scale phenomena in biology - F. Yang	Pope C17
A Bayesian approach to parameter identification for keratin dynamics	E. Campillo-Funollet
Free boundaries on the cell boundary: Understanding biologically relevant asymptotic limits of a model for receptor-ligand dynamics	C. Venkataraman
Modelling intermediate filaments: effect of intracellular transport	S. Portet
Energy distribution and endothermy in dinosaur and modern birds	A. Rendall

MS-15-AM-05 Mathematical Modelling of Biological Movement: From individual movement to emergent collective behaviour - M. Lewis	Pope C18
Cues and collective decisions in migrating animal groups	C. Torney
Animal Movement in Dynamic Landscapes: Understanding the Importance of Learning and Perception	W. Fagan
Territory surveillance and prey management: do wolves keep track of space and time?	U. Schlägel
Analysing Trajectories - A Computational Geometry Perspective	M. Buchin

MS-15-AM-06 Mathematical Models of Cardiovascular Disease - J. Dunster	Pope C19
The Virtual Platelet, mathematical models of platelet activation.	J. Dunster
Hierarchy of scales in platelet-dependent hemostasis and thrombosis modelling	M. Panteleev
Predicting drug-induced cardiac side effects with electrophysiology models	G. Mirams
Patient-specific models of pulmonary hypertension	N. Hill

MS-15-AM-07 Models and tools for exploring the human colon - A. Moorthy	ESLC A9
Multiscale modelling of intestinal crypt organization and carcinogenesis	A. Fletcher
Modelling the Emergent Dynamics and Major Metabolites of the Human Colonic Microbiota	H. Kettle
Exploring the effects of antibiotics using the compuGUT	A. Moorthy
A Model for Alkalinity and pH in the Human Colon	A. Marcus

MS-15-AM-08 Models for Bees and Pollination - H. Eberl	ESLC B1
The interplay between varroa-virus infestation and division of labor in a honeybee colony	V. Ratti
A diffusion-based model for wild bee movement and survival in agricultural landscapes	R. Tyson
A fractional-order diffusion model to predict transgenic pollen dispersal	E. Hanert
Bumble-BEEHAVE: An agent-based population model for bumble bees	M. Becher

MS-15-AM-09 Regulatory properties of bacterial two-component systems - R. Straube	ESLC B2
Signaling via Switchable Allosteric Modulator Proteins (SAMPs)	I. Bischofs
Sensitivity and robustness in two-component systems with a bifunctional sensor kinase	R. Straube
A New Way of Sensing: Need-Based Activation of Antibiotic Resistance by a Flux-Sensing Mechanism	G. Fritz
Design principles of two-component signaling from evolutionary and systems dynamics perspectives.	O. Soyer

MS-15-AM-10 The role of gene expression dynamics in network evolution - B. Verd	Chemistry X1
Inheritance of Process: A dynamical systems view of development and evolution	N. Monk
Dynamics of gene circuits shapes evolvability	A. Jiménez
A damped oscillator drives posterior gap gene expression in Drosophila melanogaster	B. Verd
From head to tail: in silico evolution of axis extension and segmentation.	R. Vroomans

MS-15-AM-11 Using mathematical models of infectious diseases to inform public health policy - J. Panovska-Griffiths	Chemistry X2
MenB, or not MenB - using models to inform decision making about the use and price of a new vaccine against meningococcal disease in England	H. Christensen
Incorporating demographic heterogeneity in epidemiological models for better public health decision-making	P. Klepac
Modelling HPV transmission in the UK, and assessing the cost-effectiveness of vaccination strategies	S. Datta
Evaluation of the cost-effectiveness of Pre-exposure prophylaxis for HIV prevention among men who have sex with men in the UK	V. Cambiano

CT-15-AM-01 Cancer 7 – Therapy	ESLC B7
A multi-scale model of tumour growth and combination therapy for breast cancer	X. Lai
A multi-scale systems pharmacology approach for anticancer chronotherapy personalisation	A. Ballesta
Data and Identifiability in Models of Cancer Chemotherapy	H. Jain
Predictive modeling of treatment strategies for bone metastatic prostate cancer	A. Araujo
Abscopal benefits of localized radiotherapy depend on activated T cell trafficking and distribution between metastatic lesions	J. Poleszczuk
Mathematical modelling of hyper-radiosensitivity at low-dose radiation	T. Hillen

CT-15-AM-02 Epidemiology 7 – Networks	ESLC B8
Dangerous connections: on binding site models for infectious disease dynamics	K. Leung
A biologically inspired immunization strategy for network epidemiology	M. Jusup
On the exact analysis of epidemic processes on networks	M. Lopez-Garcia
The impact of degree distribution on network epidemic models with casual contacts	B. Davis
Household demographic determinants of Ebola epidemic risk	B. Adams
Modeling Spatial Transmission of Ebola in West Africa	J. D'Silva

CT-15-AM-03 Physiology 3	ESLC B14
A metabolic model of the porcine muscle cell to understand the hypertrophic response to growth promoters	H. Williams
Modeling Serotonin Movement Through the Human Colonic Mucosa	H. Dockrell
Optimal control of drug release rates in chronic wounds	J. Thew
Image-based modelling of blood flow and oxygen transfer in foeto-placental capillaries	P. Pearce
Computational Modelling of Epithelial Fluid and Ion Transport in the Parotid Duct	S. Fong
Modeling Selenium metabolism: Maximum-likelihood estimation for multi-dimensional inhomogeneous stochastic differential equations with random effects	M. Große Ruse

CT-15-AM-04 Populations	ESLC C1
Harvesting optimization in random environments: variable harvesting effort versus constant sustainable effort policies	C. Braumann
Unifying biological adaptations by selection and prediction via path-wise formulation	T. Kobayashi
Introduced populations in a stochastic world	N. Bajeux
Lucilia cuprina population dynamics with heterogeneous maturation sites.	G. Kiss
The impact of migration on transient and long-term population dynamics	A. Zincenko
	.

CT-15-AM-05 Spatial modelling	Pope A1
Reproducibility of scratch assays is affected by the initial degree of confluence: experiments, modelling and model selection	W. Jin
The impact of experimental geometry on inference of cell processes	A. Parker
A minimal model for cell migration	N. Meunier
Pattern formation in multiphase models of chemotactic cell aggregation	E. Green
Cox process representation and inference for stochastic reaction-diffusion processes	D. Schnoerr
A general framework for modelling the epithelial tissue	M. Ferreira

CT-15-AM-06 Stochastic models & Biochemical networks	Pope A17
Multiscale fluctuations in nutrient transport in an uncertain environment	M. Russell
Parameter sensitivity analysis for reaction-diffusion models	C. Lester
Properties of a stochastic gene expression model	R. Rudnicki
Single-Molecule Stochastic Analysis of Channeling Enzyme Tryptophan Synthase	D. Loutchko
Stochastic cellular populations of mtDNA: Inheritance, evolution, and diseases	I. Johnston
Choice of ammonium assimilation pathways: A system biology approach	S. Bera

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Hallward Library	9
Highfield House	10
Humanities Building	55
Keighton Auditorium	56
Law & Social Sciences	7
Lenton Grove	5
Medical School	46
Music Building	33
Nottingham Conferences Cottage	59
Nottingham Lakeside Arts Centre	49/50
Pharmacy Building	26
Physics Building	22
Pope Building	27
Portland Building	15
Psychology Building	29
Sir Clive Granger Building	16
The Hemsley Building	8
Trent Building	11
Vaughan Parry Williams Pavilion	47

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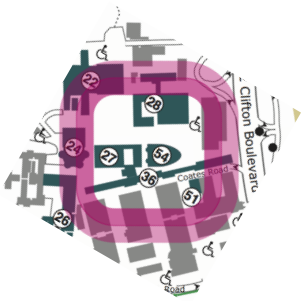

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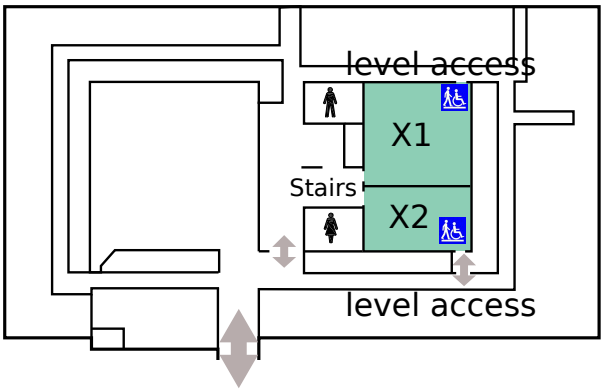

A (ground floor)

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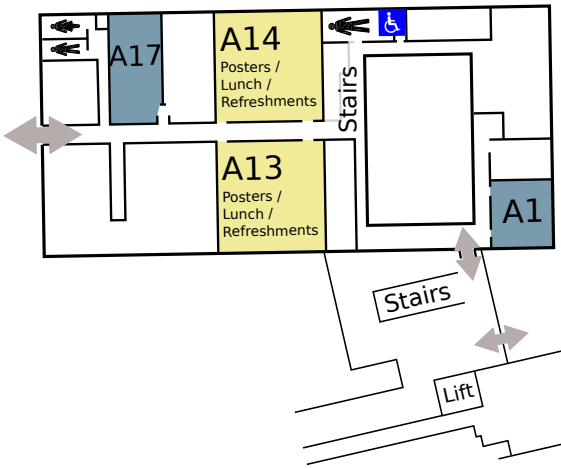

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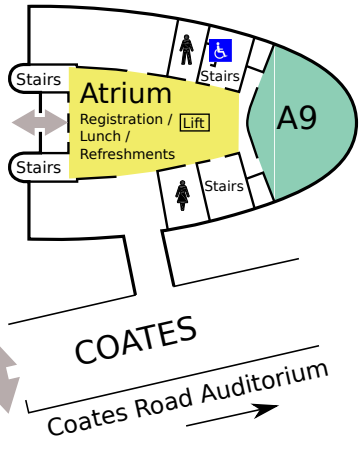

B (first floor)

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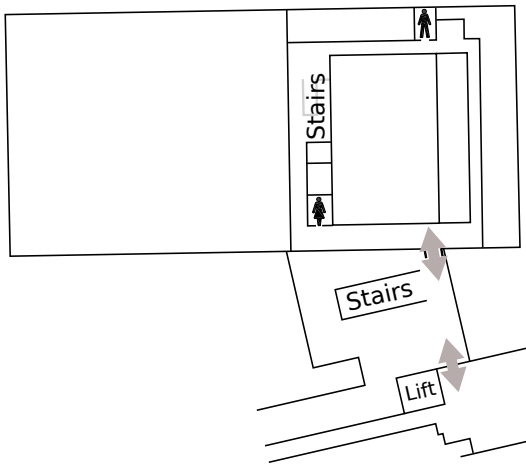

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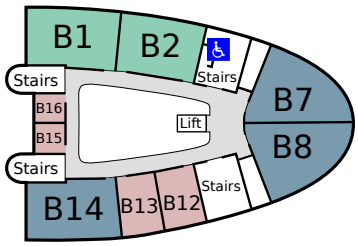

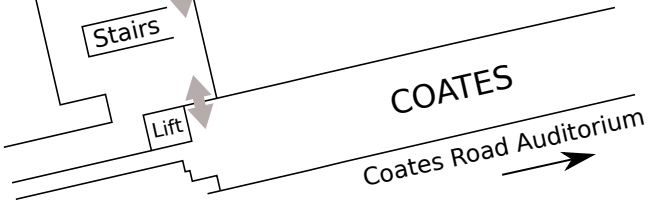

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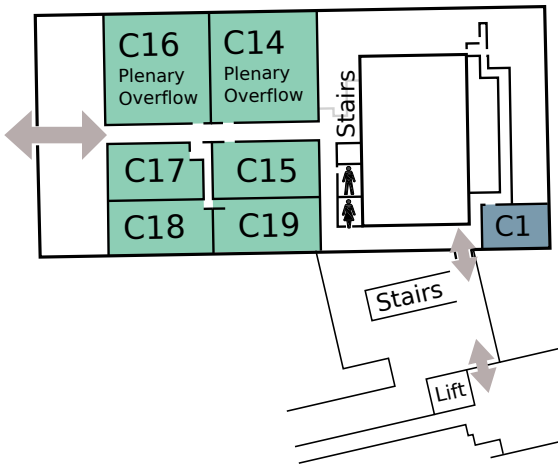

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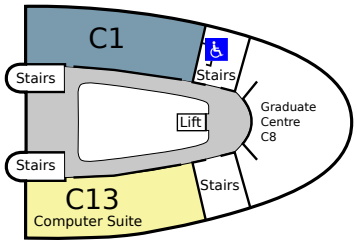

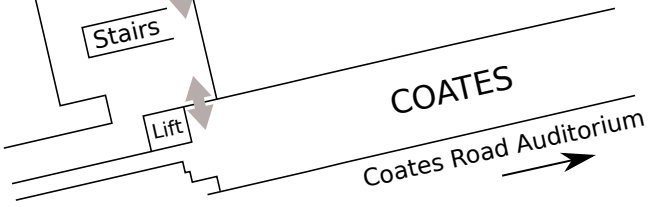

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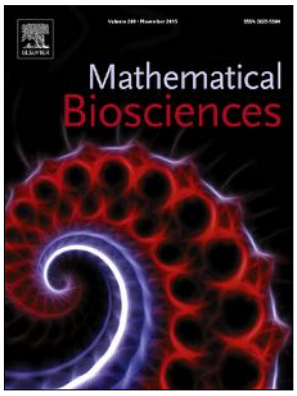

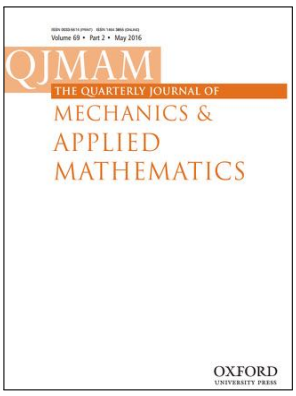

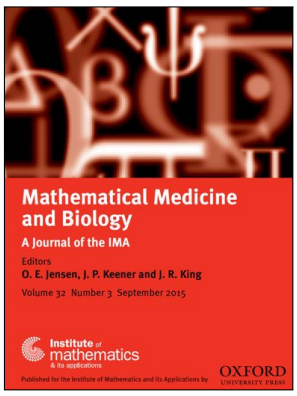

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