

Conference Agenda

British Applied Mathematics Colloquium 2019

Date: Wednesday, 24/Apr/2019

9:00am Registration and coffee
- Location: **Foyer, Level 1**

9:50am Welcome and Information Session
- Location: **CB 1.10**
Chair: Jonathan Dawes
Chair: Paul Milewski

10:00am Plenary 1: The Stewartson Memorial Lecture
- Location: **CB 1.10**
Chair: Paul Milewski

Extracting Order from Disorder: Periodic Orbits Buried in Fluid Turbulence

Rich Kerswell

11:00am Coffee break
- Location: **Foyer, Level 1**

11:30am Minisymposium 25A: IMA
- Lighthill-Thwaites Prize
Presentations
Location: **CB 3.1**
Chair: Alan R Champneys

11:30am - 12:00pm

Fluid mechanics of kidney stone removal

Jessica G Williams, Sarah L Waters, Derek E Moulton, Ben W Turney

12:00pm - 12:30pm

High contrast approximation for penetrable wedge diffraction

Matthew Allan Nethercote, Raphael Assier, Ian David Abrahams

12:30pm - 1:00pm

A mathematical framework for modelling the metastatic spread of cancer

Linnea Christin Franssen, Tommaso Lorenzi, Andrew Edward Felix Burgess, Mark Andrew Joseph Chaplain

Contributed Talks 13: Epidemiology and ecology
Location: **CB 4.16**
Chair: Sandro Azaele

11:30am - 11:50am

Incorporation of Awareness Programs into a Model of the Spread of HIV/AIDS amongst People who Inject Drugs (PWIDs)

Maha ALSHARARI

11:50am - 12:10pm

Anticipating Disease Elimination

Minisymposium 1A: New applications and advances in the analysis of wave scattering.

Location: **CB 3.5**
Chair: David Peter Hewett
Chair: Euan Spence

11:30am - 12:00pm

Recent advances in the quarter-plane problem

Raphael Assier

12:00pm - 12:30pm

Wave scattering by fractal screens

David Peter Hewett, Simon Neil Chandler-Wilde, Andrea Moiola

12:30pm - 1:00pm

On scattering of whispering gallery modes by boundary inflection points

Valery Smyshlyaev

Minisymposium 6A: Shape changes in soft and biological solids

Location: **CB 5.1**
Chair: Matteo Taffetani

11:30am - 12:00pm

Buffering by buckling allows shape changes in thin, soft materials

Dominic Vella

12:00pm - 12:30pm

The flagellar perversion phenomenon in human sperm

Hermes Gadelha

Minisymposium 2A: Nonlinear dispersive waves

Location: **CB 3.9**
Chair: Karima Khusnutdinova
Chair: Emilian I. Parau

11:30am - 12:00pm

Hydroelastic waves over constant vorticity flows: solitary waves and modulational instabilities

Paul Milewski, Tao Gao, Zhan Wang

12:00pm - 12:30pm

Application of the non-local AFM method in cylindrical geometry

Emilian I. Parau

12:30pm - 1:00pm

Nonlinear Hydroelastic Waves

Jean-Marc Vanden-Broeck

Contributed Talks 14: Physiology 1

Location: **CB 3.15**
Chair: Nicholas A. Hill

11:30am - 11:50am

Bridging the gap between individual-based and continuum models of growing cell populations

Fiona Macfarlane

11:50am - 12:10pm

Computational modelling and simulation of cancer growth and migration within a 3D heterogeneous tissue

Minisymposium 3A: Network dynamical systems in mechanics and biology.

Location: **CB 4.1**
Chair: Alexander Erlich
Chair: Andrew L. Krause

11:30am - 12:00pm

Metapopulation Models in Ecology & Epidemiology

Andrew L. Krause, Robert A. Van Gorder, Nabil Fadai

12:00pm - 12:30pm

Mechanical Characterisation of Disordered and Anisotropic Cellular Monolayers

Alexander Nestor-Bergmann, Emma Johns, Sarah Woolner, Oliver Eskild Jensen

12:30pm - 1:00pm

Autonomous actuation of active mechanical networks

Francis Woodhouse

Contributed Talks 26: Industrial modelling 1

Location: **CB 3.16**
Chair: Matthew Haynes

11:30am - 11:50am

Mathematical Modelling of Metal Forming

Hanson Bharth

11:50am - 12:10pm

Multiscale Modelling Methods for the Flow During Grinding

Zakhary Crowson, John Billingham, Paul Houston

12:10pm - 12:30pm

<p>Emma Southall, Adjani Dessavre, Michael Tildesley, Louise Dyson</p>	<p>12:30pm - 1:00pm</p> <p>Length regulation of epithelial cell junctions</p> <p><u>Michael Staddon</u></p>	<p>Cicely K. Macnamara, Alfonso Caiazzo, Ignacio Ramis-Conde, Mark A.J. Chaplain</p>	<p>Exact solutions of the Laplace-Young equation in parametric form for a horizontal liquid bridge</p> <p>Kevin Martin Moroney, Matthew Haynes, Stephen B. G. O'Brien</p>
<p>12:10pm - 12:30pm</p> <p>Linear transit compartment pharmacokinetic models – analytical solutions and equi-dosing regimen regions</p> <p><u>Lloyd Bridge</u></p>		<p>12:10pm - 12:30pm</p> <p>Discrete-to-continuum modelling of cells to tissue</p> <p><u>Nicholas A. Hill, Roxanna G. Barry, Peter S. Stewart</u></p>	<p>12:30pm - 12:50pm</p> <p>Flexure Coupling Mechanisms for High Performance Robotics and Automated Processes</p> <p><u>Jianhang Ding, Nicola Bailey, Patrick Keogh</u></p>
<p>12:30pm - 12:50pm</p> <p>A spatial stochastic model close to a critical point</p> <p><u>Sandro Azaele</u></p>	<p>Contributed Talks 2: Fluids 1 Location: CB 4.8 Chair: Jack Samuel Keeler</p>	<p>12:30pm - 12:50pm</p> <p>A mathematical model for photothermal ablation of spherical tumors</p> <p><u>Ahmed Mostafa Abdelhady Ismaeel</u></p>	<p>Contributed Talks 3: Optimization and control theory Location: CB 3.6 Chair: Vladimir Turetsky</p>
<p>Contributed Talks 33: Porous media and flow networks Location: CB 4.10 Chair: Alexandra Tzella</p>	<p>11:30am - 11:50am</p> <p>Shallow-water sloshing with wetting/drying</p> <p><u>Matthew Turner, Thomas Bridges</u></p>	<p>Contributed Talks 9: Droplets 1 Location: CB 3.11 Chair: Carlos Antonio Galeano Rios</p>	<p>Contributed Talks 3: Optimization and control theory Location: CB 3.6 Chair: Vladimir Turetsky</p>
<p>11:30am - 11:50am</p> <p>Axisymmetric flow in a heterogeneous aquifer</p> <p><u>Edward Hinton, Andrew Woods</u></p>	<p>11:30am - 11:50am</p> <p>Bouncing off the Walls: Gas-Kinetic & van der Waals Effects in Drop Impact</p> <p><u>James Edward Sprittles, Duncan Lockerby, Mykyta Chubynsky, Kirill Belousov</u></p>	<p>11:30am - 11:50am</p> <p>High performance computing approach to the max-cut problem</p> <p><u>Timotej Hrga, Janez Povh</u></p>	<p>11:30am - 11:50am</p> <p>High performance computing approach to the max-cut problem</p> <p><u>Timotej Hrga, Janez Povh</u></p>
<p>11:50am - 12:10pm</p> <p>An asymptotic approach to flow in pipes of triangular cross section</p> <p><u>Laura Marie Keane, Iain R. Moyles, Cameron L. Hall</u></p>	<p>11:50am - 12:10pm</p> <p>To break or not to break: The influence of invariant solutions on the transient behaviour of an air bubble in a perturbed Hele-Shaw cell.</p>	<p>11:50am - 12:10pm</p> <p>Quasi-normal free-surface impacts, capillary walking and an application to droplets.</p>	<p>11:50am - 12:10pm</p> <p>Input restoration by a linear-quadratic tracking control</p> <p><u>Vladimir Turetsky</u></p>
<p>12:10pm - 12:30pm</p> <p>Dispersion in Periodic Networks</p> <p><u>Yahya Farah, Alexandra Tzella</u></p>	<p>Jack Samuel Keeler, Gregoire Lemoult, Alice Thompson, Andrew Hazel, Anne Juel</p>	<p>Carlos Antonio Galeano Rios, Paul Antoine Milewski, Jean-Marc Vanden-Broeck</p>	<p>11:50am - 12:10pm</p> <p>Input restoration by a linear-quadratic tracking control</p> <p><u>Vladimir Turetsky</u></p>
<p>12:30pm - 12:50pm</p> <p>The effect of compression on filtration performance</p> <p><u>Jakub Kory, Ian Griffiths, Armin Krupp, Colin Please</u></p>	<p>12:10pm - 12:30pm</p> <p>Levitation by Thin Viscous Layers</p> <p><u>Tom Mullin</u></p>	<p>12:10pm - 12:30pm</p> <p>Droplet impact onto complex substrates: pre-impact dynamics</p> <p><u>Gavin Moreton</u></p>	<p>12:10pm - 12:30pm</p> <p>Semi-global incremental input-to-state stability of Lur'e systems.</p> <p><u>Max Edward Gilmore, Chris Guiver, Hartmut Logemann</u></p>
<p>Contributed Talks 32: Mathematical and statistical physics Location: CB 3.7 Chair: Vitaliy Kurlin</p>	<p>12:30pm - 12:50pm</p> <p>Towards a model of an inflatable aerofoil: the dynamics of an elastic cell in a uniform stream</p> <p><u>Adam Alexander Yorkston</u></p>		<p>12:30pm - 12:50pm</p> <p>A New PDE-constrained Optimization Framework for Multiscale Particle Dynamics</p> <p><u>Mildred Aduamoah</u></p>
<p>11:30am - 11:50am</p> <p>Zero Temperature Limit of the Tight Binding Model for Point Defects</p> <p><u>Jack Thomas, Christoph Ortner</u></p>			
<p>11:50am - 12:10pm</p> <p>Discrete Coagulation-Fragmentation Systems</p> <p><u>Lyndsay Kerr, Matthias Langer, Wilson Lamb</u></p>			
<p>12:10pm - 12:30pm</p>			

	<p>From asymptotics to exact results: Painlevé I equation and 2d gravity <u>Ines Aniceto</u>, Ricardo Schiappa, Marcel Vonk</p>			
	<p>12:30pm - 12:50pm</p> <p>A continuous approach to a classification of solid crystalline materials <u>Vitaliy Kurlin</u></p>			
1:00pm - 2:00pm	<p>Lunch Location: Foyer, Level 1</p>			
2:00pm - 3:00pm	<p>Plenary 2 Location: CB 1.10 Chair: Apala Majumdar</p>			
	<p>Upside-Down and Inside-Out: The Biomechanics of Cell Sheet Folding <u>Ray Goldstein</u></p>			
3:00pm - 3:30pm	<p>Coffee break Location: Foyer, Level 1</p>			
3:30pm - 5:00pm	<p>Minisymposium 25B: IMA Lighthill-Thwaites Prize Presentations Location: CB 3.1 Chair: Alan R Champneys</p> <p>3:30pm - 4:00pm</p> <p>Optimization of mixing in stirred, binary fluids <u>Maximilian F. Eggl</u>, Peter J. Schmid</p> <p>4:00pm - 4:30pm</p> <p>The Unified Transform: A New Tool for Scattering Problems <u>Matthew Colbrook</u></p> <p>4:30pm - 5:00pm</p> <p>Sticking with droplets: Insect-inspired modelling of capillary adhesion <u>Matthew David Butler</u>, Finn Box, Thomas Robert, Dominic Vella</p> <p>Minisymposium 4A: Optimal Transport in the Analysis of Signals and Images Location: CB 4.16 Chair: Bernhard Schmitzer Chair: Matthew Thorpe</p> <p>3:30pm - 4:00pm</p> <p>Clustering of Big Data: consistency of a nonlocal</p>	<p>Minisymposium 1B: New applications and advances in the analysis of wave scattering Location: CB 3.5 Chair: David Peter Hewett Chair: Euan Spence</p> <p>3:30pm - 4:00pm</p> <p>For most frequencies, strong trapping has a weak effect in frequency-domain scattering <u>David Lafontaine</u>, Euan Spence, Jared Wunsch</p> <p>4:00pm - 4:30pm</p> <p>The halfspace matching method for scattering problems in infinite complex media : the dissipative case <u>Sonia Fliss</u>, Anne-Sophie Bonnet-Ben Dhia, Patrick Joly, Yohanes Tjandrawidjaja, Antoine Tonnoir</p> <p>4:30pm - 5:00pm</p> <p>The halfspace matching method for scattering problems in infinite complex media : the non-dissipative case <u>Anne-Sophie Bonnet-Ben Dhia</u>, Simon Chandler-Wilde, Sonia Fliss, Christophe Hazard, Karl-Mikael Perfekt, Yohanes Tjandrawidjaja</p> <p>Contributed Talks 5: Dynamical systems Location: CB 5.1 Chair: Matthew Ray Turner</p> <p>3:30pm - 3:50pm</p> <p>Localised radial spots on the free surface of a ferrofluid. <u>Dan J. Hill</u>, David J. B. Lloyd, Matt Turner</p>	<p>Minisymposium 2B: Nonlinear dispersive waves Location: CB 3.9 Chair: Emilian I. Parau Chair: Karima Khusnutdinova</p> <p>3:30pm - 4:00pm</p> <p>Wave-mean flow interactions in dispersive hydrodynamics: a new take on the old problem <u>Gennady El</u>, Thibault Congy, Mark Hoefer</p> <p>4:00pm - 4:30pm</p> <p>Integrability and continuous wave instabilities: an algebraic-geometric approach <u>Sara Lombardo</u></p> <p>4:30pm - 5:00pm</p> <p>Nonlinear waves in layered elastic waveguides and zero-mass contradiction <u>Karima R. Khusnutdinova</u>, Matthew R. Tranter</p> <p>Contributed Talks 15: Physiology 2 Location: CB 3.15 Chair: Alberto Gambaruto</p> <p>3:30pm - 3:50pm</p> <p>Propagation of waves and transmission-reflection in stented arteries</p>	<p>Minisymposium 3B: Network dynamical systems in mechanics and biology Location: CB 4.1 Chair: Alexander Erlich Chair: Andrew L. Krause</p> <p>3:30pm - 4:00pm</p> <p>Designing networks with specified spectra <u>Aden Forrow</u>, Francis G. Woodhouse, Jorn Dunkel</p> <p>4:00pm - 4:30pm</p> <p>Modelling structural determinants of ventilation heterogeneity: a perturbative approach. <u>Carl A Whitfield</u>, Alex Horsley, Oliver E. Jensen</p> <p>4:30pm - 5:00pm</p> <p>Network models for melt ponds on sea ice <u>Michael John Coughlan</u>, Sam Howison, Ian Hewitt, Andrew Wells</p> <p>Contributed Talks 27: Industrial modelling 2 Location: CB 3.16 Chair: Ferran Brosa Planella</p> <p>3:30pm - 3:50pm</p> <p>Homogenisation of a shrinking core model for gas-solid reactions in granular particles</p>

<p>Ginzburg-Landau type model <u>Riccardo Cristoferi</u>, Matthew Thorpe</p> <p>4:00pm - 4:30pm</p> <p>Semi-discrete optimal transport and applications <u>David Bourne</u></p> <p>4:30pm - 5:00pm</p> <p>Inverse optimal transport <u>Andrew Stuart</u>, Marie-Therese Wolfram</p>	<p>3:50pm - 4:10pm</p> <p>Bifurcation of localized structures in biologically inspired reaction-diffusion equations <u>Fahad Saif Al Saadi</u>, Alan Champneys</p> <p>4:10pm - 4:30pm</p> <p>The 3D Painlevé Paradox <u>Noah David Cheesman</u>, John Hogan</p> <p>4:30pm - 4:50pm</p> <p>Exploring the role of directionality in shaping transition dynamics in the brain using basin stability. <u>Amelia J G Padmore</u>, Martin R Nelson, Jonathan J Crofts</p>	<p><u>Sara Frecentese</u>, Theodosios K. Papathanasiou, Alexander B. Movchan, Natasha V. Movchan</p> <p>3:50pm - 4:10pm</p> <p>The potential of director theory to the application of cardiovascular modelling <u>Mikaela Joanne Webster</u>, Alberto M Gambaruto, Alan Richard Champneys</p> <p>4:10pm - 4:30pm</p> <p>A Mathematical Model of the Pulmonary Circulation with Respiration <u>Jay Aodh Mackenzie</u>, Nick A. Hill</p> <p>4:30pm - 4:50pm</p> <p>Mathematical modelling of electro-mechano-fluidic coupling in the left ventricle <u>Hao Gao</u>, Kenneth Mangion, Radostin Simitev, Colin Berry, Xiaoyu Luo</p>	<p><u>Benjamin Matthew Sloman</u>, Colin Peter Please, Robert Ashton Van Gorder</p> <p>3:50pm - 4:10pm</p> <p>Asymptotic Analysis of Small Aspect Ratio Lithium-Ion Batteries <u>Robert Timms</u>, S. Jon Chapman, Colin P. Please</p> <p>4:10pm - 4:30pm</p> <p>Asymptotic reduction of a thermal-electrochemical model for lithium-ion batteries <u>Ferran Brosa Planella</u>, W. Dhammika Widanage</p> <p>4:30pm - 5:00pm</p> <p>Thermodynamics vs molecular dynamics based models of electrochemical transport <u>Maxim Zyskin</u></p>
<p>Contributed Talks 30: Transition to turbulence 1 Location: CB 4.10 Chair: Ashley Willis</p> <p>3:30pm - 3:50pm</p> <p>Buoyancy-suppressed transition in vertical pipe flow <u>Ashley Willis</u>, Elena Marensi</p> <p>3:50pm - 4:10pm</p> <p>Fractal neutral curves in stably-stratified shear flows <u>Jonathan James Healey</u></p> <p>4:10pm - 4:30pm</p> <p>Optimal forcing to destabilise turbulence in a pipe flow <u>Elena Marensi</u>, Ashley P. Willis, Rich R Kerswell</p> <p>4:30pm - 4:50pm</p> <p>Density homogenisation within stably-stratified exact coherent structures in shear flows <u>Jake Langham</u>, Tom Eaves, Rich Kerswell</p>	<p>Contributed Talks 4: Fluids 2 Location: CB 4.8 Chair: Emmanuel Dormy</p> <p>3:30pm - 3:50pm</p> <p>Atmospheric predictability: the origins of the finite-time behaviour <u>Tsz Yan Leung</u>, Martin Leutbecher, Sebastian Reich, Theodore G. Shepherd</p> <p>3:50pm - 4:10pm</p> <p>Leaky equatorial waves <u>Lyubov Chumakova</u></p> <p>4:10pm - 4:30pm</p> <p>Mathematical modelling of heat pumps as a renewable energy source <u>Alistair Delboyer</u></p> <p>4:30pm - 4:50pm</p> <p>Eye formation in large scale vortices: mathematical models vs tropical cyclones <u>Emmanuel Dormy</u>, Ludivine Oruba, Peter Davidson</p>	<p>Contributed Talks 10: Droplets 2 Location: CB 3.11 Chair: Nikos Savva</p> <p>3:30pm - 3:50pm</p> <p>Cahn-Hilliard Navier-Stokes simulations for design of superhydrophobic surfaces <u>Matthew Ryan Tranter</u>, Benjamin Aymard, Serafim Kalliadasis, David N Sibley</p> <p>3:50pm - 4:10pm</p> <p>Wettability-Independent Droplet Transport by Bendotaxis <u>Alexander Bradley</u>, Finn Box, Ian Hewitt, Dominic Vella</p> <p>4:10pm - 4:30pm</p> <p>The spreading and stability of a cooling drop on an inclined and prewetted substrate <u>Shailesh Naire</u>, Ghanim Algwauish</p> <p>4:30pm - 4:50pm</p> <p>Droplet dynamics over heterogeneous substrates with mass transfer <u>Danny Groves</u>, Nikos Savva</p>	<p>Contributed Talks 24: Soft matter 1 Location: CB 3.6 Chair: Reuben O'Dea</p> <p>3:30pm - 3:50pm</p> <p>Post-buckling analysis of soft elastic bilayers <u>Hamza Aderemi Alawiye</u></p> <p>3:50pm - 4:10pm</p> <p>Biological membranes with deformations induced by point particles <u>Philip Justin Herbert</u></p> <p>4:10pm - 4:30pm</p> <p>Multiphase and morpho-poro-elastic multiscale models of biological tissue growth <u>Reuben O'Dea</u></p> <p>4:30pm - 4:50pm</p> <p>Phase field models for small deformations of biomembranes arising as Helfrich energy equilibria <u>Luke Hatcher</u></p>
<p>Contributed Talks 1: Finance, economics and society Location: CB 3.7 Chair: Cameron Luke Hall</p> <p>3:30pm - 3:50pm</p> <p>Preference selection of Lithuanian II pillar pension funds by stochastic dominance rules</p>			

Audrius Kabašinskas, Miloš Kopa, Kristina Sutienė

3:50pm - 4:10pm

Approximate filtering of intensity process for Poisson count data

Naratip Santitissadeekorn

4:10pm - 4:30pm

Modelling the effect of externalities on auctions with multiple successful bidders

Cameron L. Hall, Mel T. Devine, Niall Farrell

5:00pm
-
6:00pm

Plenary 3: IMI Public Lecture

Location: **CB 1.10**

Chair: Christopher Budd

Applying mathematics to understand our changing climate

Emily Shuckburgh

6:00pm
-
8:30pm

Poster Session 1 and CUP drinks reception

Location: **Foyer, Level 1**

Chair: Tim Rogers

Chair: Apala Majumdar

Anti-plane motion in a pre-stressed compressible elastic laminate

Maha Mohammed Helmi

Assessing the impact of tissue vascularisation on intratumour heterogeneity using a formal Hamilton-Jacobi approach

Chiara Villa, Tommaso Lorenzi, Mark A. J. Chaplain

Bifurcation and Stability of plume structure in a downflowing pipe of gyrotactic swimmer suspension

Lloyd Fung, Yongyun Hwang

Challenges in Variability and Uncertainty Quantification for Ion Channel Modelling

Chon Lok Lei, Michael Clerx, David J Gavaghan, Liudmila Polonchuk, Ken Wang, Gary R Mirams

Deep water drifting by acoustic-gravity waves generated by sub- marine earthquakes

Mohammed Alghazi, Usama Kadri

Electrical current distribution in a silicon furnace

Ellen Luckins, Robert Van Gorder, James Oliver, Colin Please

Explicit model for surface waves on a multi-layered elastic half-space

Ali Mohammed Mubarak, Danila Prikazchikov

Exponential asymptotics and Stokes surfaces

Yyanis Johnson-Llambias, Philippe H. Trinh

Exponential asymptotics for parasitic capillary ripples

Josh Shelton, Paul Milewski, Philippe Trinh

Extracting Positions of Sheep from Drone Footage

Hayley E. L. Moore, Andrew W. Baggaley, Colin S. Gillespie

Fines Migration in Oil Reservoirs

Tom Babb, Jon Chapman, Chris Breward

Mathematical modelling of immunoglobulin cell fate

Osamah Obied Alayafi

Modelling the Spread of Tree Disease Through Forests

Sultan Abdullah Alyobi, Nicholas Parker, Andrew Baggaley

Non-Newtonian and Viscoplastic models for a vertical draining free liquid film

Hani Nami Alahmadi, Shailesh Naire

Phase field models for small deformations of biomembranes arising as Helfrich energy equilibria

Luke Hatcher

Nonlinear Dynamics of Coupled Axion-Josephson Junction Systems

Jin Yan

Response Theory for Finite Markov Processes

Manuel Santos Gutiérrez, Valerio Lucarini

Synchrony: From Franklin Bells to Brain Dynamics

Mustafa Sayli, Yi Ming Lai, Rüdiger Thul, Stephen Coombes

The Numerical Solution of Neural Field Models Posed on Realistic Cortical Domains

Sammy Petros, Daniele Avitabile, Stephen Coombes, Stamatios Sotiropoulos, Paul Houston

Travelling wave solutions for a space-time fractional SIR model by the (G'/G) expansion method

Areej Abdullah Almuneef, Moustafa Elshahed, Nigel Mottram

An improved initialization method of k-means algorithm for the clustering of space-frame joints for fabrication

Antiopi Koronaki, Paul Shepherd, Mark Evernden

Biological membranes with deformations induced by point particles

Philip Justin Herbert

Exploring the role of directionality in shaping transition dynamics in the brain using basin stability.

Amelia J G Padmore, Martin R Nelson, Jonathan J Crofts

Locating bat roosts through the coupling of diffusion modelling and acoustic detectors

Lucy Henley, Thomas Woolley, Owen Jones, Fiona Mathews, Domhnall Finch

Modeling molecular diffusion in the intracellular environment

Remus Stana

Non-linear Inverse Problem Related to Electrostatic Source Localization

Shaerdan Shataer, Chris Budd

Stochastic user equilibrium lane assignment for highways

Frank Brooks-Tyreman

The effectiveness of various adaptive management strategies on the control of invasive pests

Yasser Meteb Alrashedi, Markus Mueller, Stuart Townley

The stability of a column of ferrofluid centred on a wire in the presence of a magnetic field

Sarah Helen Ferguson Briggs

Stability and instability of planar layers of smectic A liquid crystals

Omar Ameer Alsuheimi, Iain Stewart, Gunnar Hornig

9:30am Plenary 4
- Location: **CB 1.10**
10:30am Chair: Tim Rogers

Modelling and data analysis of epidemics

Julia Gog

10:30am Coffee break
- Location: **Foyer, Level 1**

11:00am Minisymposium 8A: The
- multiphysics of liquid films,
12:30pm drops, and fibers
Location: **CB 3.1**
Chair: **Matthew G. Hennessy**

11:00am - 11:30am

Droplet motion in coupled solid-liquid-vapour systems

David Nicholas Sibley, Andrew Archer, Luis González MacDowell

11:30am - 12:00pm

Connecting pattern formation and surface conditions in dewetting films of polymer melts

Andreas Münch

12:00pm - 12:30pm

Contact line dynamics on rough and heterogeneous surfaces

Nikos Savva, Danny Groves, Serafim Kalliadasis

Minisymposium 4B: Optimal Transport in the Analysis of Signals and Images

Location: **CB 4.16**
Chair: **Bernhard Schmitzer**
Chair: **Matthew Thorpe**

11:00am - 11:30am

Adaptive methods for data assimilation

Christopher Budd

11:30am - 12:00pm

Optimal Transport for Signal and Image Analysis

Soheil Kolouri

12:00pm - 12:30pm

Sinkhorn Divergences: Bridging the gap between Optimal Transport and MMD

Aude Genevay

Contributed Talks 18: Cell biology

Location: **CB 4.10**
Chair: **Lyubov Chumakova**

Minisymposium 9A: Dynamics of Complex Contagions

Location: **CB 3.5**
Chair: **Sam Moore**
Chair: **Tim Rogers**

11:00am - 11:30am

How does imperfect adherence to antimalarials contribute to transmission? A within-host modelling approach

Joseph D. Challenger, Azra C. Ghani, Lucy C. Okell

11:30am - 12:00pm

A mathematical model for the community ecology of *Borrelia burgdorferi* strains

Ben Adams

12:00pm - 12:30pm

Correlations between stochastic endemic infection in multiple interacting subpopulations

Sophie Meakin, Matt Keeling

Minisymposium 6B: Shape changes in Soft and Biological Solids

Location: **CB 5.1**
Chair: **Matteo Taffetani**

11:00am - 11:30am

Large strain elasticity: geometry, instability and brains.

John Biggins

11:30am - 12:00pm

Wrinkling instabilities in soft dielectric plates

Hannah Conroy Broderick

12:00pm - 12:30pm

Is biological growth driven by stress or strain?

Alexander Erlich, Gareth W. Jones, Derek E. Moulton, Alain Goriely

Contributed Talks 6: Fluids 3

Location: **CB 4.8**
Chair: **Nicola Bailey**

Minisymposium 10A: Recent advances in PDE models describing emergent behaviour and collective dynamics

Location: **CB 3.9**
Chair: **Bertram Düring**
Chair: **Marie-Therese Wolfram**

11:00am - 11:30am

Derivation of macroscopic dynamics for collective motion in a fluid

Pierre Degond, Sara Merino-Aceituno, Fabien Vergnet, Hui Yu

11:30am - 12:00pm

Strong solutions and weak-strong stability in a system of cross-diffusion equations

Judith Berendsen

12:00pm - 12:30pm

Incorporating a multistage representation of the cell cycle into models of cell migration

Kit Yates

Minisymposium 13A: Fluctuating Hydrodynamics

Location: **CB 3.15**
Chair: **Serafim Kalliadasis**
Chair: **James Edward Sprittles**

11:00am - 11:30am

Mean field limits for systems of interacting particles: phase transitions and fluctuations

Grigorios Pavliotis

11:30am - 12:00pm

Instability, Rupture and Fluctuations in Thin Liquid Films: Theory and Computations

Rishabh Gvalani, Miguel Duran-Olivencia, Serafim Kalliadasis, Grigorios Pavliotis

12:00pm - 12:30pm

Revisiting the Rayleigh-Plateau instability for the nanoscale

Chengxi Zhao, James Sprittles, Duncan Lockerby

Minisymposium 12A: Modern Approaches to Inverse Problems

Minisymposium 11A: New Perspectives and Challenges at the Junction of Modelling and Applications

Location: **CB 4.1**
Chair: **Apala Majumdar**

11:00am - 11:30am

On the shape of gravitating planets

Alain Goriely

11:30am - 12:00pm

On the Millennium Bridge Synchronisation Myth

Alan R Champneys, Igor Belykh, Kevin Daley, John Macdonald

12:00pm - 12:30pm

Moving-boundary problems in tissue growth

John King

Contributed Talks 28: Industrial modelling 3

Location: **CB 3.16**
Chair: **Carl A Whitfield**

11:00am - 11:20am

Modelling the Hydriding of Uranium for Nuclear Waste Storage Applications

Holly Barker, Andrew Hazel

11:20am - 11:40am

Mathematical Modelling of Uranium Oxidation in Water Vapour

Monisha Natchiar
Renganathan

Contributed Talks 34: Nonlinear waves

Location: **CB 3.6**
Chair: **Thibault Congy**

	<p>11:00am - 11:20am</p> <p>Deterministic limit of intracellular calcium spikes</p> <p><u>Valérie Voorsluijs</u>, Silvina Ponce Dawson, Yannick De Decker, Geneviève Dupont</p>	<p>11:00am - 11:20am</p> <p>Chiral transfer of angular momentum</p> <p><u>Henry Keith Moffatt</u></p>	<p>Location: CB 3.11</p> <p>Chair: <u>Matthias J Ehrhardt</u></p>	<p>11:00am - 11:20am</p> <p>Early stage of integrable turbulence in 1D NLS equation: the semi-classical approach to statistics</p> <p><u>Giacomo Roberti</u>, Gennady EI, Stephane Randoux, Pierre Suret</p>
	<p>11:20am - 11:40am</p> <p>Modelling the Brain: From Dynamical Complexity to Neural Synchronisation, Chimera-like States and Information Flow Capacity</p> <p><u>Chris Antonopoulos</u></p>	<p>11:20am - 11:40am</p> <p>Euler-Poincare variational principles for wave-structure-fluid interactions</p> <p><u>Hamid Alemi Ardakani</u></p>	<p>11:00am - 11:30am</p> <p>MAP estimators and posterior consistency for Bayesian inverse problems for functions</p> <p><u>Masoumeh Dashti</u></p>	
	<p>11:40am - 12:00pm</p> <p>Shear-driven instabilities in membrane tubes</p> <p><u>Sami Cameron Al-Izzi</u>, Pierre Sens, Matthew Simon Turner</p>	<p>11:40am - 12:00pm</p> <p>Centrifugally Induced Interfacial Instabilities in a circular domain</p> <p><u>Bobby Dave Clement</u></p>	<p>11:30am - 12:00pm</p> <p>Sparse recovery from subsampled random convolutions</p> <p><u>Holger Rauhut</u></p>	<p>11:20am - 11:40am</p> <p>Nonlinear Schrödinger equations and the universal description of dispersive shock wave structure</p> <p><u>Thibault Congy</u>, Gennady EI, Mark Hoefer, Michael Shearer</p>
	<p>12:00pm - 12:20pm</p> <p>Which head is ahead: Two stochastic models of intracellular transport, and an experiment</p> <p><u>Gleb Zhelezov</u>, Lyubov Chumakova</p>	<p>12:00pm - 12:20pm</p> <p>Characteristics of a Fluid Lubricated Bearing with Random External Forcing</p> <p><u>Nicola Bailey</u>, Stephen Hibberd, Michael Tretyakov</p>	<p>12:00pm - 12:30pm</p> <p>Projection Methods, Superiorization and Applications</p> <p><u>Aviv Gibali</u></p>	<p>11:40am - 12:00pm</p> <p>Generalised Coupled Nonlinear Schrodinger Equation and its Applications to Nonlinear Mechanical Topological Insulators</p> <p><u>David Snee</u>, Yi-Ping Ma</p>
12:30pm - 1:30pm	<p>Lunch and Poster Session 2</p> <p>Location: Foyer, Level 1</p> <p>Chair: <u>Tim Rogers</u></p> <p>Chair: <u>Apala Majumdar</u></p>			
1:30pm - 3:00pm	<p>Minisymposium 9B: Dynamics of Complex Contagions</p> <p>Location: CB 3.5</p> <p>Chair: <u>Sam Moore</u></p> <p>Chair: <u>Tim Rogers</u></p>	<p>Minisymposium 11B: New Perspectives and Challenges at the Junction of Modelling and Applications</p> <p>Location: CB 4.1</p> <p>Chair: <u>Apala Majumdar</u></p>	<p>Contributed Talks 19: Cardiac dynamics</p> <p>Location: CB 5.1</p> <p>Chair: <u>Hao Gao</u></p>	<p>Minisymposium 15: Mathematical Neuroscience</p> <p>Location: CB 3.16</p> <p>Chair: <u>Stephen Coombes</u></p> <p>Chair: <u>Kyle C Wedgwood</u></p>
	<p>1:30pm - 2:00pm</p> <p>From interdependent percolation to cooperative contagion processes on multilayer networks</p> <p><u>Ginestra Bianconi</u></p>	<p>1:30pm - 2:00pm</p> <p>Likely instabilities in stochastic hyperelastic solids</p> <p><u>L. Angela Mihai</u></p>	<p>1:30pm - 1:50pm</p> <p>Inter-subject variability in rabbit ventricular myocytes and their responses to IKr block</p> <p><u>Muhamad Hifzhudin Noor Aziz</u>, Francis Burton, Godfrey Smith, Radostin D. Simitev</p>	<p>1:30pm - 2:00pm</p> <p>Understanding sensory induced hallucinations: from neural fields to amplitude equations</p> <p><u>Stephen Coombes</u>, Abigail Cocks, Alan Johnston, Daniele Avitabile</p>
	<p>2:00pm - 2:30pm</p> <p>Infection speed on Networks</p> <p><u>Sam Moore</u></p>	<p>2:00pm - 2:30pm</p> <p>Quantization, chaotic dynamics and emergent statistics of a hydrodynamic pilot-wave system</p> <p><u>Matthew Durey</u>, Paul A. Milewski, John W. M. Bush</p>	<p>1:50pm - 2:10pm</p> <p>Effects of myofibre architecture on biventricular biomechanics: a simulation study</p> <p><u>Debao Guan</u>, Jiang Yao, Xiaoyu Luo, Hao Gao</p>	<p>2:00pm - 2:30pm</p> <p>Dynamics of visual perception with periodically changing stimuli</p> <p><u>James Rankin</u>, Farzaneh Darki</p>
	<p>2:30pm - 3:00pm</p> <p>Impact of complexity of contagion and contact on spreading dynamics</p> <p><u>Thomas House</u></p>	<p>2:30pm - 3:00pm</p> <p>Active and passive driving in liquid crystal devices</p> <p><u>Oliver Whitehead</u>, Ian M. Griffiths, Apala Majumdar, Colin P. Please</p>	<p>2:10pm - 2:30pm</p> <p>Challenges in Variability and Uncertainty Quantification for Ion Channel Modelling</p> <p><u>Chon Lok Lei</u>, Michael Clerx, David J Gavaghan, Liudmila Polonchuk, Ken Wang, Gary R Mirams</p>	<p>2:30pm - 3:00pm</p> <p>The bump's in the waves: spatiotemporal patterns in spiking neural networks</p> <p><u>Kyle CA Wedgwood</u>, Daniele Avitabile</p>
			<p>2:30pm - 2:50pm</p> <p>Mathematical Modelling of Coupled Myocytes and</p>	

1:30pm - 3:30pm	<p>Minisymposium 8B: The multiphysics of liquid films, drops, and fibers Location: CB 3.1 Chair: Matthew G. Hennessy</p> <p>1:30pm - 2:00pm Deformation of liquid surfaces under impinging gas jets: modelling and experiments Chinasa Juliet Ojiako, Radu Cimpeanu, Hemaka Bandulasena, Roger Smith, Dmitri Tseluiko</p> <p>2:00pm - 2:30pm Electrostatic control of instabilities in thick liquid layers Alexander Wray, Radu Cimpeanu</p> <p>2:30pm - 3:00pm Stability of a liquid membrane attached to the inside of a vertical cylinder Matthew Haynes, Eugene Benilov</p> <p>3:00pm - 3:30pm Modelling finger flow wetting fronts in soils with the Richards equation and the Preisach operator Denis P Flynn, Warren Roche, Kieran Murphy</p>	<p>Minisymposium 10B: Recent advances in PDE models describing emergent behaviour and collective dynamics Location: CB 3.9 Chair: Bertram Düring Chair: Marie-Therese Wolfram</p> <p>1:30pm - 2:00pm Boltzmann-type optimal control problems Giacomo Albi</p> <p>2:00pm - 2:30pm Proximal Methods for Mean Field Games with Local Couplings Dante Kalise</p> <p>2:30pm - 3:00pm Stationary States and Asymptotic Behaviours of Aggregation Models with Nonlinear Local Repulsion Jose A Carrillo, Yanghong Huang, Marcus Schmidtchen</p> <p>3:00pm - 3:30pm Diffusion of particles with short-range interactions Maria Bruna, Stephen Jonathan Chapman, Martin Robinson</p>	<p>Fibroblasts with Myocardial Infarction scars. Peter Mortensen, Radostin Simitev, Godfrey Smith, Hao Gao</p> <p>Minisymposium 18A: Modelling stochastic biological systems Location: CB 4.16 Chair: Cameron Andrew Smith Chair: Kit Yates</p> <p>1:30pm - 2:00pm Modelling stochastic biological systems Cameron Andrew Smith</p> <p>2:00pm - 2:30pm Particle-based simulations of stochastic reaction-diffusion processes with Aboria Martin Robinson, Philip Maini, Maria Bruna</p> <p>2:30pm - 3:00pm Equilibration times within heterogeneous crowded environments Daniel Wilson, Matthew Simpson, Ruth Baker, Francis Woodhouse</p> <p>3:00pm - 3:30pm Stochastic amplification of oscillatory gene expression underlies cell differentiation during embryonic neurogenesis Jochen Kursawe, Cerys Manning, Veronica Biga, Nancy Papalopulu</p>	<p>Minisymposium 13B: Fluctuating Hydrodynamics Location: CB 3.15 Chair: James Edward Sprittles Chair: Serafim Kalliadas</p> <p>1:30pm - 2:00pm General Framework for Fluctuating Dynamic Density Functional Theory Serafim Kalliadas, Miguel A. Duran-Olivencia, Peter Yatsyshin, Benjamin D. Goddard</p> <p>2:00pm - 2:30pm A data-driven approach to model reduction: Deep-learning memory effects Antonio Russo, Miguel A. Durán-Olivencia, Ioannis G. Kevrekidis, Serafim Kalliadas</p> <p>2:30pm - 3:00pm A finite volume scheme for stochastic PDEs Sergio P. Perez, Antonio Russo, Miguel A. Duran-Oivencia, Peter Yatsyshin, Jose A. Carrillo, Serafim Kalliadas</p> <p>3:00pm - 3:30pm Droplet coalescence commences in a 'thermal regime' Sreehari Perumanath, Matthew K. Borg, Mykyta V. Chubynsky, James E. Sprittles, Jason M. Reese</p>
	<p>Minisymposium 16A: Toy mathematical models in the physical sciences Location: CB 4.10 Chair: Philippe Trinh</p> <p>1:30pm - 2:00pm A toy model of exponentially-small instabilities in geophysical flows Stephen David Griffiths</p> <p>2:00pm - 2:30pm A toy model of coastal outflows Sean Jamshidi, Edward Johnson</p> <p>2:30pm - 3:00pm A toy model for flows through vegetation</p>	<p>Minisymposium 7: Nonsmooth Dynamical Systems: From Nodes to Networks. Location: CB 4.8 Chair: Yi Ming Lai</p> <p>1:30pm - 2:00pm Analysis of networks where discontinuities and nonsmooth dynamics collide: understanding synchrony Yi Ming Lai</p> <p>2:00pm - 2:30pm Asynchronous networks of phase oscillators with dead zones Christian Bick</p> <p>2:30pm - 3:00pm</p>	<p>Minisymposium 24: Machine Learning and Inverse Problems Location: CB 3.11 Chair: Mohammad Golbabaee</p> <p>1:30pm - 2:00pm Computational MRI: from compressed sensing to machine learning Mike Davies</p> <p>2:00pm - 2:30pm Robustness and geometry of deep neural networks Alhussein Fawzi</p> <p>2:30pm - 3:00pm Adversarial regularizers in inverse problems Sebastian Lunz</p> <p>3:00pm - 3:30pm</p>	<p>Minisymposium 14A: Mathematical Modelling of Lithium-Ion Batteries Location: CB 3.6 Chair: Matthew Hunt Chair: Jamie Michael Foster</p> <p>1:30pm - 2:00pm Multiscale modelling of cylindrical lithium ion battery temperature profiles Matthew Hunt, Ferran Brosa-Planella, Florian Theil, Dhammika Widanelage</p> <p>2:00pm - 2:30pm Mathematical insights into heat generation in lithium-ion batteries Matthew G. Hennessy, Iain R. Moyles</p> <p>2:30pm - 3:00pm</p>

	<p><u>Clint Y. H. Wong</u>, Philippe H. Trinh, S. Jonathan Chapman</p> <p>3:00pm - 3:30pm</p> <p>A toy model for aeroacoustic catastrophes</p> <p><u>Christopher John Howls</u>, Jon Stone, Rodney Self</p>	<p>Dynamics in the switching layer -- mysteries and methods</p> <p><u>Mike Jeffrey</u></p> <p>3:00pm - 3:30pm</p> <p>The nonsmooth dynamics of sleep-wake regulation</p> <p><u>Anne C Skeldon</u></p>	<p>Four dimensional ultrasound tomography with real data via traditional inversion and via machine learning</p> <p><u>Manuch Soleimani</u></p>	<p>Asymptotic Reduction of Battery Models</p> <p><u>Scott Marquis</u></p> <p>3:00pm - 3:30pm</p> <p>The role of conductivity in facilitating fast (dis)charge in LFP electrodes</p> <p><u>Jamie Michael Foster</u></p>
	<p>Contributed Talks 20: Waves 1 Location: CB 3.7 Chair: Ory Schnitzer</p> <p>1:30pm - 1:50pm</p> <p>Slender-body theory for localized-surface-plasmon resonance</p> <p><u>Matias Ruiz</u>, Ory Schnitzer</p>	<p>Minisymposium 23A: The Mathematics for Industry Network MI-Net – a European success story Location: CB 1.11 Chair: Dietmar Hoemberg Chair: Katerina Kaouri</p> <p>1:30pm - 2:00pm</p> <p>MI-Net networking lunch continues</p> <p>--</p>		
	<p>1:50pm - 2:10pm</p> <p>Wave manipulation on thin elastic plates</p> <p><u>Gregory James Chaplain</u>, Richard V. Craster</p>	<p>2:00pm - 2:25pm</p> <p>Science Shops and European Study Groups with Industry: European synergies for tackling societal challenges in the open science era</p> <p><u>Katerina Kaouri</u></p>		
	<p>2:10pm - 2:30pm</p> <p>Effective transparency of dense metallic crystals</p> <p><u>Ory Schnitzer</u>, Richard V. Craster, Rodolfo Brandao</p>	<p>2:25pm - 2:50pm</p> <p>Physically feasible decomposition of Engino® toy models: A graph-theoretic approach</p> <p><u>Miguel David Bustamante</u>, Efstathios Antoniou, Adérito Araújo, Aviv Gibali</p>		
	<p>2:30pm - 2:50pm</p> <p>Extraordinary transmission through a narrow slit</p> <p><u>Jacob R. Holley</u>, Ory Schnitzer</p>	<p>2:50pm - 3:15pm</p> <p>ESGI 137: Total Hip Arthroplasty Workshop Report</p>		
	<p>2:50pm - 3:10pm</p> <p>Acoustic scattering from bubbles trapped in micro-grooves</p> <p><u>Rodolfo Brandao</u>, Ehud Yariv, Ory Schnitzer</p>	<p>3:10pm - 3:30pm</p> <p>Friedlander-Keller Ray Expansions and Scattering at Perturbed Boundaries</p> <p><u>Anthony Marko Rade Radjen</u></p>		
	<p>3:10pm - 3:30pm</p> <p>Friedlander-Keller Ray Expansions and Scattering at Perturbed Boundaries</p> <p><u>Anthony Marko Rade Radjen</u></p>	<p>Minisymposium 19A: Different Viewpoints on Multi-Scale Problems Location: CB 4.1 Chair: Hong Duong Chair: Johannes Zimmer</p> <p>3:30pm - 4:00pm</p> <p>String method for generalised gradient flows: computation of rare events in reversible stochastic processes</p> <p><u>Tobias Grafke</u></p>	<p>Minisymposium 20A: Understanding the dynamics of particle and droplet impacts Location: CB 5.1 Chair: Ryan Palmer Chair: Frank Thomas Smith</p> <p>3:30pm - 4:00pm</p> <p>Skimming impacts and rebounds of arbitrarily shaped bodies on shallow liquid layers</p> <p><u>Ryan Palmer</u>, Frank Smith</p>	<p>Minisymposium 22A: Inverse Problems: Theory and Applications Location: CB 3.16 Chair: Neil Chada Chair: Christopher Budd</p> <p>3:30pm - 4:00pm</p> <p>Variational networks: learning regularisation operators for inverse problems</p> <p><u>Martin Benning</u>, Erich Kobler, Thomas Pock</p>
3:30pm - 5:00pm	<p>Minisymposium 21A: Networks, Collective Behaviour and their Applications Location: CB 3.5 Chair: Chris Antonopoulos</p> <p>3:30pm - 4:00pm</p> <p>Small-worldness favours network inference</p> <p><u>Rodrigo A. García</u>, Arturo C. Martí, Cecilia Cabeza, Nicolás Rubido</p>	<p>4:00pm - 4:30pm</p> <p>Edge Multiscale Methods for elliptic problems with heterogeneous coefficients</p>	<p>4:00pm - 4:30pm</p> <p>High speed drop impact at arbitrary angles of incidence: a multi-scale</p>	<p>4:00pm - 4:30pm</p> <p>Influence of numerical discretisation on object</p>
	<p>4:00pm - 4:30pm</p> <p>Topological Melting in Networks of Granular Materials</p> <p><u>Najlaa Sadeq Alalwan</u></p>			

<p>4:30pm - 5:00pm</p> <p>Scaled consensus of switched multi-agent systems</p> <p><u>Yilun Shang</u></p>	<p><u>Guanglian Li</u></p> <hr/> <p>4:30pm - 5:00pm</p> <p>Novel approaches for upscaling linear advection diffusion reaction processes in porous media</p> <p><u>Matteo Icardi</u></p>	<p>approach to defining water collection efficiency</p> <p><u>Radu Cimpeanu</u>, Demetrios Papageorgiou</p> <hr/> <p>4:30pm - 5:00pm</p> <p>The impact of wrinkling on impact</p> <p><u>Doireann O'Kiely</u>, Finn Box, Ousmane Kodio, Maxime Inizan, Alfonso Castrejon-Pita, Jonathan Whiteley, Dominic Vella</p>	<p>characterisation in inverse problems</p> <p><u>Alan A. S. Amad</u>, Paul D. Ledger, William R.B. Lionheart</p> <hr/> <p>4:30pm - 5:00pm</p> <p>A computationally efficient regularisation strategy for Ensemble Kalman Inversion</p> <p><u>Yuchen Yang</u>, Marco Iglesias</p>
<p>Minisymposium 23B: The Mathematics for Industry Network MI-Net – a European success story</p> <p>Location: CB 1.11</p> <p>Chair: Dietmar Hoemberg</p> <p>Chair: Katerina Kaouri</p> <p>3:30pm - 3:45pm</p> <p>Coffee break</p> <p>--</p> <hr/> <p>3:45pm - 4:10pm</p> <p>Elkem and Industrial-focused mathematicians – More than 30 years of fruitful collaboration</p> <p><u>Aasgeir Valderhaug</u></p> <hr/> <p>4:10pm - 4:35pm</p> <p>Imaging nanoparticles with visible light: an Industrial Mathematics case study</p> <p><u>Tim Myers</u>, Wolfgang Bacsa</p> <hr/> <p>4:35pm - 5:00pm</p> <p>Neural Networks and Arbitrage in the VIX – A Deep Learning Approach for the VIX</p> <p><u>Joerg Robert Osterrieder</u></p>			
<p>4:00pm - 5:00pm</p> <p>Minisymposium 17A: Non-convex methods in inverse problems</p> <p>Location: CB 3.1</p> <p>Chair: Sean Fraser Holman</p> <hr/> <p>4:00pm - 4:30pm</p> <p>Weakly-convex Multibang Regularization in Passive Radiation Imaging</p> <p><u>Philip, John Richardson</u>, Sean Holman</p> <hr/> <p>4:30pm - 5:00pm</p> <p>Proximal Alternating Linearized Minimization for dynamic CT in the foot and ankle</p> <p><u>Nargiza Djurabekova</u></p>	<p>Contributed Talks 12: Evolution</p> <p>Location: CB 3.9</p> <p>Chair: Tim Rogers</p> <hr/> <p>4:00pm - 4:20pm</p> <p>How do individuals' personality traits influence the community survival?</p> <p><u>Martina Testori</u>, Hedwig Eisenbarth, Rebecca B. Hoyle</p> <hr/> <p>4:20pm - 4:40pm</p> <p>Mortality differences suppress the number of self-incompatible mating type alleles in isogamous species</p> <p><u>Yvonne Krumbeck</u>, Tim Rogers, George Constable</p> <hr/> <p>4:40pm - 5:00pm</p> <p>Memory granularity effects in evolutionary binary games.</p>	<p>Contributed Talks 7: Thin films</p> <p>Location: CB 4.16</p> <p>Chair: Stephen Wilson</p> <hr/> <p>4:00pm - 4:20pm</p> <p>Molecular simulations of thin liquid films: thermal fluctuations and instability</p> <p><u>Yixin Zhang</u>, James Edward Sprittles, Duncan A. Lockerby</p> <hr/> <p>4:20pm - 4:40pm</p> <p>Analysis of Thin Leaky-Dielectric Layers Subject to an Electric Field</p> <p><u>Matthew Keith</u>, Stephen Wilson, Alexander Wray</p> <hr/> <p>4:40pm - 5:00pm</p> <p>Coating Flow on a Rotating Horizontal Cylinder subject to an Airflow</p> <p><u>Andrew James Mitchell</u>, Brian Duffy, Stephen Wilson</p>	<p>Contributed Talks 23: Mathematical chemistry</p> <p>Location: CB 3.15</p> <p>Chair: Shibabrat Naik</p> <hr/> <p>4:00pm - 4:20pm</p> <p>Instability of Homogenous States in the Gray--Scott Model</p> <p><u>Joseph Andrew Elmes</u>, Cédric Beaume</p> <hr/> <p>4:20pm - 4:40pm</p> <p>Finding NHIM: Identifying High Dimensional Phase Space Structures in Reaction Dynamics using Lagrangian Descriptors</p> <p><u>Shibabrat Naik</u>, Stephen Wiggins</p> <hr/> <p>4:40pm - 5:00pm</p> <p>Roaming reaction dynamics: An invariant manifold perspective</p>

	<p>Contributed Talks 31: Transition to turbulence 2 Location: CB 4.10 Chair: Andrew Walton</p> <p>4:00pm - 4:20pm</p> <p>Self-sustaining dual critical layer states in plane Poiseuille-Couette flow at large Reynolds number <u>Rishi Kumar</u>, Andrew Walton</p>	<p>Contributed Talks 22: Image processing Location: CB 4.8 Chair: Paul Shepherd</p> <p>4:00pm - 4:20pm</p> <p>Full Waveform Inversion of Ultrasonic Array Data for Elastic Property Tomography <u>Russell Graeme Niven</u></p>	<p>Minisymposium 12B: Modern Approaches to Inverse Problems Location: CB 3.11 Chair: Matthias J Ehrhardt</p> <p>4:00pm - 4:30pm</p> <p>On support localisation, the Fisher metric and optimal sampling in off-the-grid sparse regularisation. <u>Clarice Poon</u></p>	<p>Contributed Talks 25: Soft matter 2 Location: CB 3.6 Chair: Christopher Prior</p> <p>4:00pm - 4:20pm</p> <p>Writhing of complex entangled tubular bundles <u>Christopher Prior</u>, Anthony Yeates</p>
	<p>4:20pm - 4:40pm</p> <p>Understanding the scaffold of turbulence in compressible flows <u>Eleanor Catherine Johnstone</u>, Philip Hall</p>	<p>4:20pm - 4:40pm</p> <p>Linking reaction-diffusion and threshold dynamics on graphs <u>Jeremy Michael Budd</u>, Yves van Gennip</p>	<p>4:30pm - 5:00pm</p> <p>Uniqueness of non-negative super-resolution <u>Jared Tanner</u></p>	<p>4:20pm - 4:40pm</p> <p>The Well Order Reconstruction Solution for Three-Dimensional Wells Giacomo Canevari, <u>Joseph Harris</u>, Apala Majumdar, Yiwei Wang</p>
	<p>4:40pm - 5:00pm</p> <p>Optimizing a baffle to stabilize pipe flow <u>Zijing Ding</u>, Rich Kerswell</p>	<p>4:40pm - 5:00pm</p> <p>Robust image segmentation with medical applications <u>Liam Burrows</u>, Ke Chen, Francesco Torella</p>		<p>4:40pm - 5:00pm</p> <p>Indentation tests of two-dimensional materials: separating non-linear material behaviour from experimental error <u>Thomas Graham John Chandler</u>, Dominic Vella</p>
	<p>Contributed Talks 21: Waves 2 Location: CB 3.7 Chair: Art Gower</p> <p>4:00pm - 4:20pm</p> <p>Discontinuous Galerkin Method for Viscoelastic Problems with Internal Variables <u>Yongseok Jang</u></p>			
	<p>4:20pm - 4:40pm</p> <p>Waves in Particulate Materials: Beyond Low Frequencies <u>Artur L. Gower</u>, I. David Abrahams, William J. Parnell</p>			
	<p>4:40pm - 5:00pm</p> <p>P-SV wave scattering from an array of cylinders; tail-end asymptotics for the quasi-periodic Green's function <u>Georgia Madison Lynott</u>, William J. Parnell, I. David Abrahams</p>			
5:00pm - 6:00pm	<p>Plenary 5 Location: CB 1.10 Chair: Jonathan Dawes</p> <p>Collaborative Industrial Mathematics in Europe <u>Poul Hjorth</u></p>			
7:30pm - 8:00pm	Pre-dinner drinks			
8:00pm - 9:30pm	Conference Dinner			

Date: Friday, 26/Apr/2019

9:30am Plenary 6: The IMA Lighthill Lecture

Location: [CB 1.10](#)

-

10:30am

Singular Formation in 3D Euler Equations and Related Models

Tom Hou

10:30am Coffee break

Location: [Foyer, Level 1](#)

-

11:00am

11:00am Minisymposium 17B: Non-convex methods in inverse problems

Location: [CB 3.1](#)

Chair: Sean Fraser Holman

11:00am - 11:30am

Nonlinear matrix recovery

Florentin Govens, Coralia Cartis, Armin Eftekhari, Greg Ongie

11:30am - 12:00pm

Task-adapted reconstruction from tomographic data

Carola-Bibiane Schönlieb

12:00pm - 12:30pm

Bregman algorithms for non-convex optimisation problems with applications in magnetic resonance imaging

Matthias Ehrhardt, Martin Benning, Marta Betcke, Veronica Corona, Lynn Gladden, Richard Mair, Andi Reci, Stefanie Reichelt, Andrew Sederman, Carola-Bibiane Schönlieb

11:00am Minisymposium 18B: Modelling stochastic biological systems

Location: [CB 4.16](#)

Chair: Cameron Andrew Smith

Chair: Kit Yates

11:00am - 11:30am

Homogenization approximations for advection-dominated solute transport in a spatially disordered domain

George Price, Oliver Jensen

11:30am - 12:00pm

Modeling molecular diffusion in the intracellular environment

Remus Stana

12:00pm - 12:30pm

Stochastic dynamics and regulation of Filopodia-like structures

11:00am Minisymposium 21B: Networks, Collective Behaviour and their Applications

Location: [CB 3.5](#)

Chair: Chris Antonopoulos

11:00am - 11:30am

Dynamics on modular networks: Chimera-like states, cannibalism and hidden modules

Gorka Zamora-López, Nikos E. Kouvaris, Tiago Pereira

11:30am - 12:00pm

Fast and slow domino effects in networks

Jen Creaser, Peter Ashwin, Krasimira Tsaneva-Atanasova

12:00pm - 12:30pm

Integrating sentiment and social structure to determine preference alignments: The Irish Marriage Referendum

David J.P. O'Sullivan, Guillermo Garduño-Hernández, James P Gleeson, Mariano Beguerisse-Díaz

11:00am Minisymposium 20B: Understanding the dynamics of particle and droplet impacts

Location: [CB 5.1](#)

Chair: Ryan Palmer

Chair: Frank Thomas Smith

11:00am - 11:30am

Three-dimensional gas-cushioned droplet impacts with finite-depth liquid layers

Peter Daniel Hicks

11:30am - 12:00pm

Fluid-body interactions and impacts at high flow rates

Frank Thomas Smith

12:00pm - 12:30pm

Towards High-speed Impacts on Engineered Surfaces

Manish K Tiwari

Contributed Talks 29: Genetics and stem cells

Location: [CB 3.9](#)

Chair: Gabor Kiss

11:00am - 11:20am

Modelling The Gene Regulatory Network Governing Efflux Pump Expression In Gram-Negative Bacteria

George Henry Youlden, Sara Jabbari, John King

11:20am - 11:40am

Equilibria and oscillations of a regulated two-gene model

Gabor Kiss

11:40am - 12:00pm

Modelling human embryonic stem cell colonies to optimise clonality

Laura Wadkin, Sirio Orozco-Fuentes, Irina Neganova, Sanja Bojic, Nick Parker, Anvar Shukurov, Majlinda Lako

12:00pm - 12:20pm

Understanding Shh Aggregation through Mathematical Modelling

Daniel Derrick, Kathryn Wolton, Richard Currie, Marcus Tindall

Contributed Talks 16: Physiology 3

Location: [CB 3.15](#)

Chair: Marianna Cerasuolo

11:00am - 11:20am

Primary blast lung injury simulator: a mathematical/computational model based on Human Data

Mainul Haque, Timothy Scott

11:20am - 11:40am

New information from old signals: A novel approach to the analysis of ECG waveforms

Jane V Lyle, Philip J Aston, Manasi Nandi

11:40am - 12:00pm

Revealing hidden mutations in intestinal tissue

11:00am Minisymposium 19B: Different Viewpoints on Multi-Scale Problems

Location: [CB 4.1](#)

Chair: Hong Duong

Chair: Johannes Zimmer

11:00am - 11:30am

Averaging of fast-slow Hamiltonian systems

Matthias Klar, Karsten Matthies, Johannes Zimmer

11:30am - 12:00pm

Front propagation in periodic flows

Alexandra Tzella, Jacques Vanneste

12:00pm - 12:30pm

On using fluctuation dissipation relations for finding macroscopic evolution equations from particle observations

Peter Embacher, Nicolas Dirr, Johannes Zimmer, Celia Reina, Xiaoguai Li

11:00am Minisymposium 22B: Inverse Problems: Theory and Applications

Location: [CB 3.16](#)

Chair: Neil Chada

Chair: Christopher Budd

11:00am - 11:30am

Parameter estimation for pedestrian dynamics models

Susana Gomes, Andrew Stuart, Marie-Therese Wolfram

11:30am - 12:00pm

Learning a Sampling Pattern for MRI

Ferdia Sherry, Matthias J. Ehrhardt, Carola-Bibiane Schönlieb

12:00pm - 12:30pm

Learned image reconstruction for high-

<p>Ulrich Dobramysl, Iris Jarsch, Hanae Shimo, Yoshiko Inoue, Benjamin Richier, Jonathan Gadbsy, Julia Mason, Astrid Walrant, Richard Butler, Edouard Hannezo, Benjamin Simons, Jennifer Gallop</p>		<p>Doran Khamis, Ed Morrissey</p>	<p>resolution tomographic imaging Andreas Hauptmann</p>
<p>Minisymposium 16B: Toy mathematical models in the physical sciences Location: CB 4.10 Chair: Philippe Trinh</p>	<p>Contributed Talks 8: Fluids 4 Location: CB 4.8 Chair: Guanglian Li</p>	<p>Contributed Talks 11: Droplets 3 Location: CB 3.11 Chair: Alexander Wray</p>	<p>Minisymposium 14B: Mathematical Modelling of Lithium-Ion Batteries Location: CB 3.6 Chair: Matthew Hunt Chair: Jamie Michael Foster</p>
<p>11:00am - 11:30am A toy model for bacterial nutrient uptake Mohit Dalwadi, Yanming Wang, John King, Nigel Minton</p>	<p>11:00am - 11:20am Spatio-temporal symmetry-breaking of the flow past an oscillating cylinder Puneet Matharu, Andrew Hazel, Matthias Heil</p>	<p>11:00am - 11:20am Competitive evaporation of multiple sessile droplets Stephen K. Wilson, Alexander W. Wray, Brian R. Duffy</p>	<p>11:00am - 11:30am Multiscale modeling of lithium batteries Jeta Molla, Markus Schmuck</p>
<p>11:30am - 12:00pm A toy model for the manufacture of liquid crystal devices Joseph R. L. Cousins, Stephen K. Wilson, Nigel J. Mottram</p>	<p>11:20am - 11:40am Talk cancelled --</p>	<p>11:20am - 11:40am Bifurcation analysis of evaporating droplets on smooth surfaces Michael Ewetola, Marc Pradas</p>	<p>11:30am - 12:00pm Electrode heterogeneity in lithium ion batteries Jon Chapman, Toby Kirk, Colin Please</p>
<p>12:00pm - 12:30pm A toy model for surge in turbochargers Kate Powers</p>	<p>11:40am - 12:00pm Generation of first Mack modes in supersonic boundary layers by slow acoustic waves interacting with streamwise isolated wall roughness Yinhui Liu, Ming Dong, Xuesong Wu</p>	<p>11:40am - 12:00pm A 2D model for the evaporation of a pair of liquid ridges Feargus Schofield, Stephen Wilson, David Pritchard, Alexander Wray, Khellil Sefiane</p>	<p>12:00pm - 12:30pm On the (dis)charge of LiFePO4-based Li-ion battery electrodes Michael Jack Castle, Rahifa Ranom, Giles Richardson, Jamie Michael Foster</p>
<p>12:00pm - 12:20pm The periodic multiply-connected Schwarz-Christoffel mapping Peter Jonathan Baddoo, Darren G Crowdy</p>	<p>12:00pm - 12:20pm Evaporation of a sessile droplet in a shallow well Hannah-May D'Ambrosio, Stephen K. Wilson, Brian R. Duffy, Teresa Colosimo, Colin D. Bain, Daniel E. Walker</p>		
<p>Contributed Talks 17: Granular media Location: CB 3.7 Chair: Gleb Zhelezov</p>			
<p>11:00am - 11:20am Modelling granular media using Dynamical Density Functional Theory Timothy David Hurst, Ben Goddard, Raffaella Ocone</p>			
<p>11:20am - 11:40am Dynamic Density Functional Theory: Well-Posedness, Global Asymptotic Stability Ben Goddard, Rory Mills-Williams, Grigoris Pavliotis</p>			
<p>11:40am - 12:00pm Diffusion processes at nanoscale Claudia Fanelli</p>			
<p>12:00pm - 12:20pm Application of the compressible I-dependent</p>			

**rheology to chute and shear
flow instabilities**

**James S. Fannon, Iain R.
Moyles, Andrew C. Fowler**

12:30pm Lunch
- Location: **Foyer, Level 1**

1:30pm

1:30pm Plenary 7: The QJMAM Fund Lecture
- Location: **CB 1.10**

2:30pm Chair: **Christopher Budd**

The mathematical theory of geophysical flow models - challenges and some results

Beatrice Pelloni

2:30pm Plenary session: Prize presentations
- Location: **CB 1.10**

3:00pm

3:00pm Coffee and departures
- Location: **Foyer, Level 1**

3:30pm