The 63rd British Applied Mathematics Colloquium

Conference Programme

BAMC22

bamc2022.lboro.ac.uk

Loughborough University

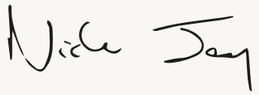
WELCOME

Dear participants of the 63rd British Applied Mathematics Colloquium, welcome to Loughborough!

The BAMC is a meeting that has a central place in the UK Applied Mathematics calendar. It is one of the first places where PhD students and Early Career Researchers present their work, and where mathematicians across all career stages have a chance to actively interact with each other. This aspect of the conference has been severely affected during the pandemic.

The first 'post-pandemic' BAMC will be held in Loughborough in a hybrid format (allowing both in person and online participation) for the first time in the history of the conference. It has been a challenging task for the organisers and I would like to thank them for their hard work in making all the necessary arrangements. I hope that the conference will give all researchers a chance to interact with their peers and the broader community, while simultaneously helping to address inclusivity and diversity needs.

I am delighted to see that the submitted contributions have allowed the conference team to put together an exciting programme. I wish you a very successful and enjoyable meeting and look forward to joining you during the event.



Professor Nick Jennings CB, FREng
Vice-Chancellor and President

ORGANISING COMMITTEE

Andrew Archer, Karima Khusnutdinova, Anatoly Neishtadt and David Sibley

PRINCIPAL ADMINISTRATIVE COMMITTEE

Mark Dabney, Aaran Grimley

ESSENTIAL INFORMATION

Website and latest information

Latest information and update can be found at **bamc2022.lboro.ac.uk**

The conference programme and timetables can be found on the BAMC2022 website.

Registration

Registration will take place in James Frances Exhibition Area, this will also act as a point of assistance throughout the conference.

Hybrid event information

This BAMC will be the first in a hybrid format. We plan that online and in-person participants interact reasonably seamlessly throughout. In particular, talks have not been separated by mode of delivery, and online participants will watch/present to physical rooms.

MS Teams is accessible on mobile devices as well as computers, and hence interaction between online and in-person participants should be possible e.g. in refreshment breaks, if in-person participants log into the BAMC Team (see below).

All in-person presenters will need to share their slides through MS Teams screen-sharing in the channel of the same name as the physical room. There will be helpers to aid in this. Online presenters will use their own device and also screen-share through MS Teams, and in-person participants will see their presentation in the relevant physical lecture theatre.

All major plenary lectures will be held in EHB.1.04 (Edward Herbert Building), and the MS Teams channel EHB104 should be used by online participants.

BAMC Team on MS Teams

Microsoft Teams may be accessed through an installed app on a computer or smartphone, or via a web browser. All participants using MS Teams will need to log in with the email address they registered to the conference with (or one we have otherwise been supplied with by you). Once MS Teams is open, navigate to your list of "Teams" and you should find one called "British Applied Mathematics Colloquium". Within this, there will be a list of channels (General, CC011, CC012,...). The General channel may be used for some announcements, but for the majority of the time, online participants should use the programme to see which physical room the talks/events are being held in, and then select the channel of the same name to view the talk.

Refreshments

Tea and coffee will be provided in James Frances Exhibition Space each morning and afternoon throughout the conference (morning only Wednesday 13th April).

Lunch will be provided each day in the same location, your Conference lanyard and name badge will act as your lunch ticket. Dietary requirements as requested in your booking will be available on the day.

The EHB (Edward Herbert Building) shop will be open 08.30–16.00 daily throughout the conference for any additional refreshment needs.

Monday evening Poster Session and CUP wine reception

There will be a wine reception sponsored by Cambridge University Press at the poster session on Monday 11th April at 18.10 in the James Frances Exhibition Area. Entry to the reception is included in your registration fee. Alterative drinks will be available.

There will be an opportunity to talk with Poster presenters (online and in-person). In-person poster presenters should hang their posters during the Monday morning registration time, or as soon as possible afterwards. Online poster presenters will join the Exhibition area via a big screen to give a brief "shout out" about their poster.

All posters will be available physically (online presenters will have their posters printed by the organisers), and digitally via the BAMC Teams channel. In-person participants are encouraged to ask questions via Teams to the online poster presenters (using their own device or using a lectern in one of the adjoining lecture theatres), and in-person poster presenters may wish to also join MS Teams (e.g. via a smartphone) to interact with online participants.

Conference Gala Dinner

The Conference Dinner will be held at Burleigh Court Hotel on the evening Tuesday 12th April at 18:30. This event requires an additional pre-paid ticket, which will be included on the back of your name badge.

The meal will be proceeded by a short drink's reception held at the hotel lounge.

Bars and pubs

Burleigh Court Hotel and The Link Hotel both have onsite bars open till late.

If you wish to get off campus for the evening, there are a variety of bars and restaurants in Loughborough Town Centre.

The town centre is around a 25 minute walk from the conference venue. There is also a bus (Kinch Sprint) that operates between the university, town centre, and train station. Information is here **kinchbus.co.uk/services/sprint** but note that there is a slightly reduced timetable (shown on the above website) during the university holidays and the last buses are only around 6pm.

Taxis

There are a number of taxi companies in Loughborough. If arriving by train, Loughborough is a major station where taxis are usually available on the rank. Your hotel will be able to provide taxi numbers if required, with a selection here.

ADT Taxis 01509 260000
TK Taxis 01509 231313

Parking on campus

Parking on Loughborough University campus is free of charge. As you come past the security gatehouse, you will be provided with a parking permit and you can use any of the onsite car parks. We recommend Car Park 9 due to its proximity to the venue (3 minute walk).

Accommodation

There are three University hotels available onsite. We recommend Burleigh Court 4* Hotel as our primary conference hotel. However alternatives can be found at the Elite Athlete Centre or The Link Hotel **welcometoimago.com**

Wi-Fi Access

Wi-Fi is available anywhere on campus. If you have an existing eduroam account, you should automatically connect. If you do not have an eduroam account, you can connect using the Imago network. You will need to register with your email account and the code 4435 for activation.

PLENARY SPEAKERS

Professor Catherine Sulem FRSC
University of Toronto

Stewartson Memorial Lecture

Normal form transformations and the Dysthe's equation for the nonlinear modulation of deep-water gravity waves

Modulation theory has been an effective tool for the asymptotic modeling and analysis of surface gravity waves in a weakly nonlinear scaling regime. Two limiting regimes of interest are the shallow-water regime where waves are viewed as mild modulations of the uniform mean flow, and the deep-water regime where approximate solutions are sought in the form of mild modulations of monochromatic waves. The present talk is focused on the latter case where a modulational Ansatz makes it possible to derive reduced models for the wave envelope such as the nonlinear Schrödinger equation which is a canonical model for nonlinear dispersive waves. Another example is the Davey–Stewartson system which describes wave modulation on finite depth in three dimensions. A higher-order approximation was proposed by Dysthe (1979) for deep water using the perturbative method of multiple scales and was later extended to several other settings. The Dysthe equation and its variants have been widely used in the water wave community due to their efficiency at describing realistic waves, in particular waves with moderately large steepness. However, unlike the Nonlinear Schrödinger equation, earlier versions of the Dysthe equation are not Hamiltonian while the original water wave system has a Hamiltonian structure. Using the method of normal form transformations near the equilibrium state, I will present a new derivation of the Dysthe equation that preserves the Hamiltonian character of the water wave problem. A precise calculation of the third-order normal form allows for a refined reconstruction of the free surface. This modulation approximation is tested against direct numerical simulations of the full Euler system and against predictions from the classical Dysthe equation in various physical settings.

Professor William Parnell
University of Manchester

The QJMAM Lecture

The Mathematics of Waves and (Meta) Materials

The last two decades have seen a rapid advance in the science of advanced composites and metamaterials, i.e. media that have properties that surpass those exhibited by materials available from natural sources. Applied mathematics has played a key role in this progress, ranging from developments in transformation theory to yield the required properties of cloaks and metamaterials, to advances in dynamic homogenisation techniques to predict effective properties for specific microstructures in order to try to realise those metamaterials. It was also understood that the Willis-Milton-Briane equations, first introduced by Willis in 1981, could model the effective dynamic behaviour of complex inhomogeneous media with microstructural asymmetries, by employing non-standard elastodynamic constitutive equations. A range of topics will be described in this talk, covering much of the work that our group has carried out over the last 5-6 years and in particular in the areas of wave propagation in complex media, metamaterials, and the modelling and design of advanced composites. We will highlight the benefits that can be realised by working at the interface of mathematics and materials characterisation, imaging and state-of-the-art experimentation and the impact that this can have on applied mathematics. In the first half of the talk we will cover some concepts associated with wave propagation in complex media and the notion of effective properties of inhomogeneous materials. We will introduce transformation theory and describe how this can act as one approach to metamaterial and advanced composites design. We will describe slow sound, and acoustic cloaks, as well as elastic cloaks in both the static and dynamic regimes. Much of acoustics is focused on tuning the impedance of a medium in order to control sound and vibration. We will discuss one such application for a specific type of composite foam, describing its constitutive behaviour with reference to a broad range of mathematical techniques including nonlinear viscoelasticity and constrained buckling. Under load, the medium in question undergoes strong nonlinearity and we describe how modelling has been integrated with experimentation and characterisation to better understand the behaviour of these foams, whilst also pointing to surrogate modelling techniques that can be exploited to optimise the material's response in future designs. The second half of the talk will cover some very recent work associated with elastodynamic metamaterials. We introduce some new concepts for enhanced elastodynamic resonators and discuss how they can be employed to tune scattered fields and metamaterial properties. Following this, we describe a novel microstructural configuration with asymmetry that leads to directional-dependent properties that do not break (physical) reciprocity arguments. The effective response of these materials must be described by elastodynamic constitutive laws with a non-zero Willis coupling coefficient. These materials and their associated dynamic constitutive laws pave the way for new materials that can control, tune and redirect acoustic and elastic waves in novel and exciting ways.

Professor Julia Yeomans FRS
University of Oxford

Active Matter: "Evading the decay to equilibrium"

In his 1944 book, ""What is Life? The Physical Aspect of the Living Cell"", Erwin Schrödinger wrote living matter evades the decay to equilibrium.

Active matter theories, which describe persistent non-equilibrium behaviour, are being increasingly applied to biological processes. Dense active matter shows complex collective behaviour, and mesoscale turbulence, the emergence of chaotic flow structures characterised by high vorticity and self-propelled topological defects. I shall discuss how the ideas of active matter are suggesting new ways of interpreting cell motility and morphogenesis.

Public Lecture

Mathematics: Enabling Innovation in Sport

Dr Peter Husemeyer, Co-Founder and CTO of Sportable Sportable Technologies Ltd is a UK-based Sports Data company. They recently launched the world's first commercially available 'smart' rugby ball in partnership with Gilbert. Sportable is an innovative, forward thinking tech start-up that is revolutionising how we view, understand and interact with live sport. With rugby as a primary focus, they are working with a number of top teams and manufacturers, creating and developing state of the art hardware and wearable devices that enable sport specific data to be collated in real time to deliver an enhanced spectator experience, and elevated fan engagement. Peter holds Bachelor and Master's degrees from the University of Cape Town, and a PhD in Nuclear Engineering from the University of Cambridge. Prior to founding Sportable, Peter worked at the NASA Marshall Space Flight Center, investigating the feasibility of an advanced rocket engine concept. In 2016, Peter co-founded Sportable, and as its Chief Technology Officer leads on product development and innovation related activities.

Panel Discussion

Facilitator

Professor Mike Caine, Professor of Sports Technology and Innovation and Associate Pro Vice-Chancellor for Sport. Professor Caine has collaborated with many of the world's leading sporting goods brands, developing and commercialising new products.

Panellists

Dr Varuna De Silva – Senior Lecturer in Artificial Intelligence, specifically multi-agent reinforcement learning, multimodal computer vision, and simulation models in Sport, and other application domains.

Dr Lauren Burch – Senior Lecturer in Sport Business with research interests in digital and social media communication and marketing within the Sports industry.

Professor Nick Jennings – Vice-Chancellor and President of Loughborough University. Professor Nick Jennings is an internationally-recognised authority in the areas of AI, autonomous systems, cyber-security and agent-based computing.

Professor Helen Wilson
University College London

IMA Lighthill Lecture
Modelling Complex Suspensions

Materials made from a mixture of liquid and solid are, instinctively, very obviously complex. From dilatancy (the reason wet sand becomes dry when you step on it) to extreme shear-thinning (quicksand) or shear-thickening (cornflour oobleck) there is a wide range of behaviours to explain and predict. I'll discuss the seemingly simple case of solid spheres suspended in a Newtonian fluid, which still has plenty of surprises up its sleeve.

Professor Alan Champneys
University of Bristol

Beyond Kuramoto: Synchronisation and the wisdom of the crowd

This talk shall begin with the beautiful and highly influential theory of phase-coupled oscillators due to Yoshiki Kuramoto, which has led to much understanding of emergent synchronisation among incoherent autonomous agents. Although never the main theme of my research, I shall introduce a number of problems in applied maths I have worked on over the years that involve the concept of synchronisation. In each case, it turns out that one needs to go beyond Kuramoto. Problems addressed include stability of the national grid, how courting mosquitoes synchronise harmonics of their wing beat frequencies, and, within neurophysiology, ongoing work on modelling circadian rhythms and synchronous bursting activity of neurons responsible for dopamine secretion. The main example though will be recent published work in which we busted the popular myth that the lateral pedestrian-induced instability of the London Millennium Bridge is a text-book example of Kuramoto-style synchronisation. It transpires that there is a simpler theory, fully consistent with observations on many bridges. Simply put; when walking on moving ground, pedestrians try not to fall over. As I shall show, its slightly more subtle than that. But the main point is that, irrespective of their gait frequency, pedestrians provide positive feedback, or negative damping, on average. Thus, as has been understood by engineers for a while, pedestrian-induced bridge instability is a simple Hopf bifurcation, not due to resonance but to a positive feedback mechanism, akin to flutter in fluid-structure interaction problems. I shall conclude by finding other examples that suggest this other kind of synchronisation may be more prevalent than previously thought, where incoherent agents provide positive feedback on average leading to the onset of and entrainment to a single exogenous oscillation frequency.

OVERVIEW PROGRAMME

SUNDAY 10 APRIL		
16.00-18.45	Early Career Mathematicians "Icebreaker". Organised and run by the IMA (separate registration via the IMA)	
MONDAY 11 APRIL		
09.30-10.20	Registration and Coffee	James France Exhibition area – James France Building
10.20-10.30	Welcome and introductions	EHB.1.04 – Edward Herbert Building
10.30-11.30	Stewartson memorial lecture Professor Catherine Sulem FRSC	EHB.1.04 – Edward Herbert Building
11.40-12.40	Contibuted talks in parallel sessions	Various
12.40-13.30	LUNCH	JAMES FRANCE EXHIBITION AREA – JAMES FRANCE BUILDING
13.30-15.30	Minisymposia in parallel sessions	Various
15.30-16.00	COFFEE BREAK	JAMES FRANCE EXHIBITION AREA – JAMES FRANCE BUILDING
16.00-17.00	QJMAM lecture Professor William Parnell	EHB.1.04 - Edward Herbert Building
17.10-18.10	Contibuted talks in parallel sessions	Various
18.10-	Posters and wine reception Sponsored by Cambridge University Press	James France Exhibition area – James France Building
TUESDAY 12 APRIL		
09.00-10.00	Plenary lecture Professor Julia Yeomans FRS	EHB.1.04 – Edward Herbert Building
10.00-10.30	COFFEE BREAK	JAMES FRANCE EXHIBITION AREA – JAMES FRANCE BUILDING
10.30-12.30	Contibuted talks in parallel sessions	Various
12.30-13.30	LUNCH	JAMES FRANCE EXHIBITION AREA – JAMES FRANCE BUILDING
13.30-14.30	Public lecture Dr Peter Husemeyer, and Panel Discussion	EHB.1.04 – Edward Herbert Building
14.40-15.40	Contibuted talks in parallel sessions	Various
15.40-16.00	COFFEE BREAK	JAMES FRANCE EXHIBITION AREA – JAMES FRANCE BUILDING
16.00-18.30	Minisymposia in parallel sessions	Various
18.30-	Conference Dinner (separately registered)	Burleigh Court
WEDNESDAY 13 APRIL		
09.00-10.00	IMA Lighthill Lecture Professor Helen Wilson	EHB.1.04 – Edward Herbert Building
10.00-10.30	COFFEE BREAK	JAMES FRANCE EXHIBITION AREA – JAMES FRANCE BUILDING
10.30-12.30	Minisymposia in parallel sessions	Various
12.30-13.30	LUNCH	JAMES FRANCE EXHIBITION AREA – JAMES FRANCE BUILDING
13.30-14.30	Plenary lecture Professor Alan Champneys	EHB.1.04 – Edward Herbert Building
14.30-15.00	Prizes, Handover and Closing ceremony	EHB.1.04 – Edward Herbert Building

MINISYMPOSIA SESSIONS

CC011 CC012 CC013 CC014 CC021 CC029a James France Building surrounding the Exhibition Area
D002 James France Building, in the rear part of the building
EHB001 EHB002 EHB104 Edward Herbert Building

MONDAY 13.30-15.30

CC011		
	At the interface between analytical methods and high performance computing in fluid mechanics	Radu Cimpeanu and Matthew Moore
13.30	Exploring a new dimension in high-speed liquid-liquid impact	Matthew Moore and Radu Cimpeanu
13.50	Active control of thin liquid film flows using a hierarchy of models	Susana Gomes
14.10	Lubrication layer driven capillary-scale rebound dynamics: A pesudo-spectral approach	Katie Phillips
14.30	Optimal control of multiphase flows	Alexander Wray
14.50	Stretches and Wobbles: Probing the stability and bifurcation of a dynamic contact line	Jack Keeler
15.10	Sedimentation of Thin, Rigid Discs: An Augmented Finite-Element Method	Christian Vaquero-Stainer
CC012		
	Mathematical Modelling in the Social Sciences	Ben Goddard and Greg Pavliotis
13.30	Bounded Confidence Models of Opinion Dynamics	Benjamin Goddard
13.50	The Imagined Electorate: The role of subjective perception and objective difference in modelling vote choice	Ailsa Henderson
14.10	Supervised learning for mean field consensus control	Sara Bicego
14.30	Consensus-based models for global and multi-objective optimisation	Claudia Totzeck
14.50	Parameter Estimation for Macroscopic Pedestrian Dynamics Models from Microscopic Data	Susana Gomes
15.10	Discussion – Using multiagent systems for developing mathematical models in the social sciences	Led by Greg Pavliotis
CC013		
	Nonlinear Surface and Internal Waves	Emiliano Renzi and Alberto Alberello
13.30	Theoretical and numerical investigations of extreme waves through oblique soliton interactions	Anna Kalogirou
13.50	A dissipative Nonlinear Schr\"{o}dinger model for surface waves propagating in sea ice	Alberto Alberello
14.10	Transition from elongating to squeezed interfacial ring waves on a current	Karima Khusnutdinova
14.30	Internal solitary wave shoaling and the effect of stratification	Magda Carr
14.50	The Crawford-Saffman-Yuen equation and evolution of inhomogeneous sea-states	Raphael Stuhlmeier
15.10	A theory for steady parasitic capillary ripples on steep gravity waves	Phil Trinh
CC021		
	Advances and challenges in the modelling of multiscale, complex, and heterogeneous materials	Dr Ariel Ramírez Torres and Dr Raimondo Penta
13.30	A Quasilinear Viscoelastic Model for the cyclic compression of all-polymer syntactic foams	Sy-Ngoc Nguyen
13.50	Multiphase Flow in Dual Scale Porous Media during Resin Infusion Process of Composite Manufacturing	Ruoyu Huang
14.10	On the role of elasticity in the quasi-static decohesion of biological systems	Salvatore Di Stefano
14.30	Influence of remodelling in a biphasic multicellular aggregate: stress-relaxation and shape recovery	Alessandro Giammarini
14.50	Double poroelasticity derived from the microstructure	Laura Miller
15.10	Multi-scale modelling of magnetic nanoparticles delivery and heat transport in vascularized tumour	Tahani Al Sariri

EHB001		
	Decision making under uncertainty	Eric Hall and Abdul-Lateef Haji-Ali
13.30	Mutual Information for Explainable Deep Learning of Multiscale Systems	Eric Hall
13.50	Multilevel Double Loop Monte Carlo Method with Importance Sampling for Bayesian Optimal Experimental Design	Luis Espath
14.10	Unified landslide hazard assessment using hurdle models	Daniela Castro-Camilo
14.30	Randomized multilevel Monte Carlo for inference	Kody Law
14.50	Adaptive Multilevel Monte Carlo	Abdul-Lateef Haji-Ali
15.10	Sparse Online Variational Bayesian Inference	Vitaly Zankin
EHB002		
	Ethics in Mathematics (I)	Timothy Johnson
13.30	Epidemics, ethics and uncertainty: the roles of statistics versus mathematics	Professor Jane L Hutton
13.50	Aren't the laws of physics the same for everyone? Exploring the ethics of modelling and simulation.	Erica Thompson
14.10	The Alliance for Data Science Professionals: Building trust through standards and accreditation	Prof Rachel Hilliam and Dr Mathew Forshaw
14.30	Mathematics and ethical citizenship: Analyzing moral orders embedded in ethics and mathematics education	Dr. Sikunder Ali
EHB104		
	Mathematical models of plant-soil interactions	Matthias Mimault, Mariya Ptashnyk and Lionel Dupuy
13.30	From root hydraulic architectures to macroscopic representations of root hydraulics in land surface models	Valentin Couvreur
13.50	Control models for crop management: Application to Wastewater Reuse	Antoine Haddon
14.10	Modelling the impact of root-guided preferential soil moisture flow on plant water uptake	Andrew Mair
14.30	Crowd movement in bacteria colonisation of rhizosphere	Matthias Mimault
14.50	Modelling Root System Architectures in Challenging Soil Environments	Ernst Dirk Schäfer
15.10	Lockhart with a twist: Modelling cellulose microfibril deposition and reorientation reveals twisting plant cell growth mechanisms	Rosemary J Dyson

TUESDAY 16.00-18.30

CC011		
	Reservoir Computing and Dynamical Systems	Jonathan Dawes and Andrea Ceni
16.00	An invitation to Echo State Networks	Jonathan Dawes
16.20	Imbedding Deep Neural Networks	Andrew Corbett
16.40	Learning with Reservoir Computing: Geometric perspective and open problems	Lyudmila Grigoryeva
17.00	Learning strange attractors with reservoir systems	Allen G Hart
17.20	Modelling transitions in epileptic seizure dynamics with a multifunctional reservoir computer	Andrew Flynn
17.40	A Machine Learning Perspective on Driven Dynamical Systems	Peter Tino

CC012		
	Nonlinear Waves and Jets	Dr Emiliano Renzi
16.00	Nonlinear triad interactions of acoustic-gravity waves	Usama Kadri
16.20	Deformation and dewetting of liquid films under gas jets	Ojiako Juliet Chinasa
16.40	Nonlinear dispersive waves generated by moving seabed deformation	Emiliano Renzi
17.00	Heat transfer in the seabed laminar boundary layer	Simone Michele
17.20	Wave Dynamics in the Neighbourhood of the Benjamin-Feir Instability	Daniel Ratliff
CC013		
	Wave Problems in Complex Continua	Martin Richter
16.00	Analytical continuation of two-dimensional wave fields	Raphael Assier
16.20	Ray-tracing the Ulam way	David Chappell
16.40	Surface waves in nonlocally elastic solids	Dr Ludmila Prikazchikova
17.00	An enhanced dipole resonance for elastodynamic metamaterials	Marie Touboul
17.20	Ultrasonic measurement of stress without material constants	Artur Gower
17.40	Spectral properties of the chiral orthogonal, unitary, and symplectic ensembles – A microwave realization	Martin Richter
CC021		
	Deep Learning and Inverse Problems	Margaret Duff and Matthias J. Ehrhardt
16.00	Regularising Inverse Imaging Problems Using Generative Machine Learning Models	Margaret Duff
16.20	Deep Neural Networks for Inverse Problems with Pseudodifferential Operators: An Application to Limited Angle Tomography	Tatiana A. Bubba
16.40	A Convex Variational Model of the Blake-Zisserman Type for Segmentation of Low Contrast and Piecewise-smooth Images	Liam Burrows
17.00	Imaging conductivity from current density magnitude via neural networks	Bangti Jin
17.20	Bayesian Inference using Neural Networks As Data Driven Generative Priors	Matthew Holden
17.40	Inferring a Continuous Distribution of Atom Coordinates from Cryo-EM Images using VAEs	Jonas Adler
18.00	Discussion	-
CC029a		
	Ethics in Mathematics (II)	Timothy Johnson
16.00	A Hippocratic Oath for Mathematicians; necessary, but not sufficient	Maurice Chiodo
16.20	On epistemic exclusion in the production of mathematical knowledge	Colin Jakob Rittberg
16.40	Hard Conversations and Consequences: Updating and Assessing the Ethical Guidelines in Mathematics	Catherine A. Buell
17.00	The influence of Calvin's theology on the emergence of mathematical probability and its ethical implications	Timothy Johnson
EHB001		
	Mathematical modelling of biological oscillations	Anne Skeldon and Kyle Wedgwood
16.00	Dynamic switching of lateral inhibition spatial patterns for cell-cell interactions	Paul Glendinning
16.20	Modelling the effects of deep brain stimulation in Parkinson's disease	Rafal Bogacz
16.40	Thalamo-Cortical Networks: Reduction, Analysis, and Modulation	Stephen Coombes
17.00	Entrainment dynamics organised by global manifolds in a circadian pacemaker model	Kyle Wedgwood
17.20	Modelling the circadian clock	Hanspeter Herzel
17.40	Why do we procrastinate in going to bed and struggle to get up in the morning? Using mathematics to design light interventions to improve sleep timing.	Anne C Skeldon

EHB002		
	Mathematics in microbiology	Sara Jabbari and John Ward
16.00	It's good to talk (but not too quickly): emergent robustness of bacterial conversations due to delayed bifurcations	Mohit Dalwadi
16.20	Founder cell configuration drives competitive outcome within colony biofilms	Fordyce A. Davidson
16.40	The impact of boundaries on micro-swimmer distributions in channel flow, and the resultant boundary encounter angles	Smitha Maretvadakethope
17.00	Dynamics of squirmers in a confined anisotropic fluid	Marco Mazza
17.20	Multiscale modelling of bacterial populations	Philip Pearce
17.40	Novel treatment of chronic wounds using bioactive glass fibres – a partial differential equation model	Sandeep Shirgill
18.00	Modelling Antibiotic Resistance Gene Spread in Wastewater Treatment Plants	Cansu Uluseker
EHB104		
	Modelling the respiratory transmission of Covid-19	Avshalom Offner
16.00	A spatially dependent model for rapid prediction of airborne transmission of Covid-19	Ian Griffiths
16.20	Modelling and simulation of airborne virus transmission: Present and Future	Dimitris Drikakis
16.40		
17.00	Lifetime of respiratory saliva droplets	Avshalom Offner
17.20	Is localised extraction effective at reducing the spread of respiratory droplets?	Cathal Cummins
17.40	Application of fluid dynamics in modelling indoor airborne disease transmission and developing mitigating strategies	Rajesh K Bhagat
18.00	Micro-particle expiratory ejecta driven by buoyant vortex dynamics	Emiliano Renzi

WEDNESDAY 10.30-12.30

CC011		
	Dispersive hydrodynamics and applications	Daniel Ratliff and Thibault Congy
10.30	Dispersive hydrodynamics of soliton condensates	Gennady El
10.50	Undular bores governed by the full water wave equations and Whitham-Boussinesq equations	Rosa Maria Vargas-Magana
11.10	The Interaction of Internal Solitary Waves and Sea Ice in the laboratory	Sam Hartharn-Evans
11.30	Stability of waves on deep water with a constant background shear field	Emilian Parau
11.50	Mode-2 internal solitary waves to a three-layer system	Alex Doak
12.10	Linear stability spectra of a novel long wave-short wave system	Marcos Caso-Huerta
CC012		
	Smectic Fluids: Reduced Dimensionality/Increased Complexity	Tyler Shendruk and Marco Mazza
10.30	Theories of smectic A liquid crystals: a critical discussion	Timothy J. Sluckin
10.50	Two-dimensional nematics and their applications	Prof Apala Majumdar
11.10	Smectic Layering: A Complex Tensor Representation	Jack Paget
11.30	New patterns of twist-bend liquid crystal phase behaviour	Rebecca Walker
11.50	A Q-tensor model of smectic-A liquid crystals and its numerical analysis	Jingmin Xia
12.10	Smectic A liquid crystals in non-uniform domains: Modelling the impact of imperfect boundaries	Alan J. Walker
CC013		
	Nonreversible processes: analysis and computations	Hong Duong and Nikolas Nüsken
10.30	Variational formulations beyond gradient flows	Michiel Renger
10.50	Piecewise Deterministic Monte Carlo in Infinite Dimensions	Joris Bierkens
11.10	Design and Implementation of PDMP Monte Carlo Methods	Sam Power
11.30	Entropic Variational Schemes for Non-Gradient Systems.	Daniel Adams
11.50	Geometric integrators for optimization	Guilherme Franca

CC021		
	Applied Algebra and Geometry	Dr Emilie Dufresne, Dr Dimitra Kosta and Dr Nelly Villamizar
10.30	Structural and practical identifiability of ERK kinetics	Emilie Dufresne
10.50	Representations of partial leaf sets in phylogenetic tree space	Gillian Grindstaff
11.10	Discussion/Networking	
11.30	Linear programming complementation	Maximilien Gadouleau
11.50	Algebraic Degree of Polynomially Constrained Optimization	Olga Kuznetsova
12.10	Exact reductions of dynamical systems	Gleb Pogudin
EHB001		
	Mathematics of the eye	Dr Jennifer Tweedy
10.30	Mathematical Models of a Heterogeneous Vitreous Humour: An Investigation into Vitreoschisis and the Premacular Bursa	Laura Bevis
10.50	The Human Tear Film Modelling: Marx's line formation	Dr Vladimir Zubkov
11.10	A mathematical model of aqueous humour production	Mariia Dvoriashyna
11.30	The role of Bayesian inference in understanding Macular degeneration	Jessica Crawshaw
11.50	Elastic jump propagation through retinal networks in response to trauma	Dr Tamsin A. Spelman
12.10	Mathematical Models of Retinal Degeneration	Dr Paul A Roberts
EHB002		
	Mathematics in single-cell biology	Aden Forrow and Bianca Dumitrascu
10.30	A statistical framework for mapping context-specific regulatory variants using scRNA-seq	Anna Cuomo
10.50	Unravelling the correlation structure of noise in molecular pathways	Lucy Ham
11.10	CellRank for directed single-cell fate mapping	Marius Lange
11.30	Modularity, criticality, and evolvability of a developmental gene regulatory network	Berta Verd
11.50	Learning to Segment Cells by Co-localizing Image Patches	Steffen Wolf
12.10	Dynamic inference from single-cell snapshots by optimal transport	Stephen Zhang
EHB104		
	Inflammation and the Immune Response	Martin R. Nelson and Joanne L. Dunster
10.30	Inflammation- and stress- driven airway remodelling in asthma	Bindi S Brook
10.50	Mechanistic modelling towards designing personalised treatment strategies for eczema	Reiko Tanaka
11.10	Agent-based modelling of macrophage phenotype plasticity facilitating tumour cell intravasation	Joshua Bull
11.30	Dissecting the cell behaviours driving inflammation and tissue repair through in vivo live imaging, genetics and computational modelling	Helen Weavers
11.50	Modelling the metabolism of DHA	Dr Susan Franks
12.10	Pattern Formation and Transition to Chaos in a Chemotaxis Model of Inflammation	Valeria Giunta

CONTRIBUTED TALKS SESSIONS

MONDAY 11.40-12.40

CC011	**CLIMATE AND ICING**	
11.40	Mathematical models of engine ice crystal icing	Timothy Peters
12.00	Relating the Milankovitch Cycles to Earth's Climate	Liam Wheen
12.20	Influence of glacier algae on ice sheet surface melt	Tilly Woods
CC012	**MARANGONI AND VISCOUS FLOWS**	
11.40	Surfactant driven cavity flow and contact line singularities	Richard Mcnair
12.00	Asymptotic corrections for extensional flow	Doireann O'Kiely
12.20	Laminar drag reduction in surfactant-contaminated superhydrophobic channels	Samuel D. Tomlinson
CC013	**WAVES**	
11.40	Nonlinear surface ring waves of moderate amplitude	Nerijus Sidorovas
12.00	Scattering of an Ostrovsky Wave Packet in a Delaminated Waveguide	Jagdeep Tamber
12.20	Magneto-thermoelastic interactions in a nanostructured micropolar orthotropic solid half-space with impedance boundary	Dr. Anand Kumar Yadav
CC014	**BAYESIAN INFERENCE AND NETWORKS**	
11.40	Pharmacokinetic Modelling for Adrenal Support	Rosie Evans
12.00	Bayesian inference on a microstructural, hyperelastic model of tendon deformation	James Haughton
12.20	Confirmation Bias Emerges From an Approximation To Bayesian Reasoning	Charlie Pilgrim
CC021	**STOCHASTIC SYSTEMS AND STATISTICAL ANALYSIS**	
11.40		
12.00	Statistical analysis of trade risk, failure, and extreme event propagation in the global economy using multi-level networks	Malvina Bozhidarova
12.20	Fluctuation-driven transitions in finite time: beyond asymptotic rates for rare events	Steve Fitzgerald
CC029a	**NUMERICAL ANALYSIS**	
11.40	High-order adaptive time-stepping methods for nonlinear fractional DEs	Fadi Awawdeh
12.00	Direct and inverse Solutions for non-homogeneous Wave Equations with Unusual Boundary Conditions	Dr. Taysir Dyhoum
12.20	Highly oscillatory quadrature and low-regularity integrators for nonlinear evolution equations	Georg Maierhofer
D002	**NAVIER-STOKES EQUATIONS**	
11.40	Existence and Smoothness of the Navier-Stokes equation by a Boundary Integral representation	Dr. Edmund Chadwick
12.00	Navier-Stokes equations on a manifold from a non-conservative action principle	Rosa Antonia Kowalewski
12.20	Building blocks for representing the decay of 3D Navier-Stokes flows and their applications	Koji Ohkitani
EHB001	**REACTING FLOWS AND DECONTAMINATION**	
11.40	Reaction dynamics and early-time behaviour of chemical decontamination	Sarah Murphy
12.00	Reacting counter-current flow of a binary gas mixture and solids in a silicon furnace	Matthew Shirley
12.20	Blow-up analysis of fast-slow PDEs with fold type singularities	Thomas Zacharis
EHB002	**MICROSWIMMERS**	
11.40	Fundamental modes of swimming correspond to fundamental modes of shape: Engineering I-, U-, and S-shaped swimmers	Berk Altunkeyik
12.00	Emergent probability fluxes in confined microbial navigation	Jan Cammann
12.20	The effects of rapid yawing on simple swimmer models and planar Jeffery's orbits	Benjamin J. Walker
EHB104	**BIOLOGICAL FLUIDS**	
11.40	Mathematical modelling of poroelastic tissue engineering scaffolds within bioreactors	George Booth
12.00	Pore-network models for haematocrit transport in disordered porous domains reflecting the human placenta	Eleanor Doman
12.20	Surface-tension-driven evolution of a viscoplastic liquid coating the interior of a cylindrical tube	James Shemilt

MONDAY 17.10-18.10

CC011	**WAVES, WAKES AND JETS**	
17.10	Basic physical mechanisms responsible for three-dimensional wake transition	Andrey I. Aleksyuk
17.30	The Effects of Compliance on Various Flow Configurations	Ryan Poole
17.50	Free Surface Waves for a Lamb-Oseen Vortex Flow	Emanuele Zuccoli
CC012	**ASYMPTOTIC ANALYSIS**	
17.10	Mathematical modelling of the effect of climate variations on cocoa production	Oluwatosin Babasola
17.30	Combining Dynamic Mode Decomposition with Ensemble Kalman filtering for tracking and forecasting	Stephen Falconer
17.50	Averaging and passage through resonances in two-frequency systems near separatrices	Anatoly Neishtadt
CC013	**LINEAR STABILITY ANALYSIS OF FLOWS**	
17.10	The Linear Stability of Ferrofluids Subject to Non-Uniform Magnetic Fields	Sarah Ferguson Briggs
17.30	Thick non-axisymmetric flow on the exterior of a vertical fibre	James Daniel Reilly
17.50	Linear stability of a viscous, rotating droplet	Tom Roper
CC014	**HOMOGENISATION IN MODELLING**	
17.10	A systematic upscaling of mass transport models for organoid expansion via homogenisation	Meredith Ellis
17.30	Nutrient Transport in a Fibrous Bioreactor Scaffold	Amy Kent
17.50	Averaged interface conditions: evaporation fronts in porous media	Ellen Luckins
CC021	**BUBBLES**	
17.10	Selection mechanisms and complex singularities in the rising bubble problem	Cecilie Andersen
17.30	Nonlinear Oscillations of Levitated Air Bubbles	George Hunter-Brown
17.50	Feedback control of propagating bubbles in Hele-Shaw channels	Joao V. N. Fontana
CC029a	**DIRECT NUMERICAL SIMULATION FOR FLOWS**	
17.10	Lightning Laplace solvers for free-surface problems	Edward Hinton
17.30	The Local Anisotropic Basis Function method – a mesh-free framework for high-order DNS in complex geometries	Jack King
17.50	Fully developed free surface 2-D flow liquid layer encounting a 3-D hump	Mansaier lin
D002	**TRACKING AND MICROROBOTS**	
17.10	Three linked spheres microrobotic steady and oscillating motions at low Reynolds number	Laila Gomma Elatrash
17.30	Slender active loops	Tom Montenegro-Johnson
17.50	Robust trajectory tracking by a multicopter platform with dynamic and information disturbance	Vladimir Turetsky
EHB001	**HEAT AND FIRE EFFECTS**	
17.10	Mathematical Modeling and Simulation of Nanofluid Flows	Wasaif Alruwaele
17.30	Internally Heated Convection at Infinite Prandtl	Ali Arslan
17.50	The Formation of Wildfire Fingers	Sam Harris
EHB002	**HYDROGELS AND RHEOLOGY**	
17.10	Deformation of swelling and shrinking bilayer beams	Matthew Butler
17.30	Modelling Encapsulated Stem Cells For Non-Invasive Therapy In The Liver	Simon Finney
17.50	Multiscale modelling of cell cytoskeleton rheology	Jakub Koery
EHB104	**MANY-BODY SYSTEMS**	
17.10	PDE-constrained optimization for multiscale particle dynamics	Jonna Roden
17.30	Emergent pseudo time-irreversibility in the classical many-body system of pair interacting particles	Gyula Toth
17.50	Identification of individual traits in collective behaviour of animal groups	Fanqi Zeng

TUESDAY 10.30-12.30

CC011	**DROPS AND FILMS**	
10.30	Evolution of and deposition from an evaporating sessile annular droplet	L. M. Mills
10.50	Modelling high-speed droplet impact onto an elastic membrane	Michael J. Negus
11.10	Droplet evaporation on inclined chemical patterns	Marc Pradas
11.30	Singularity formation in inverted film flow and transition to dripping	Dmitri Tseluiko
11.50	The three-dimensional sessile droplet on a non-flat substrate	Chung-Hao Wang
12.10	Dynamics of particle aggregation in evaporating and de-wetting films of complex liquids	Junzhe (James) Zhang
CC012	**WAVES AND MATERIALS**	
10.30	Modelling elastic wave band-limited uniform diffusers	Finn Allison
10.50	Theoretical estimates of the parameters of longitudinal undular bores in PMMA bars based on their measured initial speeds	Curtis Hooper
11.10	Nemtsov's Problem	Dr Oleg Kirillov
11.30	Diffraction by a Right-Angled No-Contrast Penetrable Wedge Revisited: A Double Wiener-Hopf Approach	Valentin Kunz
11.50	A Quantum Graph Approach to Meta-Material Design	Tristan Lawrie
12.10	Matrix Wiener-Hopf equations and the implicit quadrature scheme	Ian Thompson
CC013	**DYNAMICAL SYSTEMS AND APPLICATIONS**	
10.30	Curious dynamics of a golf ball bounce	Stanisław Biber
10.50	Dynamic tipping in the non-smooth Stommel-box model for thermohaline circulation	Chris Budd
11.10	The use of exponential asymptotics versus Borel summation in studying singularly perturbed differential equations	Samuel Crew
11.30	Optimisation using delay-induced bifurcations	Natalia B. Janson
11.50	Parameter-dependent ordinary differential equation (ODE) model identification of systems having local bifurcation	Kyoung Hyun Lee
12.10	Two process models: a nonsmooth dynamics perspective	Mustafa Sayli
CC014	**BIFURCATIONS AND OPERATORS**	
10.30	Brainstem Oscillators and Bifurcations: Understanding How Circadian Clocks Communicate	Jake Ahern
10.50	Towards a model-free bifurcation analysis of autonomous slow-fast systems	Mark Blyth
11.10	A mathematical model reveals complex roles of platelets in hepatitis progression and resolution	Joanne L Dunster
11.30	Bifurcation Analysis for a System of Rational Difference Equations	Bashir Al-Hdaibat
11.50	On the progress of q-fractional differential operators and their applications	Mohammad Momenzadeh
12.10	Turing bifurcations in reaction-diffusion equations with n components in a bulk-surface system on a sphere	Edgardo Villar-Sepúlveda
CC021	**GEOPHYSICAL, FREE-SURFACE AND VORTEX DYNAMICS**	
10.30	Parallel computations of superfluid vortex systems	Adrian Manuel Parrado Almoguera
10.50	Young and Young-Laplace equations for a static ridge of nematic liquid crystal, and transitions between equilibrium states	Joseph R. L. Cousins
11.10	Improved calculations of waterfalls and weir flows	Elle Mclean
11.30	Analytic framework for the flood estimation methods intercomparison	Piotr Morawiecki
11.50	Phase-space formulation of the Full Lagrangian Approach for dispersed multiphase flows	Chris Stafford
12.10	Vortex Leapfrogging external to a circular cylinder	Dr Matthew Turner

CC029a	NETWORKS AND QUANTUM MODELLING	
10.30	Efficient detection of twinning in crystallographic data using modified Rodrigues parameters	Cameron Hall
10.50	Simplicial Effective Resistance and Enumeration of Spanning Trees	Kang-Ju Lee
11.10	Dimensions of Level-1 Phylogenetic Networks	Samuel Martin
11.30	Solving differential equations using neural networks	Mohamed Musa
11.50	Superadiabatic transitions in Single Switch Surface Hopping	Michael Redenti
D002	**MATERIALS SCIENCE AND NUMERICAL ANALYSIS**	
10.30	Analysis of Schwarz algorithms for the modified Euler-Tricomi equation	Alex Kyriakis
10.50	Modelling the Carding of Recycled Carbon Fibre	Joe Roberts
11.10	Heat spreaders and thermal metamaterials	Eleanor Russell
11.30	Lateral Strain and Stress Concentration in Liquid Foam Fracture	Peter Stewart
11.50	An Ultra-weak Discontinuous Galerkin method for Two-Dimensional Elliptic Problems	Helmi Temimi
EHB001	**PATTERNS**	
10.30	Spontaneous pattern formation with Salerno equations: ring-cavity feedback, static instabilities, and mean-field theory	J. M. Christian
10.50	Control of diffusion-driven pattern formation behind a wave of competency	Yue Liu
11.10	Understanding Sensory Induced Hallucinations	Rachel Nicks
11.30	Mathematics, the Mind and Alzheimer's disease: Patterns of progression on brain graph	Prama Putra
11.50	Rectangle-triangle soft-matter quasicrystals with hexagonal symmetry	Alastair M. Rucklidge
12.10	Minimal Reaction Systems Exhibiting Turing Instabilities	Fraser Waters
EHB002	**CANCER AND CELLS**	
10.30	A mathematical model of macrophage phenotype switching and its role in the resolution of inflammation	Suliman Almansour
10.50	In silico model for cell therapy in acute liver injury	Evangelia Antonopoulou
11.10	Modelling spatial and phenotypic heterogeneity in solid tumours in the presence of radiation therapy	Giulia Laura Celora
11.30	The Study Of Bi-Geometric Fractional Model For The Treatment Of Cancerous Cells Using Radiotherapy	Olivia Ada Obi
11.50	Constant work: Exploring feedback mechanisms in cellular mechanosensation	Josephine Solowiej-Wedderburn
12.10	Effects of modelling assumptions on the arising dynamics in a cellular automaton model of tumour-immune interactions	Roisin Stephens
EHB104	**MATHEMATICAL BIOLOGY, CELLS AND IMAGING**	
10.30	Asymptotic Analysis Of The Vitamin C Clock Reaction: The Effect of Hydrogen Peroxide Concentration On The Effective Kinetic Law	Aliya Ali Alsaleh
10.50	A Model for Ultrasonic Transducers with Boundary Dynamics in a High-Temperature Regime	Michael Doherty
11.10	A mathematical model to describe the dynamics and scaling of nuclear growth in discrete cytoplasmic volumes	Vivienne Leech
11.30	Extracellular matrix remodelling by neural crest cells provides a robust signal for collective migration	W. Duncan Martinson
11.50	Ventral stress formation and contraction in cell-substrate adhesion	Gordon R. McNicol
12.10	Mathematical and in vitro modelling of high shear thrombosis in a long, thin, microfluidic system	Edwina Yeo

TUESDAY 14.40-15.40

CC011	EMERGENCE AND SELF-ASSEMBLY	
14.40	Tilings in block copolymers using Strong Segregation Theory	Merin Joseph
15.00	Oscillatory and chaotic dynamics of solitary waves on falling liquid films	Alexander Round
15.20	Reconfigurable capillary self-assembly	Stuart Thomson
CC012	**MULTIPHASE AND FREE SURFACE FLOWS**	
14.40	Travelling wave and asymptotic analysis of a multiphase moving boundary model for engineered tissue growth	Jacob Jepson
15.00	Modelling Confined Nanoscale Films	Jingbang Liu
15.20	The effect of an electric field on coating flow on the outer surface of a rotating horizontal circular cylinder	Rebecca A. McKinlay
CC013	**BIOLOGICAL APPLICATIONS AND DYNAMICAL SYSTEMS**	
14.40	From Mice, to Machine, to Man: The mathematics and computing of clearance in Alzheimer's disease	Georgia S. Brennan
15.00	Dynamical effects of electromagnetic flux on Chialvo neuron map: nodal and network behaviors	Indranil Ghosh
15.20	Stochastic synchronisation in non-locally coupled, noisy oscillators	Jeremy Worsfold
CC021	**INDUSTRIAL FLOWS AND POROSITY**	
14.40	Modelling the MIEX water treatment process	Michael Grinfeld
15.00	A particle level model for a concept silicon reactor	Brady Metherall
15.20	Rivulet flow over and through a porous membrane	Stephen K. Wilson
CC029a	**AEROACOUSTICS**	
14.40	Reduction of Leading-Edge Noise by Tailored Turbulence Anisotropy	Alistair Hales
15.00	The hydrodynamic instability in quadratic sheared flow over acoustic linings	Matthew King
15.20	Sound Propagation in Slowly Varying, Lined, Ducts	Tom White
D002	**POWER AND BATTERIES**	
14.40	A Thermal Single Particle Model with electrolyte(TSPMe)	Mat Hunt
15.00	Generator aggregation and power grid stability	John Moloney
15.20	Uptake of small-scale renewable energy generation: can power grid stability and resilience be maintained?	Reuben O'Dea
EHB001	**MODELLING OF CRIME AND INFECTIONS**	
14.40	Using an agent-based model to simulate recurrent urinary tract infections	Anas Lasri Doukkali
15.00	Crime and neighbourhoods, or how the community's actions affect crime rates	Laura Jones
15.20	Age dependent modelling and its application to COVID-19 outbreak	Kayode Oshinubi
EHB002	**CELL AND VASCULAR MODELLING**	
14.40	Towards a multiphase model of vascular network formation in a hydrogel	Georgina Al-Badri
15.00	Modelling Regenerative Angiogenesis in Peripheral Nerve Repair	Maxime Berg
15.20	Modelling Differentiating Stem Cells: A Novel View	Saeed Farjami
EHB104	**DEFORMATION MODELLING**	
14.40	Towards a model of a deformable aerofoil	Mark Blyth
15.00	Mathematical modelling of metal rolling: the role of elastic and plastic deformation	Frank Flanagan
15.20	The deformations of fluid conveying elastic-walled tubes	Daniel Netherwood

POSTER PRESENTATION

Measuring Bipartivity
Azhar Aleidan

Simulation of crystallisation dynamics of growth dominated phase-change material using the Master rate equation
Mesfer Sharaf Almalki

Nonlinear waves in Mass-in-Mass FPUT chains
Reem Almarashi

The Impact of Episodic Plastic Pollution on Predator-Prey Interactions
Theyab Alrashdi

Adaptive control of wave speed in integral projection models of invasive pests
Yasser M. Alrashedi

Velocity fields in a two-layer fluid with an interfacial solitary wave
Liam Baddeley

Modelling the labour market: Can we predict occupation transitions?
Anna Berryman

Spontaneous emergence of oscillatory behaviour in plastic dynamical systems
Jonathan Brooks

Dynamics of swelling and shrinking thermo-responsive hydrogels
Matthew Butler

Riemann problem for a dense soliton gas for the KdV equation: a numerical study
Henry Carr

Dynamics in a magnetic pendulum model: dipole-dipole interactions and chaos on a sphere
J. M. Christian

Minimum information variability via model predictive control
Adrian Josue Guel Cortez

Estimating critical power in cycling from routinely collected training data
Jonah Drake

Optimisation of an elastic filament for propulsion in viscous fluid
Mariia Dvoriashyna

Asymptotic model for rolling
Mozhdeh Erfanian

Exploring Artificial Neural Networks as Dynamical Systems
Adam Essex

The combinatorial structure of determinantal systems for Groebner basis computation: Critical values and beyond
Andrew Ferguson

A stochastic model of the L-H transition in fusion plasma
Patrick Fuller

Magnetic helicity and field linkage in spherical dynamos
Parag Gupta

Dynamical minimum action paths and non-equilibrium transitions
Amanda Bailey Hass

Continuum scale modelling of blood flow in sickle cell disease
Anushka Herale

A higher order virtual element method for the Cahn-Hilliard equation
Alice Hodson

First passage time densities from stochastic path integrals
Tom Honour

Nonlinear acoustics in a general 3D duct
Freddie Jensen

Are there purely topological explanations of the number of equilibria of pendulum systems?
Aditya Jha

Ice particle skimming in the aircraft icing context
Ellen M Jolley

Crime and neighbourhoods, or how the community's actions affect crime rates
Laura Jones

Optimising antibiotic release from medical implants to counteract biofilm formation
Parna Mandal

Stability, Collapse and Hyper-chaos in a Tri-Trophic Predator Prey model with Mutation and Predation
Anna McAllister

Non-spherical form factors in Crystallography
Laura Midgley

The implementation of resolved interfaces in a bubble-scale model for gas diffusion in wet foams
Jacob Morgan

Newtonian and non-Newtonian Slippery Liquid Infused Porous Surfaces using the lattice-Boltzmann algorithm
Sirio Orozco-Fuentes

GPareareal: A time-parallel ODE solver using Gaussian process emulation
Kamran Pentland

Mathematical modelling of protein aggregation in sickle cell disease
Claudia De Sousa Miranda Perez

Numerical spectral synthesis of soliton and breather gas
Giacomo Roberti

Rare events in turbulent fluid flows
Nayef Shkeir

The Role of the Double-Layer Potential in Regularised Stokeslet Models of Self-Propulsion
David Smith

Fourier extensions for solving BVPs in one and two dimensions
Ghadeer Surrati

Information Geometry from Stochastic Simulations
Abhiram Anand Thiruthummal

A Lagrangian perspective on integrability
Mats Vermeeren

Impact of helicity on solute exchange in the umbilical cord
Tianran Wan

Computational Blood Flow Modelling in Health and Disease
Leszek Wierzchleyski

Mathematical modelling of anti-adhesion therapies to tackle bacterial infections
Cameron Wilcox

Identification of individual traits in collective behaviour of animal groups
Fanqi Zeng

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