Tuesday 9th April

Agenda

Virtual Presenter

Time	Room G.41	Room G.56	Room G.06	Room 1.16	Room 1.17	Room 1.18	Room 2.14	Room 2.15	Room 2.16
8:30	**Registration**								
9:20	**Welcome & Introductions** **Nick Parker & Magda Carr**								
9:30	**Plenary Session** The mathematics and physics of wound healing **Tannie Liverpool** chaired by Otti Croze								
10:30	**Break**								
	Contributed Talks								
11:00	**Mathematical Biology I** chaired by Lukas Eigentler	**Mathematical Biology II** chaired by Ryan Palmer	**Fluids: Stability & Instability** chaired by Céline Guervilly	**Applied Statistics & Stochastic Systems** chaired by David Swailes	**Fluid: Thin Films** chaired by Otti Croze	**Networks** chaired by Kris Parag	**Acoustics, Flames & Combustion** chaired by Yue-Kin Tsang	**Dynamical Systems** chaired by Shobhna Singh	**Waves** chaired by Matthew Crowe
11:00	**162** Modelling the regulation of chronic wounds by tissue inhibitors of matrix metalloproteinases **Sonia Dari**	**236** Including dynamic organism and environmental heterogeneity in collective behaviour: looking at locusts **Fillipe Georgiou**	**270** The stability of moving fluid menisci in cylindrical geometries **Paul Alexander**	**148** Feature Selection for Time Series Forecasting: From the Sea's Depths to Space (and beyond) **Gianluca Audone**	**255** On the transition to dripping of an inverted liquid film **Dmitri Tseluiko**	**57** Information Geometry of Evolution of Neural Network Parameters While Training **Abhiram Thiruthummal**	**141** Acoustic Sensing of Particulate Material through Layers **Paulo Sergio Piva**	**58** Explicit constructions for chaotic attractors of piecewise-linear maps **David Simpson**	**72** Monotone Travelling waves in the Rosenau-KdV equation **Michael Grinfeld**
11:20	**12** Quantifying Cytoskeletal Dynamics and Remodeling from Live-imaging Microscopy Data **Carey Li**	**163** How do bee's smell? The multi-physics of honeybee olfaction **Ryan Palmer**	**244** Boundary layer recursion parameter selection for the one-way Navier-Stokes Equations **Elliot James Badcock**	**47** Fast Bayesian Identification of Nonlinear Dynamics (BINDy) in scarce and noisy data **Lloyd Fung**	**187** Data-driven equation discovery for liquid film flows thick and thin **Sebastian Dooley**	**68** Deep Learning Methodology for Perron-Frobenius Problems **Tanakorn Udomworarat**	**150** Nonlinear acoustics in a general 3D duct **Freddie Jensen**	**109** Bounce of a rubber ball and other impact phenomena **Stanisław Biber**	**226** Scattering of an Ostrovsky wave packet in a coupled waveguide **Jagdeep Tamber**
11:40	**273** Spectral approaches to stress relaxation in epithelial monolayers **Natasha Cowley**	**82** Electrocuting flowers: a guide from AAA to bee **Samuel Harris**	**40** Global stability of a confined shear layer with corrugated boundary **Matt Turner**	**122** Restricted Adaptive Probability-Based Latin Hypercube Design **HUIJUAN LI**	**304** Instabilities in falling thin liquid films laden with soluble surfactants above CMC **Anna Katsiavria**	**35** Inferring the Utility from Optimal Behaviour in an Epidemic using Neural Networks **Mark Lynch**	**303** Nonlocal Hydrodynamics in Microparticle Acoustophoresis: Implications for Acoustic Tweezer Calibration **Ricky Hunter**	**120** Does an intermittent dynamical system remain chaotic after drilling in a hole? **Samuel Brevitt**	**305** Models for long nonlinear longitudinal waves in elastic rods of variable cross section **Jacob Vizor**
12:00	**63** Modelling the mechanism behind the long range alignment of ellipse shaped particles in 2D: from two interacting cells to collective behaviour **Vivienne Leech**	**59** Critical Gap Size **Ali Beykzadeh**	**5** The Effects of Wall Compliance on the Stability of Jets and Wakes **Ryan Poole**	**143** Economic Nowcasting **Lingyi Yang**	**217** Controlling stratification in drying films with electrolyte-driven diffusiophoresis **Clare Rees-Zimmerman**	**131** Understanding linguistic dynamics in agent-based communal networks **Emily Claughton**	**257** Flame propagation and instabilities in a plane Couette flow **Joel Daou**	**20** Cost optimisation of hybrid institutional incentives for promoting cooperation in finite populations **Calina Durbac**	**19** Wave-analysis in a rotating transversely isotropic thermoelastic diffusion solid half-space in a higher-order fractional and memory dependent elasticity. **Anand Kumar Yadav**
12:20	**258** The emergence of non-standard growth laws from systematically upscaling heterogeneous organoids **Meredith Ellis**	**314** How plants 'burst the bubble' of the threat of embolisms **Jared Carpenter**	**259** Taylor dispersion-controlled Rayleigh-Benard and Darrieus-Landau instabilities **Prabakaran Rajamanickam**	**157** Laplace-transformed stochastic dynamics and the Kramers problem. **Steve Fitzgerald**	**81** Lubrication dynamics of a settling plate **Andrew Wilkinson**	**84** The Pfaffian Structure of CFN Phylogenetic Networks **Samuel Martin**	**280** Flame propagation in channels: 2D and 3D flame dynamics **Aiden Kelly**	**103** Julia sets in relaxed Schröder and Newton-Raphson maps: periodic points, escape points, symmetry-breaking **James Christian**	**206** Comparisons of internal solitons of the MCC model against extended KdV equation **Nerijus Sidorovas**
12:40	**310** Modelling the influence of the cellular microenvironment on cell cytoskeleton and adhesion development **Gordon R. McNicol**	**317** Multiscale modelling of hormone distributions regulating root development **Kristian Kiradjiev**		**311** Stochastic prey-predator theory of the L-H transition in fusion plasmas -- time-dependent statistical analysis and information theory **Patrick Fuller**			**211** Multiple-scale analysis of a premixed flame in confinement **James Harris**	**65** Experimental bifurcation analysis of a deformable bubble using control-based continuation **Sammy Ayoubi**	
13:00	**93** Numerical Schemes for SIR Model **Canan Akkoyunlu**	**132** Modelling solute transport in the plant phloem **Jacob Jepson**							
13:00	**Lunch**								
13:30 - 14:00			**Digital learning workshop - assessment and accessibility** **Christian Lawson-Perfect (NUMBAS)**						
	Mini-Symposia								
14:15	**Innovative methods and applications in modelling of public health** chaired by James Van Yperen	**Mechanics controls the behaviour of biological and active materials** chaired by Matteo Taffetani	**Discrete to Continuum Modelling in Biology** chaired by Edwina Yeo, Wesley Ridgeway, Lloyd Fung	**Mathematical Approaches to Plasticity** chaired by Tom Hudson & Ed Bramley	**Thin films and interfacial fluid mechanics with applicationschaired by Edwina Yeo, Wesley Ridgeway, Lloyd Fung** chaired by Katarzyna Lowal, Matthew Durey	**Topological methods for data analysis in science and beyond** chaired by Ka Man Yim	**Recent advances in droplet evaporation and its applications** chaired by Madeleine Moore	**Equality, Diversity and Inclusion in Applied Mathematics** chaired by Laura Wadkin	
14:15	**281** Sexual behaviour, mobility, transmission clusters: modelling a discrepancy between the epidemic of HIV in Sub-Saharan Africa and Europe **Francesco Di Lauro**	**17** Polar Fluctuations Lead to Extensile Nematic Behavior in Confluent Tissues **Chiu Fan Lee**	**2** Discrete and continuum methods to describe cancer invasion processes **Fiona Macfarlane**	**115** Multiple-Scale Asymptotic Modelling of Cold Sheet Metal Rolling **Mozhdeh Erfanian**	**80** Projected models: short waves, thick films and nonlocality **Alexander Wray**	**254** TBC **Jeff Giansiracusa**	**28** The effect of gravity-induced shape change on the diffusion-limited evaporation of sessile and pendant droplets **Stephen Wilson**	**326** Exploring the lived experiences of women mathematics PhD students **Laura Wadkin**	
14:35	**341** Integrating wastewater data and public health data for cost-effective COVID-19 surveillance **Guangquan Li**	**46** Spontaneous shape transformations of active surfaces **Alexander Mietke**	**15** The interplay between bulk flow and boundary conditions on the distribution of microswimmers in channel flow **Smitha Maretvadakethope**	**230** Higher Order Far-Field Boundary Conditions for Crystal Defects Computations **Julian Braun**	**85** A model of cerebrospinal fluid flow around the brain **Mariia Dvoriashyna**		**62** An asymptotic solution for the evaporation of arbitrary-shaped droplets **Madeleine Moore**	**41** "Why are all geniuses predominately White males?": Treating Equality, Diversity and Inclusion as a Scientific Problem **Nira Chamberlain OBE**	
14:55	**133** Modelling the epidemiological implications for SARS-CoV-2 of Christmas household bubbles in England in December 2020 **Edward Hill**	**200** Effect of constitutive law on the erythrocyte membrane response **Marianna Pepona**	**23** Linking discrete and continuous models of cell birth and migration **Duncan Martinson**	**354** Parametrising dislocation dynamics from atomistic simulations with uncertainty **Tom Hudson**	**92** Viscous fingering of unconfined thin-film flows **Haolin Yang**	**145** Local systems for periodic data **Adam Onus**	**180** Evaporation of Large Arrays of Sessile Droplets **David Fairhurst**	**346** Inclusive STEM Teaching in the Age of the Open Web **Volker Sorge**	
15:15	**249** Modeling immunity to malaria with an age-structured PDE framework **Denis Patterson**	**216** PDE modelling and simulation of intracellular signalling pathways **Sofie Verhees**	**43** Dynamical density functional theory for active matter **Michael te Vrugt**		**169** Drop rebound on a deep bath **Paul Milewski**	**151** Multiparameter persistence for spatial biology **Katherine Benjamin**	**262** Marangoni-enhanced spreading of alcohol droplets drying on a solid **Lisong Yang**	**10** Finding oneself among the stars: the importance of role models and active allyship for LGBTQ+ STEM professionals **Claire Davies**	

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Time	Room G.41	Room G.56	Room G.06	Room 1.16	Room 1.17	Room 1.18	Room 2.14	Room 2.15	Room 2.16
15:35	**344** The impact and cost-effectiveness of pneumococcal immunisation strategies for the elderly in England **Jasmina Panovska-Griffiths**	**272** Pattern formation in active solids **Anton Souslov**	**139** Clumping in Flow: Discrete to Continuum Modelling of Magnetic Particle Transport **Edwina Yeo**		**179** Unravelling Wrinkle Formation in a Lubricated Viscoplastic Beam **Thomasina Ball**	**195** Topological fingerprints for audio identification **Ximena Fernandez**	**345** How wetting affects the evaporation of droplet arrays **Alex Askounis**	**331** How to be an Ally: a collaborative definition of allyship in STEM **Rosie Evans**	
15:55	**86** A data-driven model of drug accumulation and expulsion dynamics in antimicrobial resistant bacteria **Daniel Galvis**	**306** Instability of wall-bound filaments induced by molecular motors causes rotational cytoplasmic streaming **Debasish Das**	**328** Active matter dispersion with absorbing boundaries: Fourier methods to the rescue **Hakan Caldag**		**204** Elementary interactions of deep-water waves in the presence of damping **Raphael Stuhlmeier**	**209** Diffusion Geometry for Data Analysis **Iolo Jones**	**323** The effect of contact line motion on the deposition of particles from an evaporating droplet **Hannah D'Ambrosio**		
16:15	**Break**								
16:45	**QJMAM lecture** Controlling flow through viscosity manipulation **Nigel Mottram chaired by Andrew Baggaley**								
17:45	**Poster and Wine Session sponsored by CUP - Urban Sciences Building (directly opposite Frederik Douglass Centre)**								
	22 Phase-Isostable Reduction of Oscillatory Neural Mass Networks with Delays in local dynamics and network connections **Robert Allen**								
	78 Dam-Break Flows: down a hillside and surging up a beach **Mark Cooker**								
	104 Extensible-pendulum and double-pendulum problems: damping & periodic forcing, chaos & fractals **James Christian**								
	114 Travelling fronts in a generalised neural field model that couples to the extracellular space **Oliver Cattell**								
	119 Pattern formation driven by three-wave interactions with two critical wavenumbers **Laura Pinkney**								
	124 Optimal experimental design for quantification of uncertainty in models of hERG binding mechanism **Frankie Patten-Elliott**								
	130 Coarsening and pattern formation in solids **Sakina Abdul Manan**								
	137 Modelling bacterial chemotaxis and chemokinesis in dynamic environments with application to bacteria-root interactions **Jason Bains**								
	142 Modelling of long three-dimensional surface waves on currents **Benjamin Martin**								
	147 Constrained consensus-based optimization via reflected stochastic differential equations **Piers Hinds**								
	153 Evolution of quasi-periodic internal waves with rotation **Korsarun Nirunwiroj**								
	166 The combined effects of heterogeneous susceptibility, non-pharmaceutical interventions and viral evolution on epidemic trajectories **Ibrahim Mohammed**								
	170 Measuring Microplastics: Advancing Size Quantification through Enhanced Scanning Electron Microscopy **Imoleayomide Ajayi**								
	192 Winding and Magnetic Helicity in Periodic Domains **Daining Xiao**								
	194 Sobol sensitivity analysis of action potential model for rabbit ventricular myocyte **Zhechao Yang**								
	196 Modelling Tumour Escape Mechanisms in CAR T-Cell Treatment of Leukemias. **Alexis Farman**								
	205 Modelling structure borne sound and radiation of submerged structures at high frequencies **Samuel Palama**								
	222 An exact solution for laminar flow in fully-filled sewer pipes with egg-shaped and horseshoe-shaped cross-sections **André Lopes**								
	233 Bifurcations of attractors in singular fast-slow system **Said Elahjel**								
	234 Modelling Epithelial Ridge and Sweat Gland Formation **Luci Mullen**								
	248 A nonorthogonal geometric formulation of sheared rotation **Gert Botha**								
	252 Thermal boundary layer around a circular cylinder on the seabed forced by free-surface waves. **Henry Thomas**								
	266 Mathematical Modelling of Airways in Asthma **Ewan Farrell**								
	274 Single electrons on the Fibonacci quasicrystal: an interpolation between models **Alastair Rucklidge**								
	296 Solute transport in the cranial subarachnoid space. **Alannah Neff**								
	319 Co-dimension 2 Bifurcation Analysis Around the Boundary Equilibrium Bifurcation in Impacting Hybrid Systems **Hong Tang**								
	320 Modelling carbohydrate and protein metabolism in mammals **Bandar Alharbi**								
	322 Optimal activation functions from an OPTA perspective **Hui-An Shen**								
	325 Analysing Information Flow in Multi-View Neural Networks for Medical Imaging **Lucas Farndale**								
	339 MHD instabilities in stellar radiative regions **Virgin Durepaire**								
	342 Predator-prey models and the hares-eat-lynx paradox **Eduard Campillo-Funollet**								
	348 Approach and separation of bundles of quantized vorticity **Andrew Baggaley**								
	349 Three-dimensional ship-wave patterns: A new computational approach **Jack Keeler**								
	351 Poisson Scheme Structure Preserving Numerics for the Shallow Water Equations **James Arthur**								
	352 Cyclic loading of a non-linear heterogeneous poroelastic material **Zoe Godard**								
	355 Surface instability of a finitely deformed magnetoelastic half-space **Davood Shahsavari**								
	356 Stabilization of cyclic processes by slowly varying forcing **Julian Newman**								
19:00	**Day Close**								

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Time	G.41	G.56	G.06	1.16	1.17	1.18	2.14	2.15	2.16
9:00	**Plenary Session** Revisiting the link between turbulence to sound generation 70 years after Lighthill **Bérengère Dubrulle** chaired by Magda Carr								
10:00	**Break**								
	Contributed Talks								
10:30	**Mathematical Biology III** chaired by Freya Bull	**Disease Modelling** chaired by Ed Hill	**Waves & Vibrations** chaired by Magda Carr	**Self-assembly and ordering of complex structures in soft and hard matter.** chaired by Merin Joseph	**Fluid Dynamics** chaired by Ryan Doran	**Statistical Mechanics & Interacting Partcles Systems** chaired by David Swailes	**Networks & Optimisation** chaired by Ayse Ulgen	**Industrial Modelling** chaired by Claire Rees-Zimmerman	**Droplets** chaired by Toby Wood
10:30	**125** Multiscale Modelling of vascular tumours subjected to electrophoresis anticancer therapies **Zita Borbala Fulop**	**4** How to measure the controllability of an infectious disease? **Kris Parag**	**229** Why care about inverse problems when your focus is on modelling? **Art Gower**	**110** Exact Solution to the Quantum and Classical Dimer Models on the Spectre Aperiodic Monotiling **Shobhna Singh**	**189** Triple Deck Theory by a Green's integral equation **Edmund Chadwick**	**284** Kinetic models of many-particle systems with short-ranged inelastic interactions and clustering **Calum Braham**	**213** Spectral Measures for Graph Classification Problems **Ka Man (Ambrose) Yim**	**18** A Continuum Level model for Sintering **Mat Hunt**	**73** Evaporation of a droplet on a porous substrate **David Craig**
10:50	**241** Mean first passage time and its application in ocular drug development **Patricia Lamirande**	**9** Intelligent Optimization Analysis of the Cholera Epidemic Model **Tahir Nawaz Cheema**	**107** Ultrasonic sensing of bearings **Matheus de Carvalho Loures**	**263** 2D Quasicrystal from self-assembled nanocolumns with polygonal cross-sections **Xiangbing Zeng**	**227** Interpolation between the Navier-Stokes and the solenoidal Burgers equations **Koji Ohkitani**	**159** Order-disorder criticality in infinite particle chains at zero temperature **Gyula Toth**	**239** Modelling epileptiform discharges as frequency synchronization of Kuramoto oscillators **Yingjing Feng**	**54** Drying of porous media with impurities **Ellen Luckins**	**225** Visualizing Droplet Friction on Liquid-Infused Surfaces **Abhinav Naga**
11:10	**164** Non-Local Variable-Order Modelling of Avascular Tumor Growth Dynamics **Mariam Al Mudarra**	**95** Modelling symptom propagation in respiratory pathogens **Phoebe Asplin**	**246** Mode analysis in quasiperiodic phononic crystal structures **Marc Martí Sabaté**	**11** Square-Triangle periodic approximants in block copolymer phase separation **Merin Joseph**	**111** Bubble racing in a Hele-Shaw cell **Daniel Booth**	**75** Physics-informed Bayesian inference of external potentials in classical density-functional theory **Antonio Malpica-Morales**	**127** When reservoir computing meets information theory **Zonglun Li**	**177** Microfibre Filtration in Washing Machines **Torin Fastnedge**	**55** Good things come in threes: the interface dynamics of drops impacting onto a different liquid **Radu Cimpeanu**
11:30	**160** The role of an incoherent feed forward motif in decoding oscillatory protein expression dynamics in the developing pancreas. **Andrew Rowntree.**	**138** Data-Driven decisions in real-time: Can we control an epidemic with uncertainty in infection incidence data? **Sandor Beregi**	**256** Modelling Structural Vibrations Using Phase Space: Extending Ray Dynamics **Rory Collett**	**135** Self-assembly phase-behaviour of core-shell particles **Andy Archer**	**49** Shapes optimising grand resistance tensor entries in a Stokes flow **Clément Moreau**	**51** Bridging the gap between agent-based models and continuous opinion dynamics **Andrew Nugent**	**268** Bifurcation Dynamics of the Snapping of Shallow Circular Arches **Will Simpkins**	**155** Evolution of an annular viscous tube with variable surface tension **Matthew Shirley**	**168** Electrohydrodynamic interactions of a pair of leaky dielectric droplets **Michael McDougall**
11:50	**220** Kinetic modelling explains heterogeneity in red-blood-cell properties in sickle-cell disease **Claudia Alicia De Sousa Miranda Perez**	**8** Modeling and transmission dynamics of Zika virus through efficient numerical method **Ali Raza**	**152** Generalized Wiener-Hopf method for the problem of diffraction by a discrete wedge **Andrey Korolkov**	**77** Quasi-crystalline order in vibrating granular matter **Andrea Plati**	**113** Steady free-surface waves on an arbitrary distribution of vorticity **Alex Doak**	**186** Pattern formation and stability for a kinetic model of ants **Oscar de Wit**		**203** Surface-tension-driven buckling of a viscous disc **Nicholas Ryan**	**231** Colloidal deposits from evaporating sessile droplets **Nathan Coombs**
12:10	**87** Hybrid modelling for cancer invasion and metastasis **Dimitrios Katsaounis**	**193** Current trends in the COVID-19 pandemic dynamics **Igor Nesteruk**		**74** Self-assembly at quasicrystalline surfaces **Sam Coates**				**232** An enthalpy model for modelling of ice crystal icing in engines **Timothy Peters**	**161** Impacts of Liquid Drops: When Do Gas Microfilms Prevent Merging? **Peter Lewin-Jones**
12:30									
13:00 - 13:30			**Selecting and submitting to a scientific journal** **Royal Society Workshop**						
	Mini-Symposia								
13:45	**Mathematical methods to explore the role of directed cell movement in biological and biomedical applications** chaired by Fiona Macfarlane	**Mathematics and physics of active and living systems** chaired by Otti Croze	**Acoustic and elastic wave scattering** chaired by Artur Gower	**Excitations and measurements in quantum systems** chaired by Ryan Doran	**Geometrical optics stability analysis, microlocal analysis and applications in geo- and astrophysical fluid dynamics** chaired by Oleg Kirillov, Daniel Ratliff & Jeremie Vidal	**Application of mathematical models and controls in soft robotics** chaired by Vijay Chandiramani	**Asymptotic methods** chaired by Cameron Hall	**Topology in cosmology** chaired by Cora Uhlemann	**Novel mathematical models and methods in ecology** chaired by Eduard Campillo-Funollet
13:45	**16** Travelling waves in phenotypically structured models of cell migration into extracellular matrix **Rebecca Crossley**	**67** Insights into the control of active matter **Luke Davis**	**324** An analytical approach to the design of acoustic metamaterials and metasurfaces **David Abrahams**	**94** From wave turbulence to integrable turbulence and soliton gases **Stéphane Randoux**	**52** Geometrical optics stability analysis of rotating visco-diffusive flows **Oleg Kirillov**	**278** Overview of Mathematics and Control Theory in Soft Robotics **Vijay Chandiramani**	**53** An asymptotic upscaling of transport through the bacterial membrane **Molly Brennan**		**182** Clustering in Predator-Prey Systems **Lena Payne**
14:05	**39** Pattern formation by living droplets in chemoattractant gradients **Philip Pearce**		**61** Asymptotic models for vibration in asymmetric flexural structures: The generalised Rayleigh beam **Michael Nieves**	**71** Vortices in supersolids **Thomas Bland**	**112** Nonlinear Wave-Particle Interactions in Near-Earth Space: What Makes Our Magnetosphere Sing? **Daniel Ratliff**	**242** Model based control of soft robots **Cosimo Della Santina**	**116** Asymptotic analysis of wrinkles in a floating elastic sheet **Anthony Bonfils**	**201** Persistent Diagrams and Persistent Images as statistics to constrain primordial local non-Gaussianity **Gabriella Contardo**	**335** Spatial patterns and multi-stability in non-local models of interacting species **Valeria Giunta**
14:25	**144** How does ECM stiffness affect spheroid growth? **Margherita Botticelli**	**312** Spatio-temporal dynamics of nutrient exchanges in microbial active matter **Praneet Prakash**	**83** High-order homogenisation of the time-modulated wave equation: non-reciprocity for a single varying parameter **Marie Touboul**	**219** Optical skyrmions **Jörg Götte**	**290** Dynamics of pancake-like geophysical vortices: from waves to (bulk) turbulence? **Jeremie Vidal**	**228** Talk: Embedding Soft Synergies into Soft Materials for Intrinsic Compliant Robotic Hand Grasping **Emanuel Nunez Sardinha**	**128** Instability and transition in high Reynolds number flows with constant throughflow **Jamie Cuthbert**	**89** Understanding the early universe with Persistent Homology **Lina Julieth Castiblanco Tolosa**	**48** Quantifying invasive pest dynamics: the case of the oak processionary moth in the UK **Laura Wadkin**
14:45	**250** Exploring the role of EMT and Cell Motility in Ovarian Cancer Progression **Samuel Oliver**	**316** Bifurcations and nonlinear dynamics of the follower force model for active filaments **Bethany Clarke**	**102** Ultrasonic Travel-time Tomography of Locally Anisotropic Media using Stein Variational Gradient Descent **Katy Tant**	**279** Superfluid Vortices in Four Spatial Dimensions **Hannah Price**	**336** Instability of stratified and diffusive Taylor-Couette flow **Junho Park**	**265** Exploiting the non-linear dynamics of dielectric elastomers for soft robotics **Andrew Conn**	**174** Beyond the Richards equation: two-phase flow in an unsaturated porous medium **Michael Vynnycky**	**108** Cold-atom analogues for vacuum decay **Alex Jenkins**	**129** Persistent and anti-Persistent Motion in Bounded Space: Resolution of the First-Passage Problem **Daniel Marris**
15:05	**291** Higher-Dimensional Methods in Cellular Haptotaxis Applied to Cancer **Arran Hodgkinson**	**188** Models of Blood Flow in the Human Placenta **Eleanor Doman**	**292** Diffraction by a set of collinear cracks on a square lattice: an iterative Wiener-Hopf method approach **Elena Medvedeva**	**318** Relaxation dynamics of half-quantum vortices in a two-dimensional two-component Bose-Einstein condensate **Hayder Salman**	**337** Topological modes in stellar oscillations and instabilities **Armand Leclerc**		**264** Matched asymptotic expansions for the rocking can and other unusual problems **Cameron Hall**	**172** Quantized Vortices in Fuzzy Dark Matter Halos **Gary Liu**	**334** An assessment of the contact rates between individuals when movement is modelled by a correlated random walk **Joseph Bailey**
15:25	**299** Heterogeneous structuring in traveling wave solutions of a trait-structured Keller-Segel model **Viktoria Freingruber**	**183** Efficient Calculation of Moments in Biologically Active Taylor Dispersion Problems **Nick Bryant**	**101** Diffraction Theory and Several Complex Variables **Valentin Kunz**	**121** The thermalisation of light in a photonic mesh lattice **Tommy Moorcroft**			**218** An asymptotic framework for model differentiation and comparison in flood risk estimation and rainfall-runoff modelling **Phil Trinh**	**300** Axion String Source Modelling **Amelia Drew**	**343** A computational approach to estimate the effect of crop diversification in future climate scenarios **Marianna Cerasuolo**
15:45	**Break**								
4:15-5:15	**Public lecture** From maths to policy: a COVID-19 story **Julia Gog** chaired by David Swailes								

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Time	G.41	G.56	G.06	1.16	1.17	1.18	2.14	2.15	2.16
18:30	Conference Dinner at the Civic Centre Graeme Sarson & David Abrahams								
22:00	Day Close								

Thursday 11th April

Agenda

Time	G.41	G.56	G.06	1.16	1.17	1.18	2.14	2.15	2.16
9:00	**Plenary Session** Exploring Quantum Liquids as Simulators for Black Hole Processes **Silke Weinfurtner** chaired by Cora Uhlemann								
10:00	**Break**								
	Contributed Talks								
10:30	**Mathematical Biology IV** chaired by Otti Croze	**Bio-Fluids & Bio-Solid Mechanics** chaired by Matt Butler	**Geophysical Fluid Dynamics** chaired by Matthew Crowe	**Mathematical Physics** chaired by Ryan Doran	**Fluids: Numerical** chaired by James Arthur	**Numerical Algorithms & Data Processing** chaired by Andrew Krause	**Modelling of Physical Processes & Systems** chaired by Matthew Shirley	**Reaction-Diffusion Equations** chaired by David Swailes	**Active Matter & Complex Continua Fluids** chaired by Kraig Wymer-Webb
10:30	**30** Post-operative monitoring of human corneal cells based on in-vivo confocal microscopy study **Patrick Parkinson**	**98** Revealing 3D opposing vortices through reconstruction of 3D free sperm dynamics **Xiaomeng Ren**	**237** Dipolar geophysical vortices **Edward Johnson**	**105** Stratified Tearing Instabilities **Scott Hopper**	**313** Spatially logarithmic simulations of Rayleigh-Benard convection at high Ra **Curtis Saxton**	**208** VisualPDE: Playing with Patterns via Web Browsers **Andrew Krause**	**245** Volcanic fissure localisation: Thermoviscous fingering in non-uniform geometries **Jesse Taylor-West**	**269** Diffusive Lotka-Volterra type systems: conditional symmetries, exact solutions and their properties **Roman Cherniha**	**178** Existence of liquid toroids **Kraig Wymer-Webb**
10:50	**45** General Models for Transcription Factor Binding to DNA Promoters with Double Binding Site **Hanzhen Shen**	**34** Biofilm growth under localized antimicrobial treatment **Parna Mandal**	**202** three dimensional melting of wall mounted ice in shear flow **Thuy Duong Dang**	**247** Oscillatory reconnection at null points in the solar atmosphere **Gert Botha**	**96** Stabilisation of falling liquid films with restricted observations **Oscar Holroyd**	**60** Spherical Essentially Non-Oscillatory (SENO) Interpolation **Shingyu Leung**	**301** The largely linear response of earth's ice volume to orbital forcing **Liam Wheen**	**91** Semi-infinite travelling waves arising in a diffusive Gompertz model with a moving boundary **Nabil Fadai**	**243** Homogenised Properties of Viscoelastic Composites: An Asymptotic Homogenisation Perspective **Alejandro Roque-Piedra**
11:10	**277** A functional exchange 'shunt' in the umbilical cord: the role of coiling in solute and heat transfer **Tianran Wan**	**207** Predicting internal collapse of biological filament bundles **Christopher Prior**	**221** The coastal front propagation from a river outflow governed by dispersive potential-vorticity dynamics **Michael Nguyen**	**190** Topological Data Analysis of Monopoles in U(1) Lattice Gauge Theory **Xavier Crean**	**27** Predicting low-speed rarefied gas flow in a lid-driven cavity using a supervised machine learning approach **Arshad Kamal**	**13** On a Dynamic Variant of the Regularized Gauss-Newton Method with Sequential Data **Neil Chada**	**136** Modelling the impact of climate change on cocoa farming in Nigeria **Chris Budd**	**175** A moving-boundary approach to controlled drug release with finite dissolution rate **Maniru Ibrahim**	**117** Mathematical modelling of active fluids in a confined rectangular region **Ijuptil Joseph Kwajighu**
11:30	**149** Predicting the incidence of catheter-associated bacteriuria **Freya Bull**	**260** Predicting Retinal Haemorrhage following Retinal Vein Occlusion **Atrayee Bhattacharya**	**140** Ocean waves modelled by the forced/damped nonlinear Schrödinger equation **Ben Humphries**	**308** Semiclassical Trace Formula for Quantum Many-Body Model **David Martin**	**235** Electrified pendent liquid bridges **Agnes Bokanyi-Toth**	**181** A numerical algorithm for a coupled hyperbolic Goursat-Cauchy boundary value problem **Mihaela-Cristina Drignei**	**210** Curvature effects on two-phase flow for optimal underground hydrogen storage **Peter Castellucci**	**184** Turing and wave instabilities in reaction-diffusion systems with cross-diffusion **Edgardo Villar-Sepúlveda**	**123** A continuum theory for odd rods **Sami Al-Izzi**
11:50	**223** The initiation, invasion and blockade of ischaemic Alzheimer's disease **Andrew Ahern**	**297** Biomimetic Soft to Hard Connectors **Kit Simmonds**	**191** Melting of wall-mounted ice in shear flow in two dimensions **Ellen Jolley**	**185** How Classical is Fuzzy Dark Matter **Alex Gough**	**293** Numerical Modelling of the Mixing Dynamics of Printed Micro-droplets **Yatin Darbar**	**199** Potential features of electroencephalogram extracted by information geometry and fractal dimension **Heng Jie Choong**	**321** Reduction of quartz in silicon carbide reactors using a multiphase approach **Brady Metherall**	**64** Understanding the role of geometry and cross-diffusion in pattern formation **Gulsemay Yigit**	**173** Capillary Bridge Formation between Lipid Membranes by Biomolecular Condensates **Halim Kusumaatmaja**
12:10	**307** TIDA Neuron Bursting; Conductance modelling of a neuroendocrine population **Jake Ahern**	**97** Mechanics of extracellular matrix maintenance in biological tissues **Matthew Butler**	**66** The role of linear focusing and resonant trapping in generating extreme waves over a submerged sill **Emiliano Renzi**	**156** Phonon signatures in photon correlations **Ben Humphries**		**88** New year, new VisualPDE: fancy features, scientific stories, and more **Benjamin Walker**		**309** Pattern formation in stochastic reaction-diffusion systems **Fraser Waters**	**134** Hydrodynamic efficiency limit on a Marangoni surfer **Abdallah Daddi-Moussa-Ider**
12:30	**Lunch**								
13:00 - 13:30			Organisations supporting Knowledge Exchange and Knowledge Transfer in the Mathematical Sciences: Are we meeting your needs? **Sofia Sanz Del Pino & Lauren Hyndman**						
	Mini-Symposia								
13:45	**Nonlinear systems in mathematical biology** chaired by Andrew Krause, Denis Patterson, Jun Jewel	**From cell-cell communication to biological functions through mathematics** chaired by Giulia Celora & Josh Bull	**Recent advances in nonlinear dispersive waves** chaired by Emiliano Renzi		**Shape and form in active materials** chaired by Anton Souslov, Sami Al-Izzi, Jack Binysh	**Maths communication** chaired by Kat Phillips & Fraser Waters	**Topological aspects of fluid dynamics** chaired by Daining Xiao	**Mechanics at all scales: theory and applications** chaired by Anthony Bonfils & Marc Sune Simon	**Advances in control and adjoint methods in fluid dynamics** chaired by Alexander Wray
13:45	**3** Data-driven modelling of reaction-diffusion patterns in synthetic biofilms **Martina Oliver Huidobro**	**224** Self-organization in motile signaling bacteria **Wesley Ridgway**	**14** The conduit equation : hyperbolic approximation and generalized Riemann problem **Sergey Gavrilyuk**		**21** The mechanical secrets of the squirting cucumber **Finn Box**	**38** How I learned to stop worrying and love the (Maths)Comm **Kat Phillips**	**289** Magnetic Field Topology in Turbulent Magnetic Reconnection **Alexander Russell**	**332** Elastic Bistability and the Geometry of Cellular Neighbourhoods in Choanoflagellates and Green Algae **Raymond Goldstein**	**56** Electrostatic control of the Navier–Stokes equations for thin films **Susana Gomes**
14:05	**37** Delayed loss of stability of periodic travelling waves affects wavelength changes of patterned ecosystems **Lukas Eigentler**	**267** Spatial Modelling of Blood Vessel Remodelling in the Tumour Microenvironment **Nicholas Fan**	**25** Riemann problem for polychromatic soliton gases: a testbed for the spectral kinetic theory **Giacomo Roberti**		**29** Stress-shape misalignment in confluent cell layers **Mehrana Nejad**	**36** From MathCity to MathsWorld - changing attitudes to maths **Katie Chicot**	**106** Twisted Magnetic Knots and Links and their Current Alignment **Simon Candelaresi**		**69** Adjoint Based Shape Optimization for Thermoacoustic Stability of Combustors Using Free Form Deformation **Ekrem Ekici**
14:25	**238** Turing patterns on the move **Vit Piskovsky**	**271** Mathematical insights into context-specific Notch signalling: endothelial cells and intestinal crypt niche **Daria Stepanova**	**26** Interaction of soliton gas with variable mean flow **Thibault Congy**		**295** Inverse design for the controlled boundary shape kirigami tessellation **Xiaoyuan Ying**	**126** Chalkdust, VisualPDE, and other ways of making your mathematical life more fun **Adam Townsend**	**283** An Application of Topological Data Analysis to Drift Wave Turbulence **Sage Stanish**	**99** Optimal design of odd elastic metamaterials **Jack Binysh**	**70** Data-driven inference of adjoint sensitivities without adjoint solvers: An application to nonlinear wave equations **Defne Ege Ozan**
14:45	**176** I'll try spinning, that's a good trick!" — how nonlocal chiral movement helps forms patterns **Thomas Jun Jewell**	**288** Quantitative analysis of the drivers and consequences of the spatial pattern of cancer invasion **Robert Jenkins**	**212** Remarks on the applicability of Gardner equation to describe ISWs in a three-layer liquid system **Ricardo Barros**		**214** Modelling mechanical stresses in drying colloidal drops **Matthew Hennessy**	**146** Diversifying the Maths Curriculum at Queen Mary University of London **Adam Onus**	**340** Monopoles, Alice rings and non-Abelian vortices: topology and dynamics in spinor Bose-Einstein condensates **Magnus Borgh**	**253** Discrete differential geometry-based model for the snapping analysis of axisymmetric shells **Weicheng Huang**	**90** Pulse interactions driven by excited hidden modes **Marc Pradas**
15:05	**215** Analysing travelling waves & wave packets in laterally-inhibited grids of integrate-and-fire neurons **Henry Kerr**	**261** Motility Induced Phase Separation in Quorum Sensing particles **Devi Prasad Panigrahi**	**302** A Generelised Hydrodynamics approach to the Boussinesq equation: a prototypical example of 2D stationary soliton gas **Thibault Bonnemain**		**330** Cell-level modelling of active forces in early-stage development **Rastko Sknepnek**	**282** Breaking the (Mathematician) Mould **Robyn Goldsmith**	**294** Relaxation of Magnetic and Vortex Braids: A Comparison **Gunnar Hornig**	**327** Stretching and breaking of polymeric nanofibre bundles **Astrid de Wijn**	**118** Interactions between control and modelling for deformable bubbles **Alice Thompson**
15:25	**158** Modelling phenotypic and spatial heterogeneity in solid tumours **Giulia Celora**	**154** Matching Macrophage Mediated Metastasis Models **Joshua Bull**	**171** Stability of hydroelastic waves **Emilian Parau**			**329** Adventures in Maths Communication **Christian (Kit) Yates**	**298** Relative magnetic helicity in multiply connected domains **David MacTaggart**	**276** The curious case of the chattering chalk **Alan Champneys**	**42** Preconditioned Iterative Methods for Time-Dependent Fluid Flow Control Problems **John Pearson**
15:45	**Break**								
16:15	**Stewartson Memorial lecture** Rapidly Rotating Magnetohydrodynamic Flows and the Geodynamo **Emmanuel Dormy** chaired by Toby Wood								

Thursday 11th April

Agenda

Time	G.41	G.56	G.06	1.16	1.17	1.18	2.14	2.15	2.16
17:15	**Prizes, Handover and Closing Ceremony** **Andrew Baggaley, Magda Carr & Andrew Gilbert**								
17:30	**Day Close**								