



**Institute** of  
**mathematics**  
& its applications

**siam**® | *In cooperation with*  
Society for Industrial and  
Applied Mathematics

**4TH IMA CONFERENCE ON  
NONLINEARITY AND  
COHERENT STRUCTURES**

ONLINE EVENT VIA ZOOM

7 – 9 JULY 2021

**CONFERENCE  
PROGRAMME**

# DAY ONE - WEDNESDAY, 7 JULY 2021

Session Chairs

Professor Evgeny Ferapontov (Loughborough University)

Professor Sara Lombardo (Loughborough University)

Professor Paul Milewski (University of Bath)

12:20	Welcome, Introduction and Housekeeping
12:30	Plenary Lecture - Tamara Grava (University of Bristol, UK and SISSA, Italy) <b><i>Gibbs ensemble for the Ablowitz-Ladik lattice, circular beta-ensemble and double confluent Heun equation</i></b>
13:15	Petr Grinevich (Landau Institute for Theoretical Physics, Russia) <b><i>The linear and nonlinear instability of the Akhmediev breather</i></b>
13:40	Christian Klein (Insitute de Mathematiques de Bourgogne, France) <b><i>Complex geometric optics solutions to Dirac problems</i></b>
14:05	Thibault Congy (Northumbria University, UK) <b><i>Dispersive Riemann problem for the Benjamin-Bona-Mahony equation</i></b>
14:30	Break
15:00	Daniel Ratliff (Northumbria University, UK) <b><i>The dynamics of waves in the neighbourhood of the Benjamin-Feir instability</i></b>
15:25	Jorg Weber (Lund University, Sweden) <b><i>Global bifurcation of capillary gravity waves with overhanging profiles and arbitrary vorticity</i></b>
15:50	Joanna Tumelty (University of Leeds, UK) <b><i>Breaking the snaking in natural doubly diffusive convection</i></b>
16:15	Dan Hill (University of Surrey, UK) <b><i>Existence of localised cellular patterns</i></b>
16:40	Quickfire Poster Session
17:05	Poster Session and Networking via Spatial.chat
17:30	Plenary Lecture - Vera Hur (University of Illinois Urbana-Champaign, USA) <b><i>Unstable water waves: a new Evans function approach</i></b>
18:15	David Ambrose (Drexel University, USA) <b><i>Global existence results for the 2D Kuramoto-Sivashinsky equation</i></b>
18:40	Break
18:50	Jose Escorcia (IMPA, Brazil) <b><i>Post-blow up dynamics in the Nonlinear Schroedinger equation</i></b>
19:15	Carlos Dibaya (University of Leeds, UK), <b><i>Nonlinear mirror image method for the nonlinear Schrödinger equation with time dependent integrable boundary conditions</i></b>
19:40	Matthew Tranter (Nottingham Trent University, UK) <b><i>Resolution of the zero-mass contradiction for the Boussinesq-Klein-Gordon and coupled Boussinesq equations</i></b>
20:05	Conference Close

# DAY 2 - THURSDAY 8 JULY 2021

Session Chairs

Professor Peter Clarkson (University of Kent)

Professor Gennady El (Northumbria University)

Professor Emilian Părău (University of East Anglia)

12:25	Welcome, Introduction and Housekeeping
12:30	Plenary Lecture - Emilian Parau (The University of East Anglia, UK) <b><i>Internal Waves and Related Flows</i></b>
13:15	Alexey Slunyaev (HSE University; Institute of Applied Physics of the RAS) <b><i>Transformation of envelope solitons on a bottom step causes extreme events</i></b>
13:40	David Andrade (Technion, Israel) <b><i>Bound-wave due to sea and swell trigger the generation of freak waves</i></b>
14:05	Oleg Derzho (Institute of Thermophysics, Russia) <b><i>Internal-capillary solitary waves in a three-layer formulation</i></b>
14:30	Break
15:00	Michael Ruderman (The University of Sheffield, UK), <b><i>Quasi-parallel propagation of solitary waves in magnetised non-relativistic electronpositron plasmas</i></b>
15:25	Sonia Boscolo (Aston University, UK) <b><i>Auto-setting breather mode-locked fibre laser</i></b>
15:50	James Christian (University of Salford, UK) <b><i>Spontaneous patterns from Ablowitz-Ladik equations: cavity boundary conditions, instabilities, and mean-field theory</i></b>
16:15	Matthew Hunt (University of Warwick, UK) <b><i>Free surface flows in electrohydrodynamics with prescribed vorticity</i></b>
16:40	Eileen Russell (University of Bath, UK) <b><i>One-dimensional discrete-time droplet-Faraday wave interactions</i></b>
17:05	Networking via Spatial.chat
17:30	Plenary Lecture - David Lannes (Université de Bordeaux, France) <b><i>Modelling and numerical simulation of a floating object</i></b>
18:15	Victor Shrira (Keele University, UK) <b><i>Brave new "Legoland" of essentially 2d nonlinear evolution equations in boundary Layers</i></b>
18:40	Break
18:50	John Carter (Seattle University, USA) <b><i>Dissipative models of swell propagation across the Pacific</i></b>
19:15	Alex Doak (University of Bath, UK) <b><i>Mode two solitary waves in three-layer flows</i></b>
19:40	Karima Khusnutdinova (Loughborough University, UK) <b><i>Wavefronts and modal structure of long surface and internal ring waves on a parallel shear current</i></b>
20.05	Conference Close

# DAY 3 - FRIDAY 9 JULY 2021

Session Chairs

Professor Jean-Marc Vanden-Broeck (University College London)

Dr Matteo Sommacal (Northumbria University)

Professor Demetrios Papageorgiou (Imperial College London)

12:25	Welcome, Introduction and Housekeeping
12:30	Plenary Lecture - Demetrios Papageorgiou (Imperial College, UK) <b><i>Nonlinear interfacial waves on the microscale</i></b>
13:15	Mark Blyth (The University of East Anglia, UK) <b><i>Stability of sheared liquid film loaded with soluble surfactant</i></b>
13:40	Dmitri Tseluiko (Loughborough University, UK) <b><i>Deformation and dewetting of liquid films under gas jets</i></b>
14:05	Paul Christodoulides (Cyprus University of Technology, Cyprus) <b><i>Groundwater flow through a porous medium and modeling ground heat exchanges</i></b>
14:30	Break
15:00	Josh Shelton (University of Bath, UK) <b><i>Exponential asymptotics for steady parasitic gravity-capillary waves</i></b>
15:25	Sitai Li (University of Michigan, USA) <b><i>On the Maxwell-Bloch system in the Sharp-Line limit without solitons</i></b>
15:50	Bing-Ying Lu (University of Bremen, Germany) <b><i>Soliton resolution and asymptotic stability for the sine-Gordon equation</i></b>
16:15	Janis Bajars (University of Latvia, Latvia) <b><i>Impact of localised mode scattering by impurities in a two-dimensional hexagonal crystal lattice</i></b>
16:40	Alexey Samokhin (Moscow State Technical University of Civil Aviation, Russia) <b><i>On monotonic patterns in periodic boundary solutions of cylindrical and spherical Korteweg-de Vries-Burgers equations</i></b>
17:05	Networking via Spatial.chat
17:30	Philippe Caillol (University of Bio-Bio, Chile) <b><i>A vorticity wave packet breaking within a rapidly rotating vortex</i></b>
17:55	Roberto Ribeiro (Federal University of Parana, Brazil) <b><i>Time-dependent Kelvin cat-eye structure due to a linear shear current</i></b>
18:20	Yifeng Mao (University of Colorado, USA) <b><i>Generation of linear and nonlinear periodic traveling waves in a viscous fluid conduit</i></b>
18:45	Break
18:55	Mingyu Hu (University of Colorado, USA) <b><i>Spin-injection generated shock waves and solitons in a ferromagnetic thin film: a spin piston problem</i></b>
19:20	Giacomo Roberti (Northumbria University, UK) <b><i>Nonlinear spectral synthesis of breather gas in focusing NLS equation: a numerical approach</i></b>
19:45	Curtis Hooper (Loughborough University, UK) <b><i>Undular bores generated by fracture</i></b>
20:10	Conference Close

# Poster Presentations

Sonia Boscolo (Aston University, UK)

**Model-free modelling of nonlinear pulse shaping in optical fibres**

Marcos Caso-Huerta (Northumbria University, UK)

**Linear stability spectra of a novel long wave-short wave system**

James Christian (University of Salford, UK)

**Chaotic scattering problems with polygons and polyhedra exit basins and uncertainty fractal dimension**

Sathyanarayanan Chandramouli (Florida State University, USA)

**Characterization of envelope solitary waves in nonlocal dispersive hydrodynamic systems**