



37th Scottish Fluid Mechanics Meeting

29 May 2024

Edinburgh



Programme

8:30–9:50	Registration, breakfast, posters
9:50–10:00	Welcome and introduction
10:00–12:00	Session 1 Chair: Hannah-May D’Ambrosio
10:00–10:15	Active Darcy’s Law <u>Ryan R. Keogh</u> , <u>Timofey Kozhukhov</u> , <u>Kristian Thijssen</u> , <u>Tyler N Shendruk</u> <i>School of Physics and Astronomy, The University of Edinburgh</i>
10:15–10:30	Instabilities of thin-film flow over a spinning disk <u>Laura Milne</u> , <u>Alexander W Wray</u> , <u>Omar K Matar</u> , <u>Marc Pradas</u> , <u>Stephen K Wilson</u> <i>Department of Mathematics and Statistics, University of Strathclyde; Department of Chemical Engineering, Imperial College London; School of Mathematics and Statistics, The Open University</i>
10:30–10:45	CFD Simulation of Fast Fluidized Bed Carbonator for CO₂ Capture Process using the Eulerian-Eulerian Model <u>Darlington Amadi</u> , <u>Aditya Karnik</u> , <u>Mamdud Hossain</u> <i>School of Engineering, Robert Gordon University</i>
10:45–11:00	Experimental modelling of rock dumping through vertical and inclined pipes <u>Otto Neshamar</u> , <u>Alan Cuthbertson</u> , <u>Øyvind Thiem</u> , <u>Peter Davies</u> <i>School of Science and Engineering, University of Dundee</i>
11:00–11:15	Possible ubiquitous nature of solitary waves in the stable atmospheric boundary layer <u>Philip S. Anderson</u> <i>Scottish Association for Marine Science, Oban</i>
11:15–11:30	A unifying heat transport model for magnetoconvection <u>Matthew McCormack</u> , <u>Andrei Teimurazov</u> , <u>Olga Shishkina</u> , <u>Moritz Linkmann</u> <i>School of Mathematics, The University of Edinburgh; Max Planck Institute for Dynamics and Self-Organization, Göttingen</i>
11:30–11:45	Scattering of surface waves by ocean currents <u>Han Wang</u> , <u>Ana B. Villas Bôas</u> , <u>Jacques Vanneste</u> , <u>William R. Young</u> <i>School of Mathematics, The University of Edinburgh; Department of Geophysics, Colorado School of Mines; Scripps Institution of Oceanography, University of California at San Diego</i>
11:45–12:00	The energetics of pilot-wave hydrodynamics <u>Matthew Durey</u> , <u>John W. M. Bush</u> <i>School of Mathematics and Statistics, University of Glasgow</i>
12:00–12:10	Group photo
12:10–13:30	Lunch and Posters

13:30–15:00	Session 2	Chair: Dmitry Aleynik
13:30–13:45	Post-impact gas-cushioning in liquid-solid impacts <i>Peter Hicks - School of Engineering, University of Aberdeen</i>	
13:45–14:00	Effect of substrate wettability on the heat transfer coefficient in pool boiling <i>Giada Minozzi, Alessio D. Lavino, Edward R. Smith, Tassos Karayiannis, Khellil Sefiane, Omar K. Matar, David Scott, Timm Krüger, Prashant Valluri</i> <i>School of Engineering, The University of Edinburgh; Department of Chemical Engineering, Imperial College London; Department of Aerospace and Mechanical Engineering, Brunel University London</i>	
14:00–14:15	Simulating collective bacterial swarming in sparse systems <i>Francois de Tournemire, Kristian Thijssen, Gavin Melaugh, Tyler Shendruk</i> <i>School of Physics and Astronomy, The University of Edinburgh</i>	
14:15–14:30	The Role of Activity Patterning in Active Nematic Flow Transitions <i>Alexander J.H. Houston, Nigel J. Mottram</i> <i>School of Mathematics and Statistics, University of Glasgow</i>	
14:30–14:45	Drug inhalation simulations in patient airways with two-way and four-way coupling <i>Josh Williams, Uwe Wolfram, Ali Ozel</i> <i>Hartree Centre, STFC Daresbury Laboratory; Institute for Material Science and Engineering, TU Clausthal; School of Engineering and Physical Sciences, Heriot-Watt University</i>	
14:45–15:00	Modelling ferrofluid emulsions using a bulk stress approach <i>Paolo Capobianchi, Ghulam Sultan, Marcello Lappa, Fernando T. Pinho, Mónica S.N. Oliveira</i> <i>University of Strathclyde; University of Porto</i>	
15:00–15:30	Coffee and Posters	
15:30–17:15	Session 3	Chair: Matthew Durey
15:30–15:45	Reconstructing ocean's density stratification from surface data <i>Anirban Guha</i> <i>School of Science and Engineering, University of Dundee</i>	
15:45–16:00	A 2D model for the drainage of melt ponds on Arctic sea ice <i>Russell Campbell, David Rees Jones, David Dritschel</i> <i>School of Mathematics and Statistics, University of St Andrews</i>	
16:00–16:15	Simulation of the transient dissolution of a spherical particle using CFD <i>Mahsa Hassanpour, Sina Haeri, Stacie Tibos</i> <i>School of Engineering, The University of Edinburgh; PepsiCo International's R&D center, Leicester</i>	
16:15–16:30	Dynamics of flow around wind-dispersed dandelion-inspired polyamide flyers <i>Soumarup Bhattacharyya, Bappa Mitra, Marc Desmulliez, Ignazio Maria Viola</i> <i>School of Engineering, The University of Edinburgh; School of Engineering & Physical Sciences, Heriot-Watt University</i>	
16:30–16:45	Evidence of seabed currents enhancements in abyssal tropical ocean driven by the surface mesoscale eddies <i>Dmitry Aleynik, Andrew Dale</i> <i>Scottish Association for Marine Science, Oban</i>	
16:45–17:00	The effect of contact line motion on the deposition of particles from an evaporating sessile droplet <i>Hannah-May D'Ambrosio, Stephen K. Wilson, Alexander W. Wray</i> <i>Department of Mathematics and Statistics, University of Strathclyde</i>	
17:00–17:15	Dropwise Condensation on Silicone Oil Grafted Surfaces <i>Anam Abbas, Gary G. Wells, Glen McHale, Khellil Sefiane, Daniel Orejon</i> <i>School of Engineering, The University of Edinburgh; Department of Mechanical Engineering, University of Engineering and Technology, Lahore; International Institute for Carbon-Neutral Energy Research (WPI-I2CNER), Kyushu University</i>	
17:15–17:20	Closing remarks	

- 1. Flow and Jamming of Granular Material in TPMS structures**
Aashish Kumar Gupta, Sina Haeri
School of Engineering, The University of Edinburgh
- 2. Development and validation of a cavitation erosion model**
Adriano Evangelisti, Giuliano Agati, Domenico Borello, Paolo Venturini, Paolo Capobianchi
Sapienza University of Rome; University of Strathclyde
- 3. Numerical Modelling of Nanofiltration Membranes Using Polyethylene Glycol Solutions**
Aniol Puigdefabregas Nogueras, E. H. Papaioannou, A. Kazakidi
University of Strathclyde; Lancaster University
- 4. Numerical investigation of pulsating flow around a circular cylinder**
Brains Vasco, Oleksandr Zhdanov, Angela Busse
James Watt School of Engineering, University of Glasgow
- 5. Evaporation of droplets on porous substrates**
David Craig, Stephen K. Wilson, Alexander W. Wray, Khellil Sefiane
Department of Mathematics and Statistics, University of Strathclyde; School of Engineering, The University of Edinburgh
- 6. Evaporation-induced translation of Multiple Binary Droplets**
Debarshi Debnath, Anna Malachtari, Geroge Karapetsas, Daniel Orejon, Khellil Sefiane, Alidad Amirfazli, Prashant Valluri
School of Engineering, The University of Edinburgh; Department of Chemical Engineering, Aristotle University of Thessaloniki; Department of Mechanical Engineering, York University, Toronto
- 7. On the flow around 3D porous disks at incidence**
Doudou Huang, Chandan Bose, Ignazio Maria Viola
School of Engineering, The University of Edinburgh; College of Engineering and Physical Sciences, University of Birmingham
- 8. Advanced Thermophysical Properties Determination within CCUS Operations: Thermodynamic Modelling for Phase Equilibrium in CO₂-rich mixtures**
Elahe Rostaminikoo, Edris Joonaki, Hamid Reza Nasriani
School of Engineering and Computing, University of Central Lancashire; TÜV SÜD UK National Engineering Laboratory
- 9. Stress dependent permeability of granular polymer material as a temporary plug in subsurface reservoirs**
Feng Zhao, Yukie Tanino, Jianchun Guo, Amer Syed
School of Oil & Natural Gas Engineering, Southwest Petroleum University, Chengdu; School of Engineering, University of Aberdeen; School of Engineering, The University of Edinburgh
- 10. Ferrohydrodynamics of Ferrofluid-gaps for Direct Drive Wind Turbine Generators**
Fergus Hall, Alasdair McDonald, Markus Mueller
School of Engineering, The University of Edinburgh
- 11. Numerical experiments to assess the dynamics of sediment particle entrainment**
Gaston Latessa, Angela Busse, Maggie Creed, Jin Sun
James Watt School of Engineering, University of Glasgow
- 12. Generation of quasi-2D isolated spanwise vortex gusts**
Geethanjali Pavar, T. Bruce, B. Peterson, A. McDonald
School of Engineering, The University of Edinburgh
- 13. Machine learning based PAH modelling for LES of turbulent non-premixed flames**
Geveen Arumapperuma, Oliver Bladek, Antonio Attili
School of Engineering, The University of Edinburgh
- 14. Non-porous viscous fingering of a gravity-driven freesurface flow**
Haolin Yang, Nigel Mottram, Katarzyna Kowal
School of Mathematics and Statistics, University of Glasgow

15. **Evolution of an Evaporating Sessile Droplet According to the One-Sided Model**
Henry T. Sharp, Stephen K. Wilson, Alexander W. Wray
 Department of Mathematics and Statistics, University of Strathclyde
16. **A single-phase Level-Set method for unsteady free surface flows: geometric-based reinitialisation and physically-consistent dynamic boundary conditions**
Jorge Sandoval, Cristián Escauriaza, David Ingram
 School of Engineering, The University of Edinburgh
17. **Experimental investigation of flow boiling performance of microchannel with different hydraulic diameter and aspect ratio**
Luwen Qin, Arif Widyatama, Julio Cesar Passos, Khellil Sefiane, Daniel Orejon
 School of Engineering, The University of Edinburgh; Department of Mechanical Engineering, Federal University of Santa Catarina, Florianopolis, SC, Brazil
18. **Thermodiffusive Instabilities in Ammonia/Hydrogen Laminar Flames**
Markos-Gerasimos Viagkinis, Sofiane Al-Kassar, Antonio Attili
 School of Engineering, The University of Edinburgh
19. **Ocean wave-induced microplastic transport in the presence of the Basset-Boussinesq history force**
Mary Eby, Cathal Cummins
 Department of Mathematics, Heriot-Watt University; School of Energy, Geoscience, Infrastructure and Society Heriot-Watt University
20. **Electrohydrodynamic interactions of a pair of leaky dielectric drops**
Michael A. McDougall, Stephen K. Wilson, Debasish Das
 Department of Mathematics and Statistics, University of Strathclyde
21. **The Influence of Inlet, Headland, and Tidal Current Relative Positioning on the Formations of Ebb Tidal Jet and Eddy at Tidal Inlets**
Munawir Pratama, Vengatesan Venugopal
 School of Engineering, The University of Edinburgh
22. **Numerical turbulent viscosity estimation**
Nguyen Q. Chien
 School of Engineering, The University of Edinburgh
23. **Surface Vibration Effects on Nanoscale Ice Nucleation**
Pengxu Chen, Rohit Pillai, Saikat Datta
 School of Engineering, The University of Edinburgh
24. **Experimental Studies on the Hydraulic Behaviour of Nigerian Soils for Efficient Water Management**
Peter Uloho Osame, Taimoor Asim, Sheikh Zahidul Islam, Dalia Ali
 School of Engineering, Robert Gordon University
25. **Numerical Simulation of Inertial Particle Motion in Heterogeneous Suspensions**
Qi (Charles) Zhou, Benjamin Owen, Timm Krüger
 School of Engineering, The University of Edinburgh
26. **Nucleate pool boiling of carbon dioxide on a vertical flat copper surface in confined spaces**
Rafael B. A. Passarella, Arthur K. A. Araújo, Adonis Menezes, Júlio C. Passos
 Department of Mechanical Engineering, Federal University of Santa Catarina, Florianópolis, SC, Brazil
27. **Multiphase Flow Measurement of Wet Gas Flow Using Machine Learning Modelling Algorithms**
Seyedahmad Hosseini, Gabriele Chinello, Gordon Lindsay, Sheila Smith, Don McGlinchey
 Department of Mechanical Engineering, Glasgow Caledonian University; TÜV SÜD UK National Engineering Laboratory; Department of Applied Science, Glasgow Caledonian University
28. **Molecular kinetic modelling of non-equilibrium evaporative flows**
Shaokang Li, Livio Gibelli, Yonghao Zhang
 School of Engineering, The University of Edinburgh; Centre for Interdisciplinary Research in Fluids, Institute of Mechanics, Chinese Academy of Sciences, Beijing
29. **Two-phase blood flow downstream of a 3D bifurcation**
Tanchanok Wisitponchai, Junxi Wu, Asimina Kazakidi
 Department of Biomedical Engineering, University of Strathclyde
30. **Mathematical modelling of ice-sheet dynamics**
Tanisha Kumari, Matthew Durey, Peter Stewart, Katarzyna Kowal
 School of Mathematics and Statistics, University of Glasgow

31. **3D roughness effects on the aerodynamics of the outboard section of a wind turbine blade**
Wasina Preamsakul, Oleksandr Zhdanov, Angela Busse
James Watt School of Engineering, University of Glasgow
32. **Turbulent Hydrogen Flames at High Pressure**
William Lauder, Sofiane Al-Kassar, Geveen Arumapperuma, Antonio Attili
School of Engineering, The University of Edinburgh
33. **The interaction of waves with suspended seaweeds: wave attenuation and in-canopy hydrodynamics**
Xinyi Zhang, Dominic van der A, Tom O'Donoghue
School of Engineering, University of Aberdeen
34. **Decoupling Heat Transfer Mechanisms of Micrometre Droplets during Steady State Phase-Change**
Xuecong Wang, Nenad Miljkovic, Daniel Orejon
School of Engineering, The University of Edinburgh
35. **Exploring Critical size and temperature of size effect: Insights into Adsorption and Diffusion in Nanometer-Scale Confinement**
Xueling Zhang, Qiang Ye, Yingfang Zhou
School of Energy and Power Engineering, Zhengzhou University of Light Industry; School of Engineering, University of Aberdeen
36. **Fluid-Solid Flow Transition in Mixed (Sand-Mud) Sediment: Enhanced Modelling of Sedimentation in Estuarine and Coastal Waters**
Yi Yuan, Alan Cuthbertson, Tom Eaves
School of Science and Engineering, University of Dundee
37. **Active fluid-induced dynamics of passive polymers**
Zahra Valej Tyler N. Shendruk
School of Physics and Astronomy, The University of Edinburgh