University College Dublin
School of Mathematics and Statistics

Monday, June 10th - Wednesday, June 12th 2019
Part of the IUTAM symposium series

THERMASMART
Thermal Management of Microprocessors

Science Foundation Ireland sfi For what's next

IRISH RESEARCH COUNCIL An Chomhairle um Thaighde in Eirinn

IUTAM

UCD DUBLIN

Welcome

The Organizing Committee welcomes you to University College Dublin for the IUTAM Symposium in Computational Modellling of Instabilities and Turbulence in Stratified Two-Phase flows. The Symposium addresses the intrinsic complexities of two-phase flow, as well as planning out new avenues to model such flows with ever-increasing fidelity to the basic physics.

The Symposium has brought together a very international cohort of experts working in modelling, simulation, and experiment, who can all bring important insights to bear on the Symposium topic. The Symposium particularly welcomes the involvement of the Horizon 2020 funded network ThermaSMART, which has brought funding and scientific participants to the event. ThermaSMART is an international network of laboratories working on the applications of heat transfer in the cooling of high-power microprocessors. Many of the problems encountered by ThermaSMART involve two-phase flows, and this opens up a new frontier of potential applications for researchers working in two-phase flows.

The Symposium is also committed to supporting the next generation of researchers in two-phase flows. As such, a dedicated quick-fire presentation session for Early-Stage researchers is included in the programme, with an accompanying poster session.

Support for the early-stage researchers has come from several sources, not least the Broberg Memorial Fund administered by the UCD Foundation, in memorial to Knut Broberg, who spent a part of his career in UCD. Broberg was a distinguished researcher in Solid Mechanics who also made some contributions to Fluid Mechanics – in particular his advocacy for a power-law form (rather than a logarithm) for the "law of the wall" in wall turbulence. For these reasons, the quick-fire presentation session bears Broberg's name.

The Scientific Committee has worked to put together a very packed and diverse programme of talks and discussions over the course of the Symposium. At the same time, the Symposium has included several evening activities for participants, so that the Symposium will showcase Ireland's contributions both to Science and also to Culture.

On behalf of the Local Organizing Committee and the Scientific Committee, welcome to Ireland.

Le gach dea-ghuí,
Lennon Ó Náraigh

Extended Papers: CFD Modelling and Multiphase Flows

The submitted short abstracts appear in this conference booklet. Participants are invited to submit full-length papers arising from the presented work to a special issue of Fluid Dynamics and Materials Processing (FDMP). This forum may be of particular relevance to the applied, technical papers submitted to the Symposium. The editors for the special edition are the Chair of the Symposium, Lennon Ó Naraigh (UCD), and Prashant Valluri (Guest Editor, University of Edinburgh). All articles will be peer-reviewed in the usual manner. Deadline for manuscript submissions: 1 September 2019.

Local Organizing Committee and Contacts

Lennon Ó Náraigh is the Chair of the Local Organizing Committee and is the main point of contact throughout the Symposium. Lennon Ó Náraigh is a Tenured Lecturer in the School of Mathematics and Statistics in University College Dublin.

The other members of the Local Organizing Committee are Miguel Bustamante and Frédéric Dias (School of Mathematics and Statistics, UCD) and Michael Gilchrist (School of Mechanical & Materials Engineering, University College Dublin).

Administrative support for the Symposium is provided by the office of the School of Mathematics and Statistics. The School office is located in Room G03 Science Centre North. The contact person for these purposes is Alison Emanuel (alison.emanuel@ucd.ie).

Scientific Committee

Scientific Oversight of the Symposium has been provided by a dedicated Scientific Committee. The Chair of the Scientific Committee gratefully acknowledges the important insights provided by the other members of the Committee throughout the planning stages.

Lennon Ó Náraigh (University College Dublin, Chair)
Hang Ding (University of Science and Technology of China)
Jacques Magnaudet (Institut de Mécanique des Fluides de Toulouse, IUTAM representative)
Peter Spelt (Université Claude Bernard Lyon and Laboratoire de Mécanique des Fluides et d'Acoustique)
Gretar Tryggvason (Johns Hopkins University, Baltimore)
Stéphane Zaleski (Université de Pierre et Marie Curie, Paris)

Acknowledgements

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Local Information

The Local Organizing Committee has arranged for on-campus accommodation for all participants. This has been booked for 3 nights from Sunday 9th June departing Wednesday 12th June at UCD. 24 Hour check-in is located at the Merville Students Residence (see map).

The Symposium is based in the School of Mathematics and Statistics, O'Brien Centre for Science-North.

Registration will take place on Monday morning in H151 Science Hub from 8am where you will collect your Conference Pack. From there you can get breakfast in Pi Restaurant in Science East when you produce your conference tag. The conference will commence at 9am back in room H151.

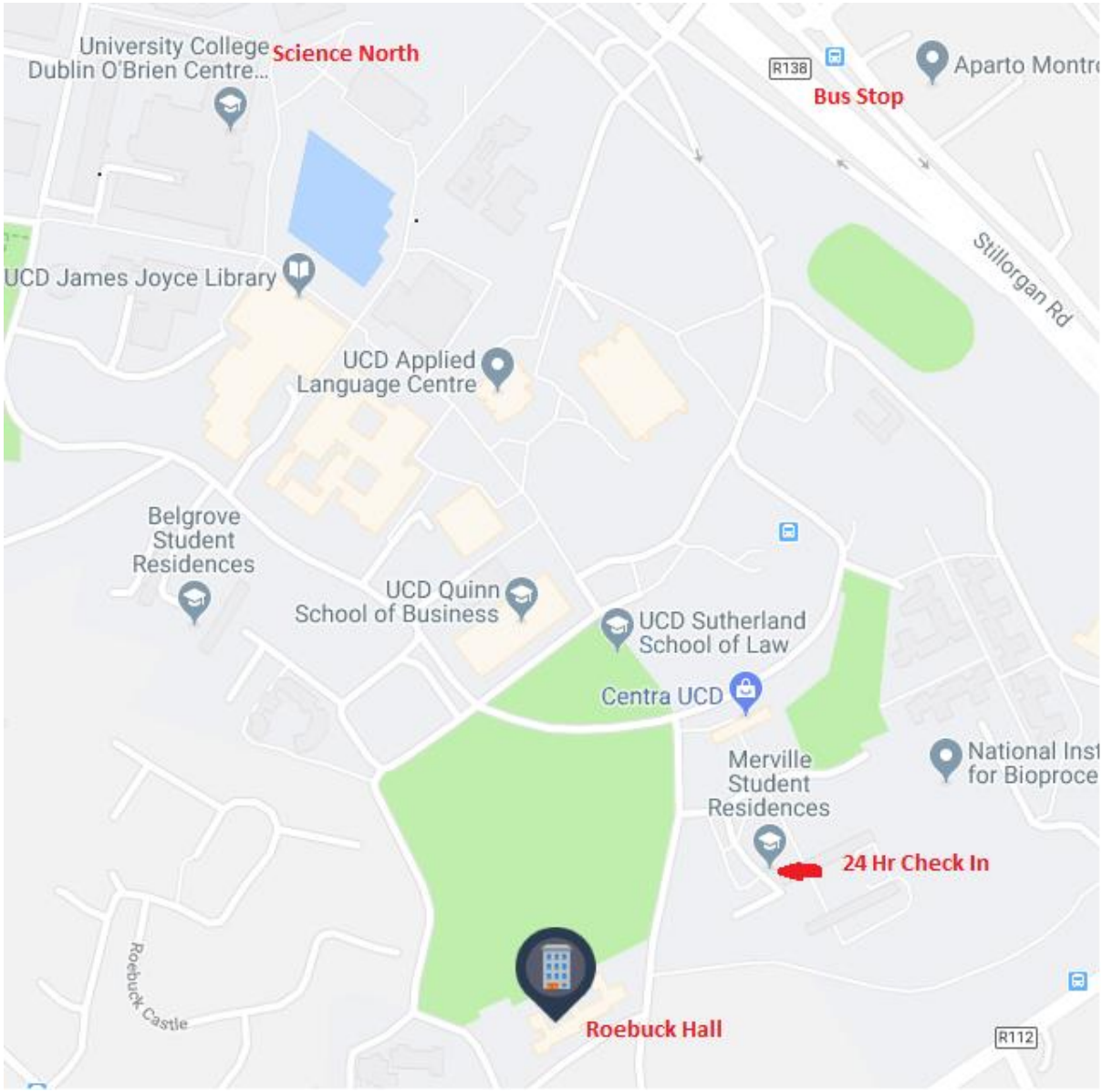
We have an excursion to the Royal Irish Academy on Monday night, departing from the UCD Bus Terminal - bus tickets ("Leap Cards") will be provided for this trip. The Leap Card will give you the use of Dublin public transport (Buses, and rail (LUAS, DART)) for 24 hours. Participants wishing to explore the city further can "top up" their Leap Cards at the Centra shop in the Merville Students Residence. Participants not intending to return to Dublin in the near future are asked to return their Leap Cards to the Symposium organizers at the end of the Symposium as these can be used for future events in UCD.

On Tuesday night we will travel by Coach to the top of the Dublin mountains to attend 'The Hooley Experience' in Johnnie Fox's pub which is one of oldest and most famous pubs in Ireland. After a meal, there will be a live traditional Irish Music Session followed by Irish Dancing.

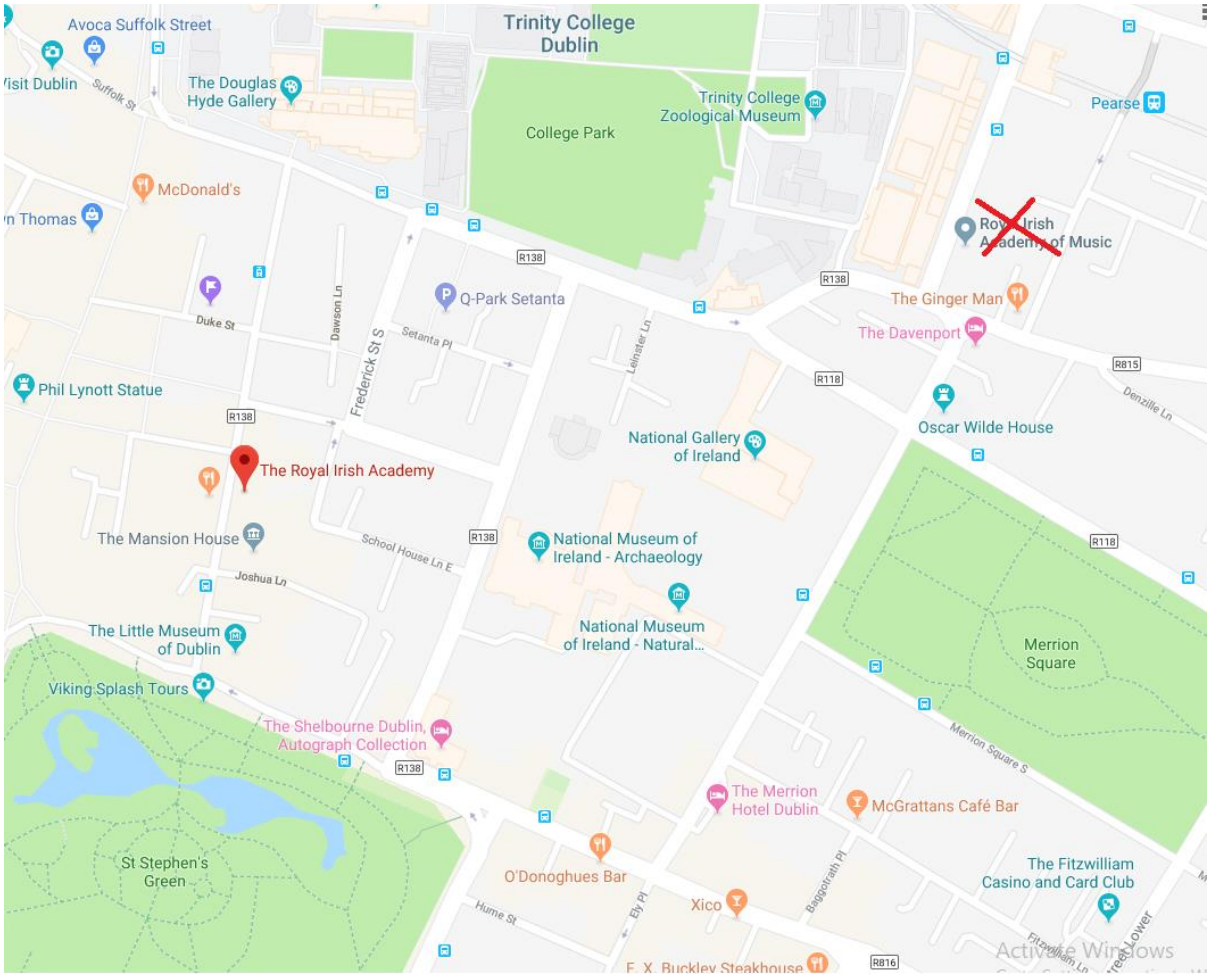
We look forward to seeing you but in the meantime if you have any queries, please do not hesitate to contact either Alison Emmanuel or Lennon Ó Náraigh during the Symposium.

There is a direct Aircoach (no. 700) from the airport which stops opposite main entrance of UCD see www.aircoach.ie. You can either book your tickets online or buy them at the airport.

Local Information – Campus Map



Local Information – The Royal Irish Academy Dawson Street



Take the 46a bus from the UCD Stillorgan Road Flyover (UCD side). The bus takes approximately 20 minutes. Alight at St Stephen's Green . Walk about 500 metres to the Royal Irish academy on Dawson Street. Buses approximately every 10 minutes.

For return to UCD in the evening, the 46a bus can be taken from Kildare Street.

For anyone using a map application on their phone, please do not go to the Royal Irish Academy of Music by mistake!

Scientific Programme

Monday 10th June			
From 08:00	Breakfast		Pi Restaurant
	Registration		
09:00-09:25	Opening Remarks		
Morning Session	Droplets, Contact Lines, and Surfactants		
09:25-09:50	Numerical simulations of two-phase flows with surfactants using a level-set method	Peter Spelt	LMFA, Université de Lyon
09:50-10:15	Drop impact onto thin immiscible liquid films	Alidad Amirfazli	York University
10:15-10:40	Secretive Instabilities in Evaporating Binary Mixtures: Pools and Sessile Drops	Prashant Valluri	University of Edinburgh
10:40-11:05	Classification and some new aspects of the dripping drops experiments	An-Bang Wang	National University of Taiwan
11:05-11:30	Tea/Coffee		Science East
11:30-11:55	A Geometric Diffuse-Interface Method for Droplet Spreading	Lennon Ó Náraigh	UCD
11:55-12:20	Inertial Landau-Levich problem: sheets, films and drops on a rotating drum	Jean-Phillipe Matas	LMFA, Université de Lyon
12:20-12:45	Fluid-structure interaction with dynamic wetting: numerical schemes and applications	Hang Ding	USTC
12:45-13:00	Wrap-Up by Session Chair		
13:00-14:00	Hot Lunch		Science East

Monday 10th June Afternoon Session:	Compressible Flows		
14:00-14:25	Pressure-based algorithm for compressible-incompressible interfacial flows	Fabian Denner	Otto-von-Guericke-Universitat Magdeburg
14:25-14:50	SCB: An efficient and simple parallel code to simulate a 3D shock induced bubble collapse	Eric Gonclaves	Université Poitiers
14:50-15:15	Developing a compressible Euler numerical solver for two phase gas/water flows in conservative form	Stephen J Shaw	Xi'an Jiaotong-Liverpool University
15:15-15:30	Wrap-Up by Session Chair		
15:30-16:00	Tea/Coffee/Biscuits		Science East
18:00-20:00	Reception in Royal Irish Academy		City Centre

Tuesday	11th June		
From 08:00	Breakfast		Pi Restaurant
Broberg Session:	Short Presentations by Early-Stage Researchers (09:00-11:00)		
09:00	A review of turbulence closures for wave-current interactions in the mixed-layer	Clément Calvino	UCD
	Evaporation kinetics and deposition from nano suspension drops on the viscoelastic substrates	Yuhong Chen	University of Edinburgh
5 minute presentation	Stability of a gravity driven particle-laden falling film	Darish Jeswin Dhas	IIT Madras
2 minutes for questions	Chaotic Orbits of a Tumbling Ellipsoid	Erich Essmann	University of Edinburgh
2 minutes for changeover	GPU Algorithms for Fluid Mechanics	Andrew Gloster	UCD
	Dynamics of a single gas bubble under forced acoustic oscillations of very low frequency	Davide Masiello	University of Edinburgh
	Remarks by Session Chair		
10:00	Adaptive interface-Mesh un-Refinement based SI-LSM for Two-Phase Flow Computations on a Cartesian Grid	Kuntal Patel	Kuntal Patel
	Effect of Non-Uniform Circumferential Heat Fluxes and Orientation on Flow Boiling in Microchannels – A Numerical Investigation	Jarryd Potgieter	University of Edinburgh
5 minute presentation	Predictive Models of Multicomponent Dense Spray Dynamics	Faniry Rahantamialisoa	University of Perugia
2 minutes for questions	A hybrid numerical model (CFD-DEM) for proppant transport in dynamically propagating hydraulic fractures in shale gas reservoirs	Yatin Suri	RGU Aberdeen
2 minutes for changeover	Proposed experimental investigation of microchannel flow boiling heat transfer with non-uniform circumferential heat fluxes at different gravitation orientations	Marius Vermaak	University of Edinburgh
	Simulation of shock-particles interaction using conservative sharp interface methods	Yi Ren	USTC
	Three-dimensional conservative sharp interface methods for the simulation of compressible multiphase flows	Yi Shen	USTC
11:00-11:30	Coffee		Science East

Tuesday 11th June	ThermaSMART Session on Heat Transfer		
11:30-11:55	A Formulation for High-Fidelity Simulations of Pool Boiling in Low Gravity	Jungho Kim	University of Maryland
11:55-12:20	Nucleate pool boiling: At the interface of spatiotemporally resolved laser/infrared experiments and advanced numerical tools	Victor Voulgaropoulus	Imperial College London
12:20-12:45	On the phase-change interface conditions for violent separated liquid-vapor Flows	Matthieu Ancellin	ENS Saclay
12:45-13:00	TBC		
13:00-13:10	Wrap-Up by Session Chair		
13:10-14:00	Hot Lunch		Science East
Afternoon Session	Turbulence, Atomization, and Instability		
14:00-14:25	Challenges in the modelling of high-speed mixing layers	Stéphane Zaleski	Sorbonne
14:25-14:50	Schlieren Imaging of Two-Phase Flows	Kevin Nolan	UCD
14:50-15:15	Interface-resolved numerical simulations of a buoyant bubble in homogeneous isotropic turbulence	Aurore Loisy	LMFA
15:15-15:40	Internal Flows in Pure Water Drops on a Local Hot-Spot: Onset and Growth of Thermocapillary Instabilities	Yutaku Kita	University of Kyushu
15:40-16:10	Tea/Coffee/Biscuits		Science East
16:10-16:25	Towards Sub-grid Scale Break-up Modeling for Simulating Turbulent Spray Atomization	Olivier Desjardins	Cornell
16:25-16:50	Falling liquid films in interaction with a confined counter-current gas	Gianluca Lavalle	LIMSI
16:50-17:05	Vortex ring formation regimes in multiphase flows	Daniel Fuster	Sorbonne
17:05-17:20	Wrap-Up by Session Chair		
18:15	Depart to Johnny Foxes (Seated by 19:30)		from UCD Bus Terminus
23:00	Depart Johnny Foxes		to UCD Bus Terminus

Wednesday 12th June			
From 08:00	Breakfast		Pi Restaurant
Morning Session	New Methodologies		
09:30-09:55	Computational Studies of Gas-Liquid Multiphase Flows Undergoing Massive Topology Changes	Gretar Tryggvason	Johns Hopkins University
09:55-10:20	ALE-FE Method for Two-Phase Flows with Dynamic Boundaries	Gustavo Anjos	Federal University of Rio de Janeiro
10:20-10:45	Modified Ghost fluid method with acceleration correction (MGFM/AC)	Tiegang Lu	Beihang University
10:45-11:10	Global sensitivity analysis of the one-dimensional two-fluid model for stratified flows	Davide Picchi	Stanford
11:10-11:40	Coffee		Science East
11:40-12:05	Pore-scale Imaging of Intermittency in Steady-state Two-phase Flow	Branko Bijeljic	Imperial College London
12:05-12:30	Formation, dissolution and properties of surface nanobubbles: Insight from molecular dynamics simulation	Panagiotis Theodorakis	Polish Academy of Sciences
12:30-13:00	Wrap-Up and Symposium Close	Session Chair	
13:00-14:00	Lunch		Science East

Short Abstracts

There now follows a collection of the Symposium short abstracts, organized alphabetically, by speaker surname.