34th International Symposium on Rarefied Gas Dynamics — RGD34

PROGRAM BOOK

13 – 17

July 2026

The 34th International Symposium on Rarefied Gas Dynamics

Hawken Engineering Building (50),
Advanced Engineering Building (49)

The University of Queensland, St Lucia Campus

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A Welcome Message from the Co-chairs

The Chairs of RGD34 and the local organising committee welcome all delegates and accompanying visitors to the latest version of the Symposium, Brisbane July 2026.

This is the second time that the Symposium will be held in Australia, we are delighted to see registrations encompassing a wide range of multi-disciplinary rarefied gas dynamics applications from diverse cultural and generational backgrounds. We hope that personal interactions between leading and nascent researchers from around the world will inspire productive collaboration and generate new ideas. We believe that these meetings play an important role in the further development of our science and have made every effort to organise an enjoyable and productive week. We acknowledge the enthusiastic team of volunteers who are giving generously of their time to ensure smooth operations before, during and after the event!

The meeting will be held on the University of Queensland St Lucia Campus, nestled in a loop of the Brisbane River easily accessible by road, bus and ferry ('city cat') from the city and surrounding suburbs. A full social day out at the Lone Pine Koala Sanctuary has been organised for the Thursday, during which we hope for fair weather, usually a good bet at this time of year, but beyond our control. Wet weather contingency plans are in place.

We look forward to meeting you all in Brisbane.

RGD34 LOC Co-chairs.

Tamara Sopek, UQ

Sean O'Byrne, ANU

Past RGD Symposia

No.	Year	City	Country
1st	1958	Nice	France
2nd	1960	Berkeley	USA
3rd	1962	Paris	France
4th	1964	Toronto	Canada
5th	1966	Oxford	UK
6th	1968	Cambridge	USA
7th	1970	Pisa	Italy
8th	1972	Stanford	USA
9th	1974	Göttingen	Germany
10th	1976	Aspen	USA
11th	1978	Cannes	France
12th	1980	Charlottesville	USA
13th	1982	Novosibirsk	USSR
14th	1984	Tsukuba	Japan
15th	1986	Grado	Italy
16th	1988	Pasadena	USA
17th	1990	Aachen	Germany
18th	1992	Vancouver	Canada
19th	1994	Oxford	UK
20th	1996	Beijing	China
21st	1998	Marseilles	France
22nd	2000	Sydney	Australia
23rd	2002	Whistler	Canada
24th	2004	Bari	Italy
25th	2006	Saint Petersburg	Russia
26th	2008	Göttingen	Germany
27th	2010	St. Petersburg	Russia
28th	2012	Zaragoza	Spain
29th	2014	Xi'an	China
30th	2016	Victoria	Canada
31st	2018	Glasgow	UK
32nd	2022	Seoul	S Korea
33rd	2024	Göttingen	Germany
34th	2026	Brisbane	Australia

Overview of RGD34

Symposium Details

Name	The 34th International Symposium on Rarefied Gas Dynamics
Date	July 13th to July 17th, 2026.
Buildings	Hawken Engineering Building (50) and Advanced Engineering Building (49)
Location	The University of Queensland, St Lucia Campus, Brisbane.
Represented Institutions	The University of Queensland, The Australian National University, The University of New South Wales, Canberra

Local Organising Committee

Co-chairs

Prof. Sean O'Byrne (ANU), Dr. Tamara Sopek (UQ)

Professor Timothy McIntyre	The University of Queensland	Dr Chris James	The University of Queensland
A/Prof. Rowan Gollan	The University of Queensland	Dr Tristan Vanyai	The University of Queensland
Dr David Petty	The University of New South Wales Canberra	Dr Trevor Lafleur	The University of New South Wales Canberra
Mr Henry Straede	The University of Queensland	Ms Imogen Berridge	The University of Queensland
Mr James Orman	The University of Queensland	Mr Jianshu Wu	The University of Queensland
Mr Toby van den Herik	The University of Queensland		

International Advisory Committee

Alina Alexeenko	Martin Grabe
Arnaud Borner	Michael Gallis
Avshalom Manela	Milana Colic
Deborah Levin	Philip Varghese
Domenico Bruno	Quanhua Sun
Elena V. Kustova	Rakesh Kumar
Felix Sharipov	Rho-Shin Myong
Henning Struchtrup	Sean O'Byrne
Ikuya Kinefuchi	Shigeru Takata
Irina Martin Graur	Thierry Magin
Jose-M. Fernandez	Thomas E. Schwartzentruber
Kazumichi Kobayashi	Vincent Giovangigli
Kun Xu	Vladimir A. Titarev
Lei Wu	Yevgeniy Bondar
Luc Mieussens	Yonghao Zhang
Manuel Torrilhon	

Program at a Glance

See main program for locations / room information

	Sunday July 12th	Monday July 13th	Tuesday July 14th	Wednesday July 15th	Thursday July 16th	Friday July 17th
8:00						
8:20		Welcome remarks				
8:40		Welcome to Country				
9:00		Plenary 1	Plenary 2	Plenary 3	Social Day	Plenary 4
9:20						
9:40						
10:10		Technical Sessions (3)	Technical Sessions (3)	Technical Sessions (3)		Technical Sessions (3)
10:30						
10:50						
11:10		Coffee Break	Coffee Break	Coffee Break		Coffee Break
11:40		Technical Sessions (4)	Technical Sessions (4)	Technical Sessions (4)		Technical Sessions (4)
12:00						
12:20						
12:40						
13:00		Lunch	Lunch	Lunch		Lunch
13:20						
13:40						
14:00	Welcome	Technical Sessions (4)	Technical Sessions (4)	Technical Sessions (4)		Farewell
14:20	Reception					
14:40	(from 2pm)					
15:00						
15:20		Coffee Break	Coffee Break	Coffee Break		
15:50		Technical Sessions (4)	Poster session	Roundtable Discussion		
16:10						
16:30						
16:50						
17:10						
17:30						
17:50						
18:00			IAC Dinner (Invite only) from 6pm		Banquet 6 for 6:30pm	

RGD34 Venues

UQ Lakes (Dr Mary Mahoney AO) Amphitheatre, UQ St Lucia Campus

Location of the Welcome Reception

The Advanced Engineering Building (AEB, Building 49), UQ St Lucia Campus

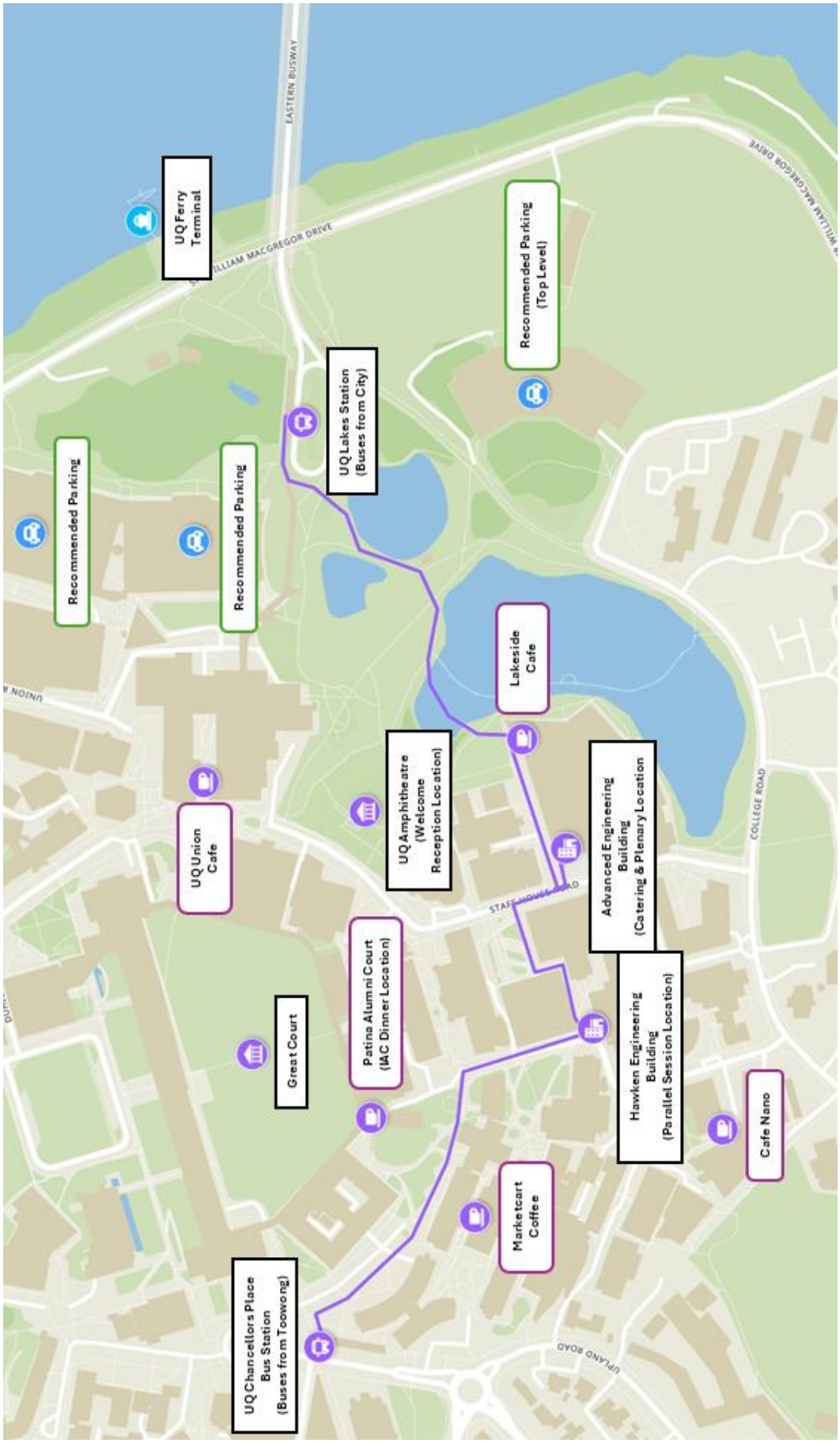
Lunches, Coffee Breaks, and Plenaries (49-200)

The Hawken Engineering Building (Building 50), UQ St Lucia Campus

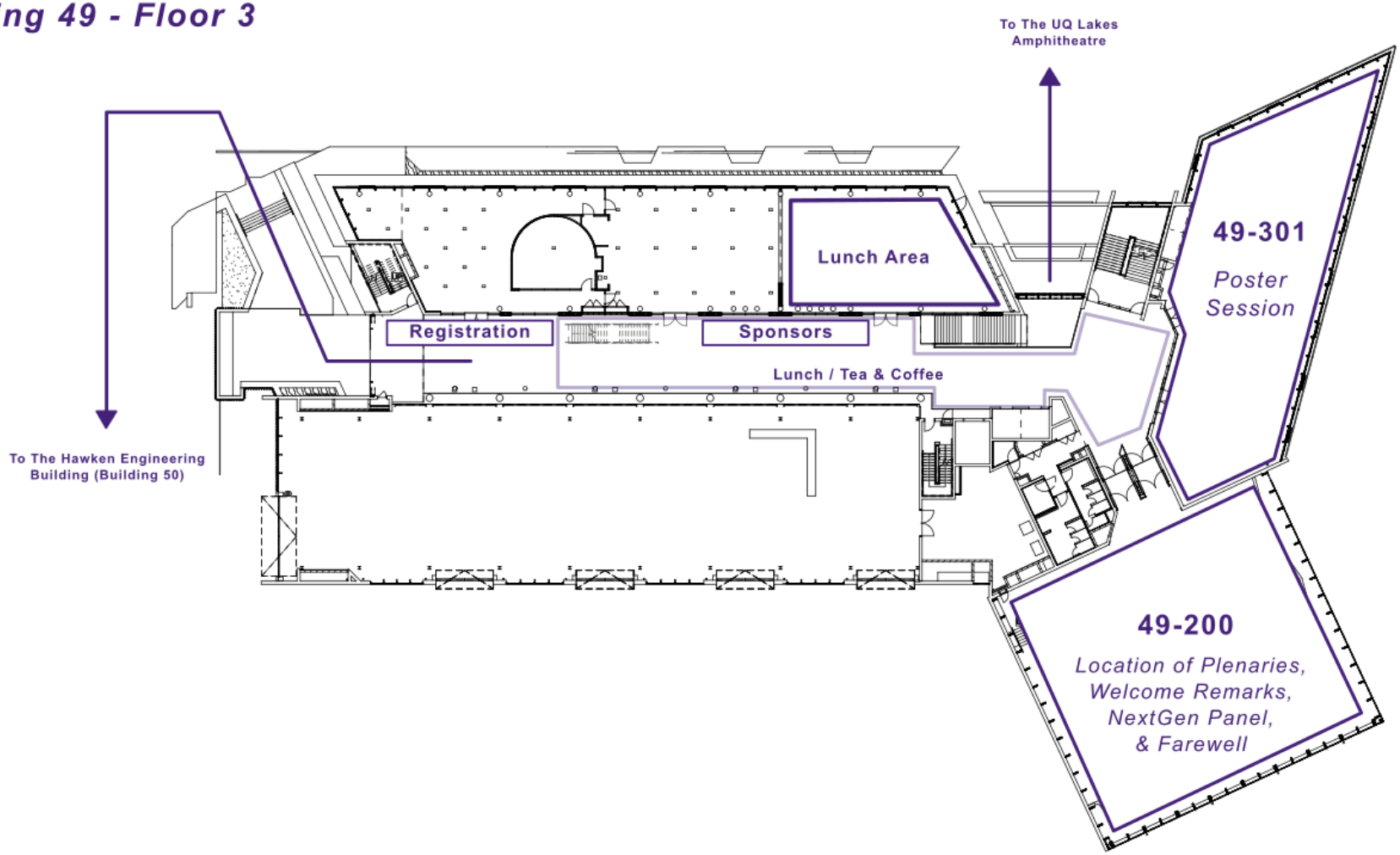
Location of Session Rooms 50-N201, 50-N202, 50-T103, 50-T105

Maps of these spaces can be found on the following pages

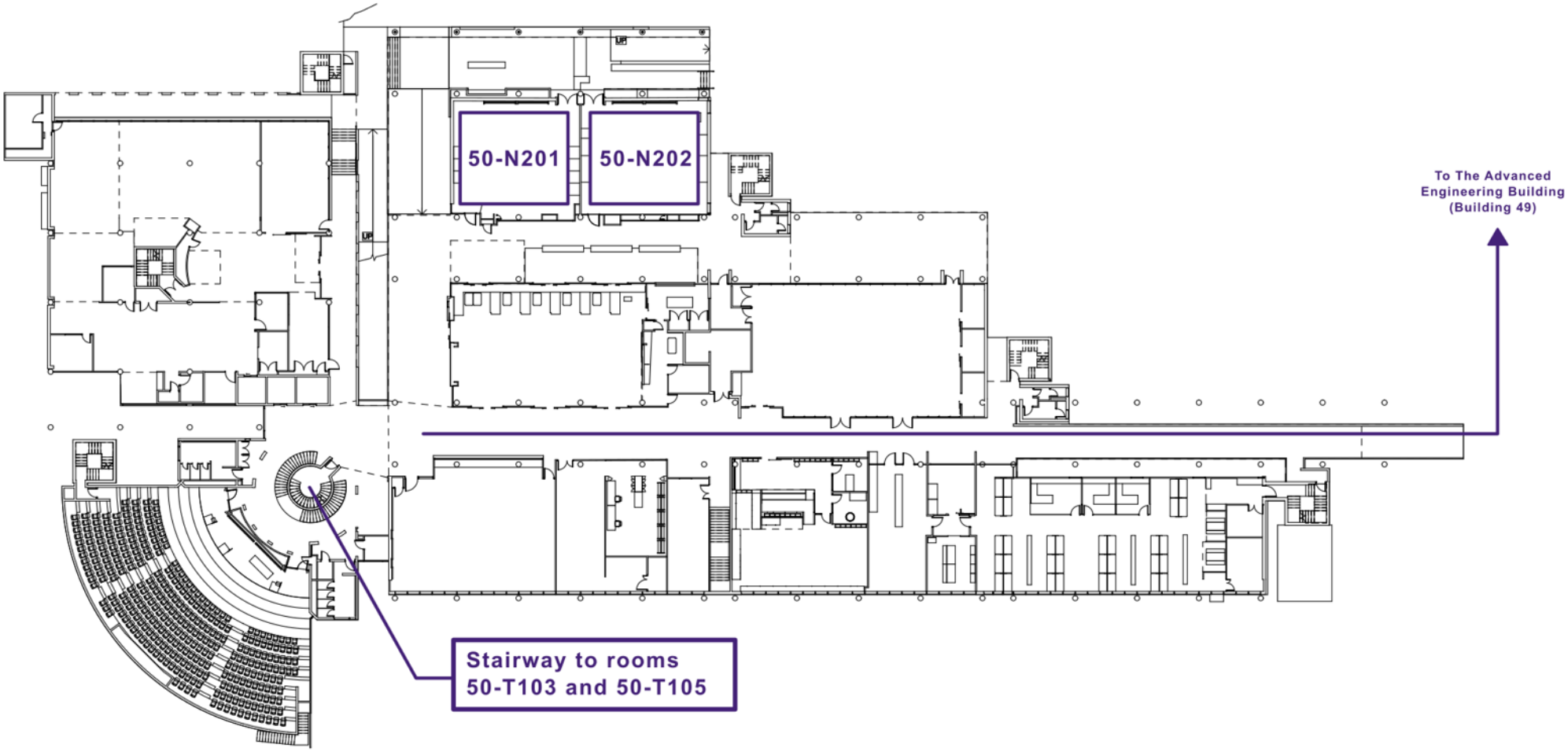
Conference Maps



The Advanced Engineering Building
Building 49 - Floor 3



The Hawken Engineering Building
Building 50 - Floor 2



Sponsors

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Photron's high-speed imaging systems are transforming shockwave research by capturing data in breathtaking detail. The latest range of cameras, including the Pharsighted E9 150S — boasting a total system throughput of 150 gigapixels-per-second— allows engineers and scientists to visualize shockwave formation, propagation, and interaction with materials. Photron's precision timing, unrivalled light sensitivity and high-resolution sensors deliver the clarity and accuracy needed for the next advancements in time-resolved flow research.

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Applied Materials Inc are the leader in materials engineering solutions that are at the foundation of virtually every new semiconductor and advanced display in the world. These solutions are essential to advancing AI and accelerating the commercialization of next-generation chips.

Australia has led the way in scramjet airbreathing propulsion research. Hypersonix is now at the forefront of commercialising hypersonic flight.

Plenary Speakers

Professor Domenico Giordano

European Space Agency (retired)

Plenary 1: The Harold Grad Lecture (Monday 13 July, Room 49-200, 9:00-10:00)

Reflections on my experience with the kinetic theory

Dr Domenico Giordano earned his degree cum laude in Aeronautical Engineering from the University of Naples in July 1984, completing a program of study with strong emphasis on aerospace specialization. After completing his military service as second lieutenant in the Italian Army, he spent several months-from January to July 1986-working at FIAT Aviazione in Turin as an engineer, focusing on turbine-blade heat-transfer protection.

Dr Giordano joined the European Space Agency in December 1986 and was assigned to the European Space Research and Technology Centre (ESTEC) in Noordwijk, The Netherlands. He spent three years in the Analysis and Programming section, where he developed expertise in computational fluid dynamics and hypersonic aerodynamics. He then transferred to the Aerothermodynamics section, where he broadened his expertise across several advanced disciplines; his work focused on high-temperature, non-equilibrium gas dynamics for both internal and external flows, thermodynamics, and chemical and thermal kinetics. He also acquired expertise in electromagnetic fluid dynamics, deepening his understanding of complex physical processes relevant to atmospheric entry. His staff-member duties included serving as technical officer for ESA's technological research programme and general-studies programme and providing technical support to ESA's projects. In addition, Dr Giordano acted as tutor for undergraduate, graduate, PhD students, and post-doctoral research fellows.

Dr Giordano earned his PhD cum laude from the École Polytechnique Universitaire de Marseille in November 2005, completing a dissertation titled "On the Statistical and Axiomatic Thermodynamics of Multi-Temperature Gas Mixtures." In May 2012, he was seconded to the von Kármán Institute for Fluid Dynamics, where he served as a visiting professor responsible for teaching two courses: Physical Fluid Dynamics and Fundamental Disciplines of Aerothermodynamics.

In 2014, he returned to his duties at ESTEC, where he remained until his retirement in May 2017. Since then, Dr Giordano has continued to pursue scientific research, developing a growing interest in self-gravitating fluids and general relativity.

Dr Shahid Rauf
Applied Materials, Inc.

Plenary 2: The Harold Grad Lecture (Tuesday 14 July, Room 49-200, 9:00-10:00)

Rarefied plasmas for nanofabrication: modeling, diagnostics and applications

Shahid Rauf serves as Managing Director of Plasma Products Modeling (PPM) at Applied Materials, Inc., a global leader in materials engineering solutions for semiconductor and display fabrication. The PPM team leverages advanced physics-based modeling to design products for plasma-assisted processes, including etching, deposition, selective removal, and atomic layer deposition. The PPM team is widely recognized within Applied Materials and externally for pioneering innovative methods for modeling semiconductor industry relevant plasmas, developing cutting-edge plasma processing tools, and advancing the physics understanding of plasma etch and deposition technologies. Shahid Rauf received the Plasma Prize from the AVS Plasma Science & Technology division in 2024. In addition, Shahid Rauf and colleagues won the prestigious Patent Hall of Fame award at Applied Materials in 2020 for patents related to the design of Sym3®, the company's world-class plasma etch system. Shahid Rauf is the inventor on more than 100 granted patents and has authored more than 100 scientific publications. Prior to joining Applied Materials, Shahid Rauf worked at Motorola (Semiconductor Products Sector) and the University of Illinois Urbana-Champaign, USA. He received his PhD in Electrical & Computer Engineering from the University of Wisconsin - Madison, USA.

Professor Irina Graur Martin

Aix-Marseille University

Plenary 3: The Lloyd Thomas Lecture (Wednesday 15 July, Room 49-200, 9:00-10:00)

Gas transport at microscale and low pressure: experiments and simulations

Prof. Irina Graur Martin obtained her M.Sc. in Applied Mathematics from Moscow Lomonosov State University in 1984, followed by a PhD from the same institution in 1989. She later earned her Habilitation from Provence University in France in 2008. From 1984 to 2000, she was an associate professor at the Keldysh Institute of Applied Mathematics in Moscow. She is currently a professor at Aix-Marseille University in France. Her research has significantly contributed to the study of rarefied gases in aerospace applications. Her current interests focus on the experimental and numerical characterization of gas properties at micro- and nanoscale levels. She leads the research group "Non-Equilibrium Phenomena and Microfluidics" at the IUSTI Laboratory. Additionally, she has organized numerous international conferences, workshops, and summer schools. She has co-authored over one hundred journal articles and conference papers.

Talk Summary: Relatively high Knudsen number flows are encountered in fields such as vacuum technology and space applications due to the low operating pressure, and in MEMS systems and micro porous media due to the small characteristic dimensions. Over several years, we have developed experimental methodologies to characterize the transport properties of such flows.

For each measurement a model, usually based on the kinetic theory, was developed, allowing the extraction of different flow characteristics. Experimental data for velocity slip and thermal slip coefficients for single gases and gas mixtures are discussed. For flows driven by temperature gradients, experimental data for the thermomolecular pressure difference and the flow relaxation time are analyzed.

All these data are obtained using models that rely, among other parameters, on the known characteristic dimension of a dispositive, such as the diameter or cross-sectional area in the case of a channel. However, for porous samples this information is not directly available. Examples of the characterization of microporous media, including permeability and the Klinckenberg factor, are presented even though a characteristic dimension is not clearly defined for this type of medium. Modeling based on gas kinetic theory enables the extraction of useful parameters, such as the "characteristic flow dimension" of a porous medium, will be discussed. Several examples illustrating the application of this methodology to various types of porous media and different gases are presented for both isothermal and non-isothermal conditions.

Professor Thomas E. Schwartzentruber
The University of Minnesota

Plenary 4: The Graeme Bird Lecture (Friday 17 July, Room 49-200, 9:00-10:00)

Direct molecular simulation of hypersonic flow and gas-surface scattering for VLEO

Tom Schwartzentruber received his Bachelor's degree in engineering science and his Master's degree in aerospace engineering from the University of Toronto. He then received his doctorate degree in aerospace engineering from the University of Michigan. For his doctorate work he received the AIAA Orville and Wilbur Wright graduate award. He joined the faculty in the Aerospace Engineering and Mechanics department at the University of Minnesota in 2008, after which he received a Young Investigator Program Award from the AFOSR and the University of Minnesota Taylor Career Development Award for exceptional contributions by a candidate for tenure. He specializes in particle simulation methods such as direct simulation Monte Carlo (DSMC) and molecular dynamics (MD), including coupling such methods with each other and with continuum computational fluid dynamics (CFD) methods. Currently, his research group is involved in a number of projects spanning hypersonic nonequilibrium reacting flows, gas-surface interactions and ablation, hybrid particle-continuum methods, and satellite material effects in low-earth orbit.

Talk summary: Predicting what happens as a hypersonic vehicle flies through the atmosphere involves a lot of interesting physics. The strong shock wave, generated ahead of the vehicle, superheats the air to thousands of degrees and partially dissociates the air into atomic oxygen and nitrogen. The vehicle heat shield must simultaneously withstand high temperatures and intense surface chemistry driven by these reactive atomic species. We have reached the point where this thin shock layer can be studied at the scale of individual molecular collisions. Direct molecular simulation (DMS) can now be performed where the only model input consists of the forces between atoms as dictated entirely by quantum chemistry. The direct simulation Monte Carlo (DSMC) method lies at the heart of the DMS method and has enabled significant insight into aerothermodynamics for hypersonic flows. In this presentation the DMS method will be described and results for internal energy relaxation, chemical kinetics, and multi-component diffusion will be highlighted. Furthermore, new models for computational fluid dynamics (CFD) and DSMC, that are based on DMS results, will be summarized. Finally, there is significant interest in flying hypersonic vehicles very high in the atmosphere and operating satellites in very low earth orbit (VLEO). At such altitudes, the flow transitions from continuum to free-molecular and gas-surface scattering dominates lift and drag. The presentation will conclude with lift and drag predictions for VLEO flight using a new gas-surface scattering model that is based on molecular beam data.

RGD34 Detailed Program

Monday 13 July				
08:20 - 09:00	Welcome Remarks, Welcome to Country, Building: 49 Advanced Engineering Building, Room: 200			
09:00 - 10:00	Room: 49-200 **Plenary 1: Dr Domenico Giordano, The Harold Grad Lecture: Reflections on my experience with the kinetic theory** **Chair: Em. Prof Hans Hornung**			
Mon 13 Jul 10:10 - 11:10				
	Room: 50-N201 **Aerospace** Chair: Yonghao Zhang	Room: 50-N202 **Monte Carlo methods and numerical** Chair: Russel Caflisch	Room: 50-T103 **Moment methods** Chair: Julian Koellermeier	Room: 50-T105 **Internal flows and vacuum systems** Chair: Surya Kiran Peravali
10:10	Vibrationally state-resolved rotational relaxation time (102) (S) Yingying Yun, Elena Kustova	Variance Reduction in the Fokker--Planck Particle Method for Rarefied Gases using Quasi-Random Numbers (127) (S) Lukas Netterdon, Veronica Montanaro, Hossein Gorji, Manuel Torrilhon	A Multi-Temperature ES-BGK Model with a Continuous Internal-Energy Variable: Derivation of a Maximum-Entropy 21-Moment System and Two-Temperature Navier-Stokes-Fourier Limits (64) Takashi Arima, Annamaria Pollino	Pressure Profile along Microchannel induced by Thermal transpiration flow (34) Hiroki Yamaguchi, Hiroki Kura, Irina Graur
10:30	Vibrational Non-Boltzmann Effects in Advection-dominated Boundary Layer Flows (151) (S) Shrihari Ravichandran, Robyn L. Macdonald	Discrete Rotational Energy for Polyatomic Molecules in Direct Simulation Monte Carlo (51) Derek Liechty, Dylan Crouse, Thomas Schwartzentruber	Symmetrizable Hyperbolic Moment Closures with a Convex Entropy (165) (S) Benoit Allard, James Mcdonald	Modelling rarefied gas mixture flows using various kinetic approaches (94) Thanasis Basdanis, Christos Tantos, Tim Teichmann
10:50	Modeling reflected-shock tube experiments using ab initio vibrational specific kinetics for oxygen mixtures (173) Luis Rodriguez, Robyn Macdonald	Polyatomic chemistry modeling in DSMC using a harmonically-coupled-anharmonic-oscillator model (26) (S) Simone Lauterbach, Franziska Tuttas, Stefanos Fasoulas, Marcel Pfeiffer	Rotation-Based Dimensional Reduction for Nonlinear Moment Closures in Multidimensional Kinetic Systems (89) (S) Eda Yilmaz, Manuel Torrilhon	Alternative Internal Structures of Turbomolecular Pumps Using Numerical Analysis of Rarefied Gas (86) Hiroshi Sugimoto, Shun Otani, Maika Itou
11:10 - 11:40	Coffee Break, Building 49 Level 3			
Mon 13 Jul 11:40 - 13:00				
	Room: 50-N201 **Aerospace** Chair: Upendra Bhandarkar	Room: 50-N202 **Monte Carlo methods and numerical** Chair: William McDoniel	Room: 50-T103 **Boltzmann and related equations** Chair: Masanari Hattori	Room: 50-T105 **Internal flows and vacuum systems** Chair: Hiroshi Sugimoto
11:40	Aerothermal Comparisons of CFD and Flight Data for the W-2 Reentry Capsule Using the MMT Model (67) (S) Sean Cranford, Thomas Gross, Thomas Schwartzentruber	Predicting hypersonic flow physics with quantum guided molecular dynamics (Invited - 40 min) (252) Maninder Grover	Steady Solutions to the Relativistic Boltzmann Equation in a Slab (15) Jin Woo Jang, Seok-Bae Yun	DSMC-Based Analysis of Gas Flow Behavior in Particle Exhaust Systems of Fusion Reactors (93) (S) Foteini Litovoli, Christos Tantos, Holger Strobel
12:00	Configuration Optimization of ABEP-Equipped VLEO Satellites Based on a Feasible-Region Approach (80) Chao Yang, Jinyue Geng, Xiaoqi Li, Heji Huang, Quanhua Sun, Yuan Hu	Predicting hypersonic flow physics with quantum guided molecular dynamics (Invited - 40 min) (252) Maninder Grover	A Kinetic Linear Stability Theory Framework for High Speed Flows (169) Irmak Taylan Karpuzcu, Mor Aharoni, Deborah Levin, Vassilis Theofilis	Study of coating uniformity and axis switching of metal vapour jet through rectangular nozzles in thin film deposition systems (113) (S) Anik Mazumder, Nagaraj Alangi, Sanjay Sethi, Upendra Bhandarkar, Kinshuk Dasgupta, Amit Agrawal
12:20	Surrogate-Based Aerodynamic Shape Optimization of HTV-2-Type Vehicle from Continuous to Rarefied Flow Regimes (114) (S) Wenpei Long, Xiaozhe Xi, Yue Zhang, Junzhe Cao, Kun Xu	Photophoretic force exerted on a membrane composed of rings (33) Felix Sharipov, Benjamin C. Schafer, Joost J. Vlassak	A Multi-level Implicit Discrete Velocity Method to Solve the Relaxation-type Boltzmann Equation (117) (S) Kaiwen Guan, Takayuki Yamada	Towards Efficient Aerosol Injector Design for Generating Protein-Sized Nanoparticle Beams (230) Suryakiran Peravali, Jingxuan He, Amit Kumar Samanta, Philipp Neumann, Jochen Ka 1/4Pper, Michael Breuer
12:40	Coarse-grain modelling of a hypersonic expanding flow (81) (S) Caiyu Xie, Rowan Gollan, Nicholas Gibbons, Carolyn Jacobs	Molecular Dynamics Study of Poiseuille Flow of Dense Confined Fluids (157) (S) Ryo Kiyose, Satoshi Taguchi, Tetsuro Tsuji	Fluid-dynamic limit of the Enskog equation with the guaranteed H-theorem (41) (S) Aoto Takahashi, Shigeru Takata	
13:00 - 14:00	Lunch, Building 49 Level 3			
Mon 13 Jul 14:00 - 15:20				
	Room: 50-N201 **Aerospace** Chair: Alina Alexeenko	Room: 50-N202 **Experimental methods** Chair: Tristan Vanyai	Room: 50-T103 **Boltzmann and related equations** Chair: Deborah Levin	Room: 50-T105 **Gas-surface interactions** Chair: Timothy Minton
14:00	DSMC coupling with peridynamics for aero-thermal-structural analysis (13) Shiwei Hu, Xu Wang, Yong Wang, Guan Zhang, Tianbai Xiao, Yonghao Zhang	Laser Absorption Measurements of Nitric Oxide Formation in Air with High Vibrational State Resolution (49) Jesse Streicher, Devin Merrell, Dylan Drescher, Ronald Hanson	Kinetic Theory Analysis of a Lid-Driven Cavity Flow of a Gas: Behavior of the Gas near Sharp Corners (23) Masanari Hattori	Gas Surface Interaction Model for Very Low Earth Orbit (VLEO) Systems (6) Ahilan Appar, Savio Poovathingal
14:20	Investigation of Shock Standoff Distance in Hypersonic Rarefied Flows with DSMC Method (32) (S) Wei Fang, Zhi-Hui Wang	Saturated Absorption Velocimetry in the Freestream of a High Enthalpy Shock Tunnel Flow (144) (S) Swapneel Roy, Sean O'Byrne	Development of a Particle Bhatnagar-Gross-Krook Method for Rarefied Monatomic Gas Mixtures (29) (S) Inchan Kim, Joonbeom Kim, Woonghwi Park, Eunji Jun	MD-DSMC modelling of gas-surface interaction for VLEO systems. (170) Sachin Nair, Ahilan Appar, Savio Poovathingal
14:40	Efficient Adjoint Optimization of Rarefied Gas Flows (38) Lei Wu	TDLAS characterisation of magnetic field deformation within a hypersonic MHD flowfield (237) Alexis Lefevre, David Gildfind, Tristan Vanyai, Timothy Mcintyre, Jude Hendricks, Takeaki Muramatsu, Kohei Shimamura	Lattice Boltzmann schemes for parabolic problems under monotonicity conditions (52) Denise Aregba, Nathalie Bonamy Parrilla, Stephane Brull	Machine Learning-Based Gas-Surface Scattering Model for Direct Simulation Monte Carlo Simulations in Very Low Earth Orbit (91) (S) Miklas Schutte, Stefanos Fasoulas, Marcel Pfeiffer
15:00	Kinetic modelling of rarefied gas flows with radiation (125) Qi Li, Jianan Zeng, Lei Wu	Velocity Distribution of Water Molecules Evaporating From a Liquid Surface: Molecular Beam Experiment and Molecular Dynamics Simulation (185) Ikuya Kinefuchi, Kohei Sato, Atsuki Fujita	KitAMR.jl: An Adaptive Mesh Based, Efficient and Scalable DVM Solver (57) (S) Longqing Ge, Tianbai Xiao, Qingdong Cai	An Inverse-Design Approach to Characterizing Gas-Surface Interaction in VLEO and Their Effects on Aerodynamic Drag (69) Sai Sudha Ramesh, Benjamin Y.J. Wong, Wai Lee Chan, Roland Yingjie Tay
15:20 - 15:50	Coffee Break, Building 49 Level 3			
Mon 13 Jul 15:50 - 17:10				
	Room: 50-N201 **Aerospace** Chair: Lei Wu	Room: 50-N202 **Experimental methods** Chair: Jesse Streicher	Room: 50-T103 **Boltzmann and related equations** Chair: Jin Woo Jang	Room: 50-T105 **Gas-surface interactions** Chair: Ahilan Appar
15:50	Magnetohydrodynamic Aerobraking Research at The University of Queensland (Invited - 40 min) (251) David Gildfind	Investigating Fibre Optic Intensity Calibrations for Spectrally Resolved Surface Emission Spectroscopy of Non-Equilibrium Flows (209) (S) Robert Hawken, Samuel Lock, Chris James	A hybrid kinetic/fluid model based on Kinetic-Diffusion Monte Carlo for neutral particle simulations in plasma edge (40) (S) Zhirui Tang, Thijs Steel, Niels Horsten, Giovanni Samaey	Surface Roughness Effects on Gas-Surface Scattering and Recombination in VLEO (22) (S) Woonghwi Park, Eunji Jun
16:10	Magnetohydrodynamic Aerobraking Research at The University of Queensland (Invited - 40 min) (251) David Gildfind	Poiseuille coefficient for mixtures of rarefied gases: measurements and modelling (227) Irina Graur Martin, Felix Sharipov, Emil Grigorov, Pierre Perrier, Frederic Topin	An implicit unified gas-kinetic scheme with adaptive mesh refinement in velocity space (215) (S) Quan Yuan, Qibing Li	Molecular Dynamics Investigation of Aerodynamic Heating on Nano-Rough Surfaces in High-Speed Flows (36) Quan Han, Can Cao
16:30	Magnetohydrodynamic Flow Control during LEO Re-entry with Realistic Magnetic Field and Capsule Geometry (83) (S) Liam Newlands, Vincent Wheatley, David Gildfind	Optimisation of X2 Schlieren System for Studying Nonequilibrium Low Density Hypersonic Flows (177) (S) Sandy Goetjens, Sam Lock, Richard Morgan, Chris James	Self-thermophoresis of a Thin Circular Disk (156) Takuma Tomita, Satoshi Taguchi, Tetsuro Tsuji	Molecular Beam-Surface Scattering Dynamics Relevant to Satellites in Very Low Earth Orbit (VLEO) (130) Tim Minton, Pedro Jorge, Chenbiao Xu, Celeste Guiles
16:50	Numerical Study of Magnetohydrodynamic Aerobraking for Large-scale Spacecraft with Magnetic Field Deformation (158) (S) Sebastiaan Van Oeveren		Evaporation of a metal droplet in rarefied gas (194) Denize Kalempa, Felix Sharipov	Effect of Adsorbed Molecules on the Scattering Characteristics of Gas Molecules at Solid Surfaces (110) (S) Kazuki Takemura, Takashi Tokumasu, Hideki Takeuchi

Tuesday 14 July				
09:00 - 10:00	Room: 49-200 **Plenary 2: Dr Shahid Rauf, The Irving Langmuir Lecture: Rarefied Plasmas for Nanofabrication: Modeling, Diagnostics and Applications** **Chair: Dr Ingrid Wysong**			
Tue 14 Jul 10:10 - 11:10				
	Room: 50-N201 **Aerospace** Chair: Eunji Jun	Room: 50-N202 **AI and Machine Learning in rarefied gas dynamics** Chair: Tianbai Xiao	Room: 50-T103 **Moment methods** Chair: Jacek Polewczak	Room: 50-T105 **Gas-surface interactions** Chair: Alessandro Munafo
10:10	A Quasi-1D Stagnation Line Solver for designing Hypersonic Non-Equilibrium Experiments (180) *(S) Taine Rossini, Toby Van Den Herik, Christopher James*	Residual closure of Navier-Stokes-Fourier system for rarefied flows (9) *(S) Yijun Wang, Hossein Gorji, Patrick Jenny*	Non-equilibrium simulations of monatomic rarefied gas flows based on Grad's 20-moment equations (58) *Satyvir Singh, Manuel Torrilhon*	A Navier Type Boundary Condition for Boltzmann Equation (65) *Vincent Giovangigli, Kazuo Aoki, Franacois Golse, Shingo Kosuge*
10:30	Nonequilibrium Ionization And Chemistry Effects Of H2O Plume Injection In Rarefied Hypersonic Reentry Flow (210) *(S) Erik Zabalegui Lopez, Evgeniia Vorozhbit, Jesus Meza-Galvan, Alina Alexeenko*	Machine-learning-based derivation of moment closures for strongly nonequilibrium flows (47) *(S) Hang Song, Satyvir Singh, Manuel Torrilhon*	Non-Equilibrium Applications of Hyperbolic Higher-Order Moment Models with Solid-Wall Boundary Conditions (164) *(S) Ethan Rice, Stefano Boccelli, James Mcdonald*	Model of Thermal Slip Under Near-Wall Fluid-Solid Interaction Potentials (133) *Tetsuro Tsuji, Koichiro Takita, Satoshi Taguchi*
10:50	Investigation of through-model surface thermography using a foil calorimeter for hypersonic heat transfer measurements (155) *(S) Chengxin Yu, David Gildfind, David Mee, Timothy Mcintyre*	Topology of machine-learned DSMC constitutive relations in rarefied Couette flow and the proof of the elliptic constraint (55) *Gagan Garg, Tapan Mankodi, Rho Shin Myong*	Boundary conditions for fluid models describing neutral particles in the plasma edge of a fusion device (25) *(S) Vince Maes, Wouter Dekeyser, Julian Koellermeier, Martine Baelmans, Giovanni Samaey*	Modeling of Sawtooth-Shaped Walls for Rarefied Gas Flow Control (112) *(S) Jiwon Lee, Dibyesh Satpathy, Kimiya Komurasaki, Nadine Barth, Maho Matsukura, Hiroyuki Koizumi*
11:10 - 11:40	Coffee Break, Building 49 Level 3			
Tue 14 Jul 11:40 - 13:00				
	Room: 50-N201 **Prof. Suzuki memorial** Chair: Domenico Giordano	Room: 50-N202 **AI and Machine Learning in rarefied gas dynamics** Chair: Nadim Maraqten	Room: 50-T103 **Turbulence and instabilities** Chair: Vincent Wheatley	Room: 50-T105 **Gas-surface interactions** Chair: Savio Poovathingal
11:40	Development of Research Concepts Based on Hypersonic Wind Tunnel Experiments (207) *Osamu Imamura*	A Physics-Informed Neural Particle Method for the Spatially Homogeneous Landau Equation (10) *Minseok Kim, Yeoneung Kim, Donghyun Lee, Sung-Jun Son*	DNS Analysis of the Free-Flight Measurements GAsFEx-2 at Mach 5 - 7.5 (99) *(S) Lennart Bott, Cosimo Capecchi, Christian Stemmer, Ingo Jahn, Jack Williamson, Morgan Van Hoffen, Marcus Hoerschgen-Eggers, Maximilian Hiepp, Rainer Kirchhartz, Robert Pietsch*	A modeling framework for gas-surface interaction processes in hypersonics and plasma discharges (109) *Alessandro Munafo, Claudio Chicchiero, Abhyudaya Singh, Sankeev Kumar, Kelly Stephani, Marco Panesi*
12:00	R&D Activity on the Inflatable Aeroshell Atmospheric-entry Technology and Future Vision of Mars Exploration (111) *Kazuhiko Yamada*	Physics-informed Neural Networks Based on the Fokker-Planck Model for Rarefied Gas Flows (21) *(S) Joonbeom Kim, Eunji Jun*	Influence of wall-temperature distribution on hypersonic boundary-layer stability (100) *(S) Cosimo Capecchi, Christian Stemmer*	Numerical assessment of parietal accommodation at hypersonic rarefied flow conditions (88) *(S) Beatriz Carda, Viviana Lago, Damien Toussaint*
12:20	DSMC Simulations and Ground Tests for ABIE Intake Development (79) *Takashi Ozawa, Ryunosuke Endo, Masahito Tagawa, Tomotaka Yamamoto, Shunsuke Imamura*	A Unified Physical-Neural Modeling Framework for Rarefied Gas Dynamics via Differentiable Simulation (70) *Tianbai Xiao*	Rarefaction effects on high-speed boundary-layer stability and receptivity (108) *Jihui Ou, Jie Chen*	Design of a Test Model for Studying Gas Surface Interactions in Ablating Flows (149) *(S) Henry Straede, Samuel Lock, Timothy Mcintyre, Richard Morgan, Christopher James*
12:40	Aerobraking and Professor Kojiro Suzuki: Contributions and Legacy (11) *Maximilien Berthet*		Modelling Characteristic Disturbances in Impulse Facilities (154) *(S) Noah Wechgelaer, Chris James*	Rarefaction-Controlled Oxidizer Transport and Thermal Response in Ablating Porous Composite TP (202) *Upendra Yadav, Kelly Stephani, Marco Panesi*
13:00 - 14:00	Lunch, Building 49 Level 3			
Tue 14 Jul 14:00 - 15:20				
	Room: 50-N201 **Jets and plumes** Chair: Martin Grabe	Room: 50-N202 **AI and Machine Learning in rarefied gas dynamics** Chair: Rho Shin Myong	Room: 50-T103 **Turbulence and instabilities** Chair: Rowan Gollan	Room: 50-T105 **Gas-surface interactions** Chair: Ikuya Kinefuchi
14:00	Ionosphere-Rocket Exhaust Plume Interactions: A Hybrid CFD-DSMC Study (82) *(S) Muhammad Arham, Trevor Lafleur, David Petty, George Bowden*	Machine Learning Collision Models to Accelerate Direct Molecular Simulation of Rarefied Flows in Diatomic Gases (225) *(S) Nicholas Daultry Ball, Justin Sirignano, Jon Macart*	Vibrational Non-Equilibrium Effects on Rarefied Reactive Richtmyer-Meshkov Instability (30) *Wendy Adolph Casseus, Kuo-Long Pan*	Accelerated Oxide Formation and Functional Degradation of Conductive Materials in Reactive, Rarefied Plasma Environments (98) *(S) Rodrigo Sandoval Rodriguez, Kalle Braumer, Jana Zorn, Jan Luka Dornseifer, Kristof Holste, Peter J. Klar*
14:20	Modelling of plume-plume interactions in space like environment via the hybrid DSMC-Fokker-Planck approach (146) *Leo Basov, Martin Grabe*	From sparse diagnostics to plume fields: what can (not) be inferred with PINN-PONN reconstruction? (152) *(S) Nadim Maraqten, Georg Herdrich, Uwe Soergel*	Experimental Evidence for the Normal Shock Instability in a Two-dimensional Granular Gas (192) *(S) Eduardo Suarez Morales, Farzane Zangene, Matei Radulescu*	Influence of diffusion modelling on catalytic wall heat flux in hydrogen/helium boundary layers (174) *(S) Matthew Uren, Yu Liu, Chris James, Richard Morgan*
14:40	Plume Impingement Software Module for Real-Time Proximity Operations (178) *Kyle Higdon, Wayne Yu*	A Data-Driven Bayesian Calibration of the International Reference Ionosphere Using Spacecraft Potential Measured Aboard the ISS (78) *Rachel Ulrich, Kelly Moran, Ky Potter, Gabriel Wilson, Carlos Maldonado*	Wave-particle turbulent simulation (WPTS), one multi-scale non-equilibrium turbulence modeling approach (216) *Xiaojian Yang, Kun Xu*	Molecular Dynamics Study of Reactive Gas-Surface Interactions Induced by Atomic Oxygen in VLEO (222) *Zhi-Hui Wang, Rui-Ling Tao, Chao-Yue Zhao, Xu-Hong Jin*
15:00		Parametric Velocity Modes from DSMC Shocks (171) *Robert Martin*	Frequency-domain general synthetic iterative scheme for efficient simulation of oscillatory rarefied gas flows (46) *(S) Li Pengshuo, Wu Lei*	
15:20 - 15:50	Coffee Break, Building 49 Level 3			
16:00 - 17:30	Poster session, Building: 49 Advanced Engineering Building, Room: 301			

Wednesday 15 July				
09:00 - 10:00	Room: 49-200 **Plenary 3: Prof Irina Graur Martin, The Lloyd Thomas Lecture: Gas transport at microscale and low pressure: experiments and simulations** **Chair: Prof Alina Alexeenko**			
Wed 15 Jul 10:10 - 11:10				
	Room: 50-N201 **Aerospace** Chair: Robyn Macdonald	Room: 50-N202 **Monte Carlo methods and numerical** Chair: Derek Liechty	Room: 50-T103 **Rarefied plasmas** Chair: Philip Varghese	Room: 50-T105 **Gas-surface interactions** Chair: Tetsuro Tsuji
10:10	Numerical Study of Photophoretic Forces on a Thin Plate with Various Structured Surfaces (214) *Jie Chen, Yi Wang*	Construction of a Unified Gas-Kinetic Wave-Particle Method for ES-BGK Models (7) *(S) Celine Baranger, Alexis Coepeau, Luc Mieussens*	Fast-convergence and asymptotic-preserving simulation of charged particle flows based on the Vlasov-BGK-Poisson system (76) *(S) Yifan Wen, Lei Wu*	Experimental Demonstration of Radiometric Force in a Crookes Radiometer with Isothermal Vanes (87) *Yuma Takami, Hiroshi Sugimoto*
10:30	Phase-based Microwave Shock Velocity Interferometry (234) *(S) Toby Van Den Herik, Christopher M. James*	Extension of unified gas-kinetic wave-particle method to the gas mixture flow with an elementary chemical reaction (85) *(S) Junzhe Cao, Yufeng Wei, Wenpei Long, Chengwen Zhong, Kun Xu*	Experimental investigation of non-thermal plasma jet chemistry (223) *(S) Roshan John Kurian, Nils Temme, Farzan Zare, Carolyn Jacobs, Vincent Wheatley*	A Molecular Dynamics Study of Evaporation and Condensation of Atomic Clusters at a Metal Surface as well as Cluster Growth in the Vapor Phase (96) *Alexey N. Volkov, Saeed Siahtiri, Lily Stubblefield*
10:50	Zeeman spectroscopy of hypersonic flow in a magnetic field (176) *Timothy Mcintyre, David Gildfind, Yu Liu, Nils Temme, Chengxin Yu, Samuel Lock*	Extension and application of a quantum lattice Boltzmann method to free molecular flow around a flat plate (97) *(S) Aaron Nagel, Leo Basov*	An Accurate Energy-Preserving Particle Integration Scheme for the Vlasov-Fokker-Planck System (66) *(S) Armin Riess, Hossein Gorji, Patrick Jenny*	Multiscale Analysis of Oxygen Transport in Catalyst Layer in Polymer Electrolyte Fuel Cell (119) *(S) Hirotaka Sugihara, Ikuya Kinefuchi, Takashi Tokumasu*
11:10 - 11:40	Coffee Break, Building 49 Level 3			
Wed 15 Jul 11:40 - 13:00				
	Room: 50-N201 **Aerospace** Chair: Ingrid Wysong	Room: 50-N202 **Monte Carlo methods and numerical** Chair: Xueli Luo	Room: 50-T103 **Rarefied plasmas** Chair: Patrick Jenny	Room: 50-T105 **Reactive gas dynamics** Chair: Robert MacDermott
11:40	DSMC-CFD Consistency in the Continuum/Transition Overlap Region for a Deployable Mars Capsule (122) *(S) Federica Portis, Domenic D'Ambrosio, Antonio Schettino*	Comprehensive cross section datasets for charged particle collisions with atoms and molecules (Invited - 40 min) (148) *Dmitry Fursa, Liam Scarlett, Haadi Umer, Corey Plowman, Igor Bray, Mark Zammit, Michael Pak, Richard Bergmayr, Dirk Wuenderlich, Ursel Fantz*	Electromagnetic flow control in hypersonic rarefied environment (145) *Zhigang Pu, Kun Xu*	Research on the Mechanism of OH Ultraviolet Non-equilibrium Radiation Spectral Characteristics in hypersonic Rarefied Flow (219) *Shijie Chai, Yuhuai Zhang, Dandan Zeng, Hao Chen, Shuaihui Li*
12:00	Dimension-reduced Simulation of Hypersonic Vibrational Non-Equilibrium Flows Using DSMC Method (179) *(S) Zixin Liu, Zhihui Wang*	Comprehensive cross section datasets for charged particle collisions with atoms and molecules (Invited - 40 min) (148) *Dmitry Fursa, Liam Scarlett, Haadi Umer, Corey Plowman, Igor Bray, Mark Zammit, Michael Pak, Richard Bergmayr, Dirk Wuenderlich, Ursel Fantz*	Monte Carlo modeling of nonstoichiometry in laser produced plasmas of a binary alloy target (163) *Rommil Emperado, Arjay Dulay, Marc Robert Casero, Myles Allen Zosa, Lean Dasallas, Wilson Garcia*	H-theorems for dense reactive mixtures and global existence of solutions (74) *Jacek Polewczak*
12:20	Propellant Transport Modeling of Atmosphere-Breathing Electric Propulsion Using a DSMC-Centered Numerical Framework (120) *Geonwoong Moon, Minwoo Yi, Eunji Jun*	Particle Merge Strategies for PIC/DSMC Plasmas (199) *William Mcdoniel, Aubrey Zimmer, Christopher Moore, Andrew Fierro*	A novel two-fluid approach for modelling the near-wall collisionless electron sheath under strong thermionic emission (193) *Shahzeb Imran, Vincent Wheatley, Dale Pullin*	Nonequilibrium Hydrogen Kinetics for Gas Giant Atmospheric Entry (16) *Clement Civrais, Sung Min Jo, Marco Panesi*
12:40	Pore-Scale Rarefaction Effects on Aerodynamic Heating of a Gas-Permeable Textile for Deployable Aeroshells (116) *(S) Reo Iida, Kazuhiko Yamada, Akira Oyama*	An Adjoint Method for Optimization of RGD (115) *Russel Caflisch, Yunan Yang*	Kinetic simulations of non-equilibrium ionization and excitation in laser-induced plasma plumes (95) *Alexey N. Volkov, Michael A. Stokes, Tanner Tripoli, Michael Wolkow, Zhibin Lin*	A flow field for studying recombination and vibrational de-excitation rates (136) *Hans Hornung, Robert Watt, Peter Jacobs, Joanna Austin, Rowan Gollan*
13:00 - 14:00	Lunch, Building 49 Level 3			
Wed 15 Jul 14:00 - 15:20				
	Room: 50-N201 **Aerospace** Chair: Tamara Sopek		Room: 50-T103 **Rarefied plasmas** Chair: Alexey Volkov	Room: 50-T105 **Reactive gas dynamics** Chair: Hans Hornung
14:00	Experimental Investigation of Test Gas Substitution Effects on Non-Equilibrium Flow Under Uranus Entry Conditions (28) *(S) Daisy-May Joslyn, Samuel Lock, Robert Watt, Nicholas Gibbons, Yu Liu, Richard Morgan, Christopher James*		Experimental investigation of the efficiency and compression ratio of a passive intake for air-breathing electric propulsion (31) *(S) Jana Zorn, Max Reinhardt, Peter J. Klar*	Modeling Reacting Flow for Hybrid Navier-Stokes/DSMC Methods (68) *(S) Mitchell Wall, Iain Boyd*
14:20	Vacuum Ultraviolet to Near-Infrared Measurements of Precursor Radiation in the X2 Expansion Tube (160) *(S) Samuel Lock, Yu Liu, Christopher James, Timothy Mcintyre, Richard Morgan*		Numerical characterisation of a supersonic bidirectional vortex inductively coupled plasma torch (128) *(S) Landry Riou, Amaury Bilocq, David Henneaux, Pierre Schrooyen, Koen Hillewaert, Thierry Magin, Trevor Lafleur*	Numerical Simulation of Chemically Reacting Wakes of Hypersonic Spheres Using Kestrel CFD (141) *Blake Martin, Robert Macdermott, Joel Redmond*
14:40	Investigation of Thermochemical Effects on Hypersonic Flow Unsteadiness Over a Double Cone (172) *Shubham Thirani, Dr. Deborah Levin*		Accurate PIC Simulation of Ion Optics using p-Adaptation on Tetrahedral Meshes (138) *(S) Kim-Sophie Ellenberger, Tobias Ott, Stefanos Fasoulas, Marcel Pfeiffer*	Rovibronic Energy Transfer and Reactive Processes in Direct Simulation Monte Carlo (53) *Clement Civrais, Marcel Pfeiffer*
15:00	Experimental Observations of Plasma Wakes Created by Charged Bodies (236) *Carlos Maldonado, Matthew Dunn, Gabriel Wilson, Rachel Ulrich*		Flight Configuration Optimization of VLEO Satellites Considering Electromagnetic Forces under Strong Geomagnetic Activity (211) *(S) Hao Ding, Shuqiu Zhang, Dandan Zeng, Xilong Yu, Shuaihui Li*	Modeling of Chemically Reactive Gas Flows for Multi-Scale Problems (62) *(S) Franziska Tuttas, Marcel Pfeiffer*
15:20 - 15:50	Coffee Break, Building 49 Level 3			
16:00 - 17:00	Room: 49-200 **Round Table Discussion: Past Achievements, Present Challenges, and Future Directions in Rarefied Gas Dynamics** **Martin Grabe, Felix Sharipov, Ingrid Wysong, Rho Shin Myong** **Chair: Dr Clement Civrais**			

Thursday 16 July	
09:00 – 15:00	Conference Social Day at Lone Pine Koala Sanctuary: Bus leaves from 39 Blair Drive next to Building 39 (-27.494587, 153.013862) at 9:10 AM, leaving the sanctuary at 2:10 PM
18:00 – 22:00	Symposium Dinner begins 6:00 PM for 6:30 PM at the Rivershed, Howard Smith Wharves (5 Boundary St, Brisbane City QLD 4000)

Friday 17 July				
09:00 - 10:00	Room: 49-200 **Plenary 4: Prof Tom Schwartzentruber, The Graeme Bird Lecture: Direct molecular simulation of hypersonic flow and gas-surface scattering for VLEO** **Chair: Prof Rho Shin Myong**			
Fri 17 Jul 10:10 - 11:10				
	Room: 50-N201 **Aerospace** Chair: Dale Pullin	Room: 50-N202 **Monte Carlo methods and numerical** Chair: Felix Sharipov	Room: 50-T103 **Moment methods** Chair: Clement Civrais	
10:10	Experimental Heat Transfer Distributions in Swept Shock-Boundary Layer Interactions (SwSBLIs) across Rarefied Regimes (107) *(S) Nnaemeka F. Anyamele, Nathan Donaldson, Alec Berry, Peter T. Ireland, Luke J. Doherty*	Multiscale Hybrid CFD/DSMC Simulation of Rocket_Induced Atmospheric Waves for Ionospheric Disturbance Prediction (18) *Gokula Krishna Tavva, George William Bowden*	Model-Adaptive Simulation of Moment Models for Non-Equilibrium Gas Flows (35) *Julian Koellermeier, Rik Verbiest*	
10:30	Maximising Vibrational Nonequilibrium in Supersonic Nozzle Flows (181) *David John Petty*	Analysis of fast-converging and asymptotic-preserving DSMC boosted by GSIS intermittently (90) *(S) Bin Hu, Liyan Luo, Lei Wu*	A Comparative Assessment of Moment-Based Closures for Flows at Various Levels of Rarefaction (162) *(S) Daniele Biasone, Pierre Bernigaud, Marc Massot*	
10:50	Failure of NS Equation in Jet Turbulence (50) *Songyan Tian, Lei Wu*	Kinetic-Continuum (KC) Internal Energy and Chemistry Model for DSMC (203) *Michael Kroells, Thomas Schwartzentruber*	Derivation of the generalized SO13 higher-order transport equation for non-continuum flows (204) *Upendra Yadav, Amit Agrawal*	
11:10 - 11:40	Coffee Break, Building 49 Level 3			
Fri 17 Jul 11:40 - 13:00				
	Room: 50-N201 **Aerospace** Chair: Sean O'Byrne	Room: 50-N202 **Monte Carlo methods and numerical** Chair: Maninder Grover	Room: 50-T103 **Boltzmann and related equations** Chair: Stephane Brull	
11:40	Gas-Dynamic Characterization of Airlock Venting Operations and Outgassing from Manned Lunar Rovers (105) *Stefano Boccelli, William M. Farrell, Prabal Saxena, Orenthal J. Tucker*	Pressure Profile Simulation in the Neutral Beam Injector System of a Volumetric Neutron Source (61) *Xueli Luo, Christos Tantos, Stefan Hanke, Thomas Giegerich, Thomas Haertl*	Achieving affordable high phase-space resolution for kinetic plasma dynamics via characteristic mapping methods (37) *Rostislav-Paul Wilhelm, Philipp Krah, Fabio Bacchini, Katharina Kormann, Kai Schneider*	
12:00	The Aerodynamic and Acoustic Performance of a Bumblebee-Inspired Vehicle in the Martian Atmosphere (238) *Nathan Widdup, Li Wang, John Young, Fang-Bao Tian*	Implementation of Surface Radiation to SPARTA's Hypersonic Ablation Model (60) *Falk Ramin, Lennart Bott, Christian Stemmer*	Heat transfer problem of a dense gas described by the Enskog equation with a modification of the Enskog factor (42) *(S) Shigeru Takata, Soma Sakata, Masanari Hattori*	
12:20			Weakly Nonlinear Drag Induced by Uniform Surface Heating of a Sphere (189) *Satoshi Taguchi, Kwanghyun Ko, Tetsuro Tsuji*	
12:40			On The De-Excitation Shock In A Hypersonic Prandtl-Meyer Nonequilibrium Oxygen Flow (195) *Amna Khraibut, Sudhir Gai*	
13:00 - 14:00	Lunch, Building 49 Level 3			
14:00 - 14:20	Farewell, Building: 49 Advanced Engineering Building, Room: 200			

Poster Session Details

The Poster Session with Drinks will be held on **Tuesday 14 July from 16:00 - 17:30** in **Room 49-301.**

Poster Session

Poster Number	Topic: Aerospace
01	Analysis of aerodynamic characteristic variations with altitude for a rocket in continuum and rarefied flow regimes (63) ***Younghwa Kim, Kyoung-Tai Kang***
02	State-to-state collision integrals and transport coefficients in oxygen mixtures (103) ***(S) Yingying Yun, Qizhen Hong, Elena Kustova***
03	Development of an ab initio-based chemistry model for atmospheric entry into Jupiter (121) ***Devendra Koushal, Tapan K Mankodi, Upendra V. Bhandarkar***
04	LIF measurements and hybrid modelling of transitional flow in a high-flux Campargue-type Rb atomic beam source (131) ***(S) Kaeshav Chandrasekar, Christopher Limbach***
05	Influence of polar environment on the orbital dynamics of near-polar VLEO satellites (212) ***Shuaihui Li, Hao Ding, Shuqiu Zhang, Dandan Zeng, Hao Chen***

Poster Number	Topic: AI and Machine Learning in Rarefied Gas Dynamics
06	Surrogate-assisted airfoil optimization in rarefied gas flows (48) ***(S) Xiaoda Li Ruifeng Yuan, Yanbing Zhang, Lei Wu***
07	A finite-volume solver with machine-learned constitutive relations for non-equilibrium flows under strong compression and expansion (56) ***Gagn Garg, Tapan Mankodi, Rho Shin Myong***

Poster Number	Topic: Boltzmann and Related Equations
08	Kinetic theory of sheared granular gases with velocity-dependent inelastic collisions (73) ***(S) Makoto R Kikuchi, Yuria Kobayashi, Satoshi Takada***
09	Comparing multi-species BGK models with DSMC for rarefied subsonic, transonic and supersonic flows (106) ***Stefano Boccelli, Anna Macaluso, Giorgio Martalo***

Poster Number	Topic: Experimental Methods
10	Raman mapping of gas flow field inside a submillimeter channel (191) ***Guzman Tejeda, Jose M. Fernandez***
11	Collisional relaxation kinetics of CO_2 at high temperatures by Raman spectroscopy (196) ***Carlos Alvarez, Guzman Tejeda, Jose M. Fernandez***
12	Molecular beam experiment of water molecules evaporating from a liquid surface at various temperatures (198) ***(S) Atsuki Fujita, Kohei Sato, Ikuya Kinefuchi***

Poster Number	Topic: Gas-Surface Interactions
13	Chemiluminescence-based investigation of methane flame gas-surface interactions and TPS ablation via propane-fueled HVOF experiments (129) ***Deog Gyun Cho, Jong Geun Bae, Se Youn Moon***
14	Realistic gas-surface interaction (GSI) model for atmosphere-breathing electric propulsion (ABEP) intake design (187) ***Ahilan Appar, Savio Poovathingal***
15	Fluid mechanics of evaporating and condensing microdroplets in the continuum-slip transition regime (208) ***(S) Erik Zabalegui Lopez, Evgeniia Vorozhbit, Jesus Meza Galvan, Alina Alexeenko***

Poster Number	Topic: Internal Flows and Vacuum Systems
16	Research on the pumping characteristics of turbomolecular pumps by high-speed incoming gas molecules in the gas capture system of ultra-low orbit aircraft (43) ***Kun Sun, Mingyang Mao, Qiang Liu, Jin Qin, Chao Yang, Shizhong Zhang***

Poster Number	Topic: Monte Carlo Methods and Numerical
17	Collision-model effects in DSMC and implicit PIC simulations of rarefied hypersonic ionizing flow (101) ***(S) Richmond McDonald, Jesse Foster, Paolo Valentini, Alex Vazsonyi***
18	DSMC study of shock waves based on the state-resolved rotational relaxation model (104) ***(S) Lei Tan, Yingying Yun, Elena Kustova***
19	Kinetic modelling of argon DC glow discharge using PIC/MCC and comparison with laser absorption measurements (140) ***(S) Hsu Chang He, Sean O'Byrne***
20	Knudsen force acting on an asymmetric object (218) ***(S) Tsuyoshi Makita, Shigeru Yonemura***
21	Knudsen force acting on an object with curved surface placed near a wall with different temperature (235) ***(S) Kiyori Fujihara, Shigeru Yonemura***

Poster Number	Topic: Rarefied Plasmas
22	Investigation on the physics of a rarefied EUV induced hydrogen plasma jet (44) ***(S) Wouter Roog, Gerrit Kroesen***
23	Two-dimensional hybrid PIC simulation of Hall thrusters with artificial magnetic field disturbances (184) ***(S) Hayate Osawa, Takuto Ogawa, Akira Furuya, Shunsuke Amikura, Rei Kawashima***

Poster Number	Topic: Reactive Gas Dynamics
24	A neural network based non-equilibrium reaction model for DSMC (175) ***Shrey Trivedi, Kisung Jung, Ahren Jasper, John K Harvey, Jacqueline H Chen***

Instructions for Poster Presentations

- No specific template is stipulated for posters. There are no general formatting rules or templates, you can design your poster to best convey the content of your work.
- Posters should be ideally printed on A0 paper (841 x 1189mm / 33.1 x 46.8 inches) and aligned in portrait orientation. However, the poster partitions available are 1200 mm wide, so they will accommodate posters in landscape also if so desired. If needed, other acceptable poster sizes are ANSI E (864 x 1118 mm / 34 × 44 inches) and Arch E (914 x 1220 mm / 36 x 48 inches).
- **Presenters are responsible for printing their own posters in hardcopy and bringing them to the conference.**
- The Symposium Poster Session will occur in Room 49-301 on Tuesday afternoon starting from 4:00 PM and finishing at 5:30 PM. During the poster session, poster presenters are expected to remain with their posters to talk to other delegates about their poster.
- You will be able to set up your poster in the Poster Session room from first thing Monday morning. Each poster will be given a number in the program and should be placed on the partition with that number. Pins to hang the posters will be provided.
- Please ensure that at the very latest your poster is installed by 3 PM on Tuesday afternoon, but we would appreciate if you install your poster earlier so others can browse the poster space at other times when they are able to.
- After the Poster Session, you may remove your poster or leave it up until Wednesday afternoon when the posters will be taken down. Any posters left over after the conference will be disposed of.

Instructions for Oral Presentations

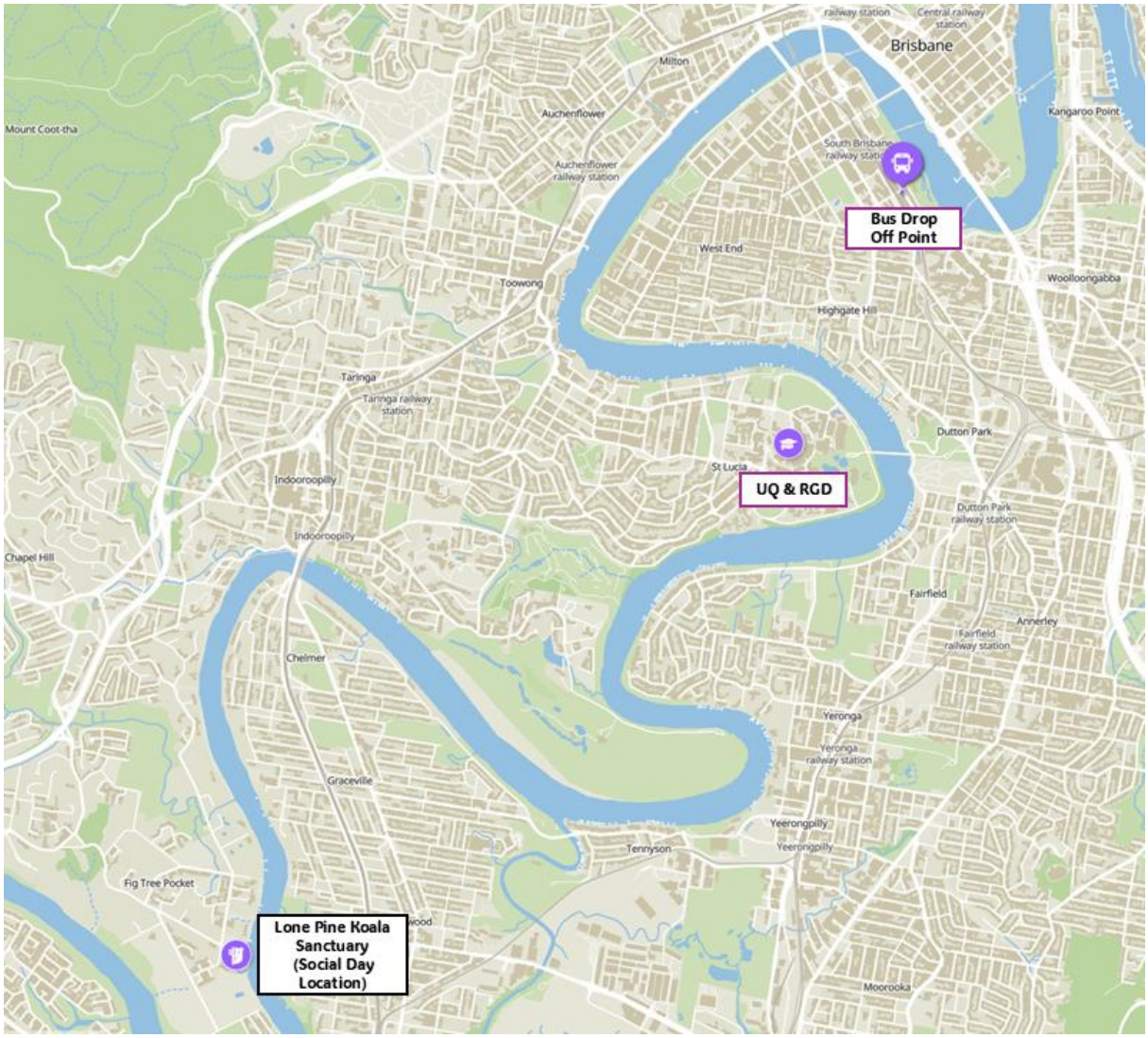
- 15-minute talk duration, 5 minutes for questions. Invited talks have 35 minutes talk duration and 5 minutes question time. Session chairs are asked to adhere strictly to start and end times for presentations.
- Presentations can be used as a Microsoft PowerPoint or pdf file.
- Presenters will not be able to bring a USB stick to the display machine at their session but will be able to present from their own laptop via a HDMI or USB-C connection. A computer will be made available at the registration desk for those who wish to upload their presentation on a USB stick before the first session of the day.

Lone Pine Social Day Details (Thursday 16 July)

The RGD34 conference social day will be held at Lone Pine Koala Sanctuary in the suburbs of Brisbane on Thursday the 16th of July. Lone Pine Koala Sanctuary is the oldest koala sanctuary in the world and somewhere where conference delegates can get up close and personal with native Australian wildlife such as koalas, kangaroos, wombats and dingoes.

Registration includes bus transfers from UQ to Lone Pine Koala Sanctuary and back to either the UQ campus or the Brisbane city after the event, entry into Lone Pine Koala Sanctuary, and lunch at the venue.

Bus pickup location is 39 Blair Drive next to Building 39 on the UQ campus (-27.494587, 153.013862) at 9:10AM.



Symposium Dinner at the Rivershed at Howard Smith Wharves

The Symposium Dinner will be held at the Rivershed at the beautiful Howard Smith Wharves in Brisbane City (5 Boundary St, Brisbane City QLD 4000). The dress code is smart casual, starting 6 for 6:30 PM.

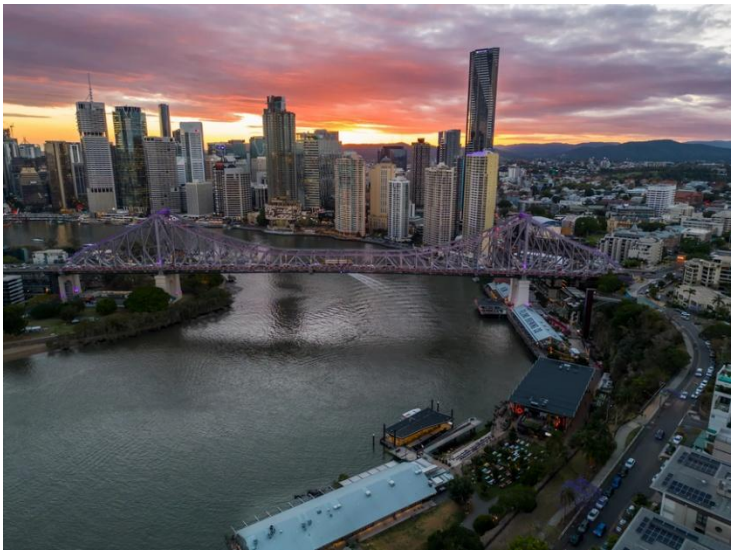
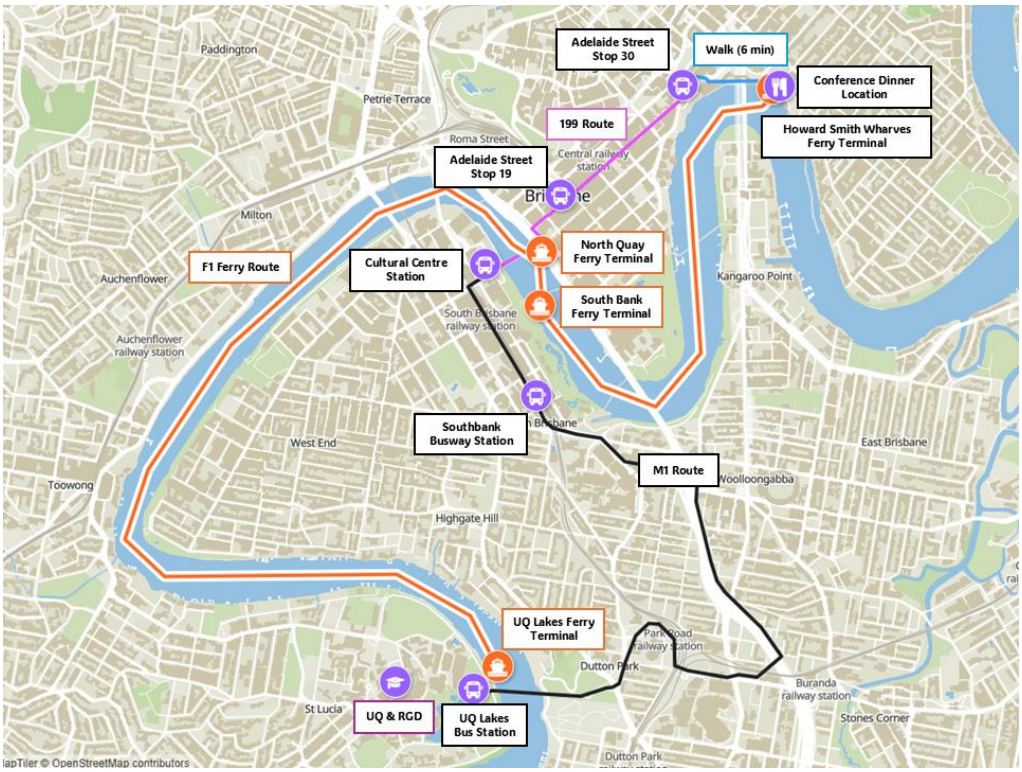


Photo of Brisbane city and the Story Bridge with Howard Smith Wharves in the foreground. The Rivershed is in the bottom left of the image. Photo taken by Brit in Brisbane.

Conference delegates will need to organise their own transport to the Conference Dinner on Thursday evening after the Social Day either from the UQ campus or from Brisbane City. There are many public transport options to do this, including bus and a ferry along the Brisbane River. Details can be seen in the image below:



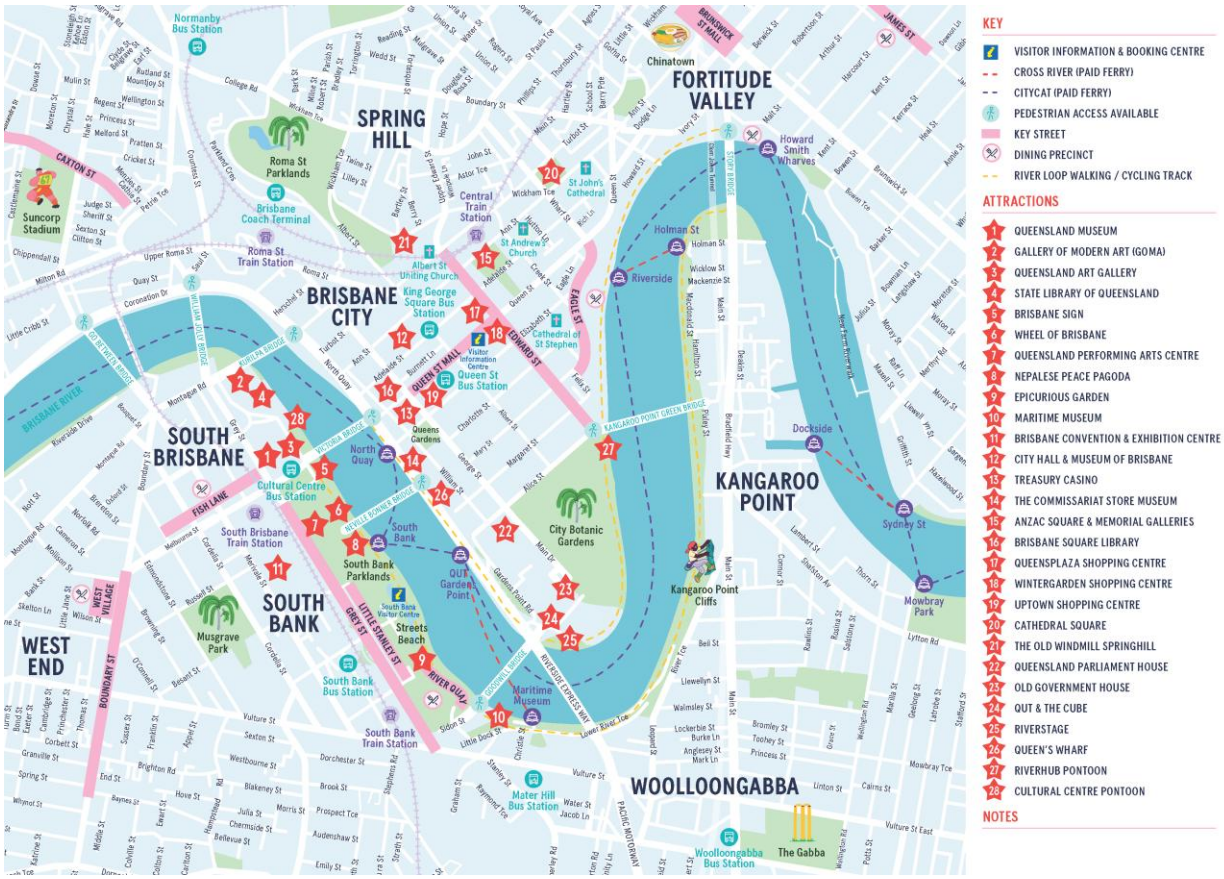
General Information

Brisbane City and Surrounds

Brisbane is the capital city of the Australian state of Queensland. Being a semi-tropical climate, Brisbane is a great place to visit in winter (when RGD34 is being held).

The greater Southeast Queensland region has many great things to see such as native wildlife, whale watching, hiking, wineries, and the great beaches of the Gold Coast and the Sunshine Coast.

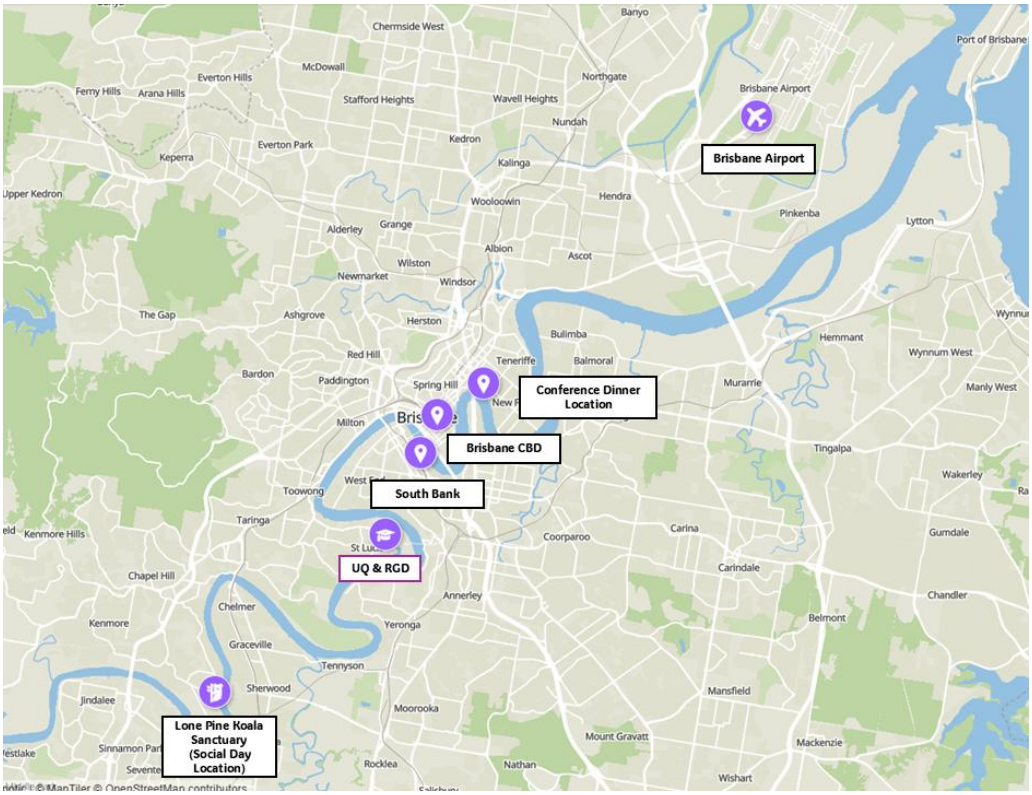
Brisbane City Map and the South Bank



Find places to eat and drink in South Brisbane, South Bank, Brisbane City, Fortitude Valley, and the West End.

Visit **visit.brisbane.qld.au/things-to-do/eat-and-drink**

The Conference Location – The UQ St Lucia Campus



Travel to the Conference Location

There is a direct train line from both the domestic and international terminals of the Brisbane airport to the city centre via the Brisbane Airtrain. The Airtrain from the international terminal to Brisbane's Central or Roma St Stations in Brisbane City is approximately 30 minutes and each fare costs $18.96 AUD.

Taxis and Ubers are also readily available at the airport to take delegates to or from the airport to Brisbane city for a typical cost of around $50 AUD.

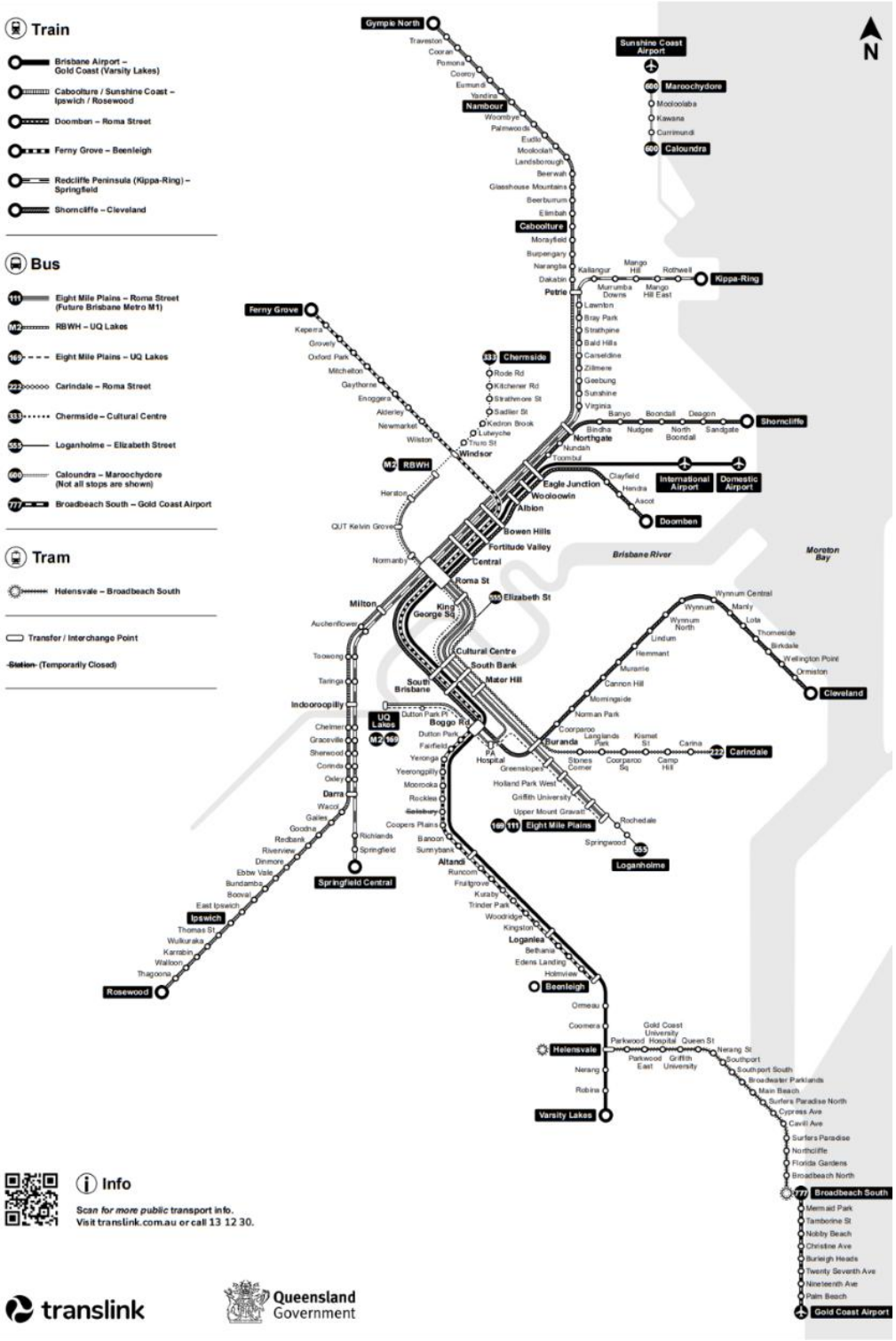
Once settled in Brisbane, use the **translink.com.au** website, Google Maps, or the TransLink app to plan your journey from your Hotel to the UQ Lakes or UQ Chancellor's place bus stop.

Bus routes M2, 192, and 412 run between UQ Campus and the city. The nearest train station to the conference location (UQ Campus) is Park Road Station with frequent connecting bus services to the UQ Campus via the adjacent Boggo Road Bus Station.

All public transport can be paid for with Visa, MasterCard, or GoCard when entering the vehicle or on the platform. GoCards can be purchased and prepaid from all major bus and train stations if desired.

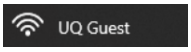
General Travel in Southeast Queensland

Other than the Airport Airtrain, all public transport in Queensland costs $0.50 AUD (including any city-cat ferry, train, buses, or Gold Coast tram). Payment by credit card is available, just make sure to swipe your card when you get on and again when you leave. Go to translink.com.au to plan your journey.



WiFi Details at UQ Campus

UQ Guest Wifi

Use UQ's Guest WiFi while on campus: 

- Select the "UQ Guest" WiFi option on your mobile device or laptop and wait for your web browser to load the portal.
- Accept and agree to the terms and conditions to join the WiFi for free.

Eduroam Network

UQ Campus is a part of the Eduroam network. If you use Eduroam at your home campus / institution, your device should automatically connect to the Eduroam WiFi network on UQ Campus.

Emergency Contacts

In Australia, the number to call police, ambulances or the fire brigade if there is an emergency is 000. It will work from any telephone on any telecommunications network. The international emergency number 112 will also work.

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34th International Symposium on Rarefied Gas Dynamics