



NICFD 2022
For Propulsion & Power

4th International Seminar on Non-Ideal Compressible Fluid Dynamics

3rd and 4th November 2022

City, University of London, UK

Conference Schedule



ERCOFTAC

European Research Community On
Flow, Turbulence And Combustion

Schedule at a glance

	Day 0 – 2nd November 2022
16:00 – 19:00	Welcome reception and lab tour

Day 1 - 3rd November 2022	
09:00	Arrival coffee
09:30	Welcome from Conference Chair and Head of Department
09:40	Fundamentals (142, 134, 140, 148)
11:00	Coffee break
11:20	Numerical methods - I (125, 133, 146, 147)
12:40	Lunch
13:40	Keynote: Blazenko Ivancic
14:20	Multi-phase flows - I (127, 130, 137)
15:20	Coffee break
15:40	Numerical methods - II (128, 136, 141, 150)
17:00	Workshop: Non-ideal computational fluid dynamics (niCFD)
18:00	End

Day 2 - 4th November 2022	
09:00	Arrival coffee
09:30	Keynote: Matthias Ihme
10:10	Experiments - I (132, 135)
10:50	Coffee break
11:10	Experiments - II (139, 144, 149)
12:10	Lunch
13:10	Workshop: Experimental test facilities
14:10	Multi-phase flows - II (126, 129)
14:50	Coffee break
15:10	Multi-phase flows - III (131, 138, 151)
16:10	Alfred Kluwick commemoration & keynote: Ted Cox
17:00	Closing ceremony
17:10	End

19:15-22:30	Conference dinner @ Saddler's Hall
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Day 1 – 3 rd November 2022	
09:00 – 09:30	Registration and arrival coffee
09:30 – 09:40	Welcome from Conference Chair and Head of Department Dr Martin White and Prof Abdalnaser Sayma
09:40 – 11:00	<p>Fundamentals – I Chair: Prof Stefan aus der Wiesche, Muenster University of Applied Sciences</p> <ul style="list-style-type: none"> Adaptive simulations of cylindrical shock waves in polytropic van der Waal gas <i>Barbara Re, Alessandro Franceschini, Alberto Guardone</i> Assessment of a state-of-the-art thermodynamic modelling approach for CFD-simulations under trans- and supercritical conditions <i>Alexander Doehring, Noah Urban, Theresa Trummler, Michael Pfitzner, Markus Klein</i> Non-ideal compressible flows in radial equilibrium <i>Alberto Guardone, Paolo Gajoni</i> Data-driven modelling of thermodynamic models in entropic form <i>Matteo Pini, Andrea Giuffre, Alessandro Cappiello, Matteo Majer, Evert Bunschoten</i>
11:00 – 11:20	Coffee break
11:20 – 12:40	<p>Numerical methods – I Chair: Prof Giulio Gori, Politecnico di Milano</p> <ul style="list-style-type: none"> Direct numerical simulation of wall-bounded turbulence at high-pressure transcritical conditions <i>Marc Bernades, Francesco Capuano, Lluís Jofre</i> Development, validation and application of an ANN-based large eddy simulation subgrid-scale turbulence model for dense gas flows <i>Alexis Giauque, Aurélien Vadrot, Christophe Corre</i> Bypass laminar-turbulent transition on a flat plate of organic fluids using DNS method <i>Bijie Yang, Tao Chen, Ricardo Martinez-Botas</i> High fidelity simulations and modelling of dissipation in boundary layers of non-ideal fluid flows <i>Francesco Tosto, Andrew Wheeler, Matteo Pini</i>
12:40 – 13:40	Lunch break
13:40 – 14:20	<p>Keynote speech - I Chair: Dr Matteo Pini, TU Delft</p> <p>Industrial aspects of real gas phenomena and challenges in rocket propulsion engines <i>Blazenko Ivancic</i></p>
14:20 – 15:20	<p>Multi-phase flows – I Chair: Prof Teemu Turunen-Saaresti, LUT University</p> <ul style="list-style-type: none"> Numerical simulations of real-fluid reacting sprays at transcritical pressures using multiphase thermodynamics <i>Mohamad Fathi, Stefan Hickel, Dirk Roekaerts</i>

	<ul style="list-style-type: none"> Numerical validation of a two-phase nozzle design tool based on the two-fluid model applied to wet-to-dry expansion of organic fluids <i>Pawel Ogrodniczak, Martin White</i> Numerical modelling of cryogenic flows under near-vacuum pressure conditions <i>Theodoros Lyras, Ioannis K. Karathanassis, Nikolaos Kyriazis, Phoevos Koukouvinis, Manolis Gavaises</i>
15:20 – 15:40	Coffee break
15:40 – 17:00	<p>Numerical methods – II Chair: Dr Andrew Wheeler, University of Cambridge</p> <ul style="list-style-type: none"> Estimating model-form uncertainty in RANS turbulence closures for NICFD applications <i>Giulio Gori</i> Grid-generated decaying turbulence in an organic vapor flow <i>Leander Hake, Stefan aus der Wiesche, Stephan Sundermeier, Aurélien Bienner, Xavier Gloerfelt, Paola Cinnella</i> Assessment of compressibility corrections for RANS simulations of real gas flows using SU2 <i>Dominik Schuster, Yusuf Ince, Alexis Giauque, Christophe Corre</i> Validation of the SU2 fluid dynamic solver for isentropic non-ideal compressible flows <i>Blanca Fuentes Monjas, Adam Joseph Head, Carlo De Servi, Matteo Pini</i>
17:00 – 18:00	<p>Workshop on non-ideal computational fluid dynamics (niCFD) Chair: Dr Matteo Pini, TU Delft</p>
19:15 – 22:30	Conference dinner at Saddlers' Hall

Day 2 – 4 th November 2022	
09:00 – 09:30	Arrival coffee
09:30 – 10:10	<p>Keynote speech – II Chair: Dr Tala El Samad, City, University of London</p> <p>Crossing the ridge: How does the Widom line affects the physical behavior of supercritical fluids? <i>Matthias Ihme</i></p>
10:10 – 10:50	<p>Experiments – I Chair: Prof Andrea Spinelli, Politecnico di Milano</p> <ul style="list-style-type: none"> Study on the operation of the LUT-sCO₂ test loop with pure CO₂ and CO₂+SO₂ mixture through dynamic modelling <i>Giuseppe Petruccelli, Teemu Turunen-Saaresti, Aki Grönman, Afonso Lugo</i> Preliminary experiments in high temperature vapours of organic fluids in the Asymmetric Shock Tube for Experiments on Rarefaction Waves (ASTER) <i>Nitish Barathwaj Chandrasekaran, Theodoros Michelis, Bertrand Mercier, Piero Colonna</i>
10:50 – 11:10	Coffee break
11:10 – 12:10	<p>Experiments – II Chair: Dr Carlo De Servi, TU Delft</p>

	<ul style="list-style-type: none"> Experimental and numerical study of transonic flow of an organic vapor past a circular cylinder <i>Stephan Constantin Sundermeier, Camille Matar, Stefan aus der Wiesche, Paola Cinnella, Leander Hake, Xavier Gloerfelt</i> Loss measurement strategy in ORC supersonic blade cascades <i>Marco Manfredi, Giacomo Persico, Andrea Spinelli, Paolo Gaetani, Vincenzo Dossena</i> Mach number estimation and pressure profile measurements of expanding dense organic vapors <i>Adam Joseph Head, Theodoros Michelis, Fabio Beltrame, Blanca Fuentes Monjas, Emiliano Casati, Carlo De Servi, Piero Colonna</i>
12:10 – 13:10	Lunch break
13:10 – 14:10	<p>Workshop on experimental test facilities Chair: Dr Martin White, City, University of London</p> <p>Panellists: Dr Carlo De Servi, TU Delft</p> <ul style="list-style-type: none"> Prof Ricardo Martinez-Botas, Imperial College London Prof Andrea Spinelli, Politecnico di Milano Dr Andrew Wheeler, University of Cambridge Prof Stefan aus der Wiesche, Muenster University of Applied Sciences
14:10 – 14:50	<p>Multi-phase flows – II Chair: Dr Ioannis Karathanasis, City, University of London</p> <ul style="list-style-type: none"> About the effect of two-phase flows formulations on shock waves in flash metastable expansions <i>Egoi Ortego Sampedro</i> Non-equilibrium phenomena in two-phase flashing flows of organic fluids <i>Carlotta Tammone, Alessandro Romei, Giacomo Persico, Fredrik Haglind</i>
14:50 – 15:10	Coffee break
15:10 – 16:10	<p>Multi-phase flows – III Chair: Prof Giacomo Persico, Politecnico di Milano</p> <ul style="list-style-type: none"> A pressure-based model for two-phase flows under generic equations of state <i>Barbara Re, Giuseppe Sirianni, Rémi Abgrall</i> Validation and Application of HEM for non-ideal compressible fluid dynamic <i>Liyi Chen, Michael Deligant, Mathieu Specklin, Sofiane Khelladi</i> Modification of a cryogenic rocket combustor informed by transcritical oxygen-methane combustion modelling <i>Jan van Schyndel, Dogan Kaya, Jan Martin, Justin Steven Hardi</i>
16:10 – 17:00	<p>Alfred Kluwick commemoration & keynote Chair: Prof Alberto Guardone, Politecnico di Milano</p> <p>Shock reflection in dense gases and other problems. A lecture dedicated to the memory of Professor Alfred Kluwick <i>Ted Cox</i></p>
17:00 – 17:10	Conference close