

Computations of High-Speed Turbulent and Complex Flows

IITH MAE Topical Meeting 2024

Department of Mechanical and Aerospace Engineering, IIT Hyderabad

Event	Time
Day 1 (28 June 2024, Friday)	
Opening Ceremony	9.00 am - 9.30 am
Session 1: Numerical Algorithms Chair: Sachidananda Behera	9.30 am - 11.10 am
Tea Break & Poster Setup	11.10 am - 11.30 am
Session 2: High-Speed Flows Chair: S. K. Karthick	11.30 am - 1.10 pm
Lunch	1.10 pm - 2.30 pm
Session 3: Turbulence Applications Chair: K. Venkatasubbaiah	2.30 pm - 4.10 pm
Tea Break	4.10 pm - 4.30 pm
Plenary 1: Vinayak Eswaran Chair: Amaresh Dalal	4.30 pm - 5.30 pm
Poster Session	5.30 pm - 7.00 pm
Dinner	7.30 pm onwards

Event	Time
Day 2 (29 June 2024, Saturday)	
Session 4: Canonical Turbulent Flows Chair: Harish Dixit	9.30 am - 11.10 am
Tea Break	11.10 am - 11.30 am
Plenary 2: R. P. Chhabra Chair: Narasimha Mangadoddy	11.30 am - 12.30 pm
Lunch	1.00 pm - 2.30 pm
Session 5: Multiphase / Multiphysics	2.30 pm - 4.10 pm

Chair: Lakshmana Chandrala	
Tea Break & Poster Session	4.00 pm - 4.30 pm
Session 6: Combustion Chair: Saravanan Balusamy	4.30 pm - 5.45 pm
Closing Ceremony	6.00 pm - 6.30 pm
Dispersal	6.30 pm

<i>Session 1 - Numerical Algorithms</i>			<i>Chair: Sachidananda Behera</i>
Sr No	Speaker	Title	Time
1	Akshay Prakash	Pedagogical talk on CFD for compressible and incompressible flows	9.30 am
2	Aravind Balan	Automated mesh adaptation for high-order compressible flow simulations	9.55 am
3	Rajesh Ranjan	PRAVAH: A GPU-enabled 3D LES solver for low subsonic to hypersonic flow computations	10.20 am
4	Amaresh Dalal	Lessons from AnuPravaha: Towards a General Purpose Computational Framework on Hybrid Unstructured Meshes for Multiphysics Applications	10.45 am
<i>Session 2 - High-Speed Flows</i>			<i>Chair: S. K. Karthick</i>
5	Ashwani Assam	Numerical analysis of flow properties on a cone-shaped body in rarefied flow	11.30 am
6	Ratnesh Shukla	Extreme scale simulations of shocked viscous flows	11.55 am
7	Tushar Sikroria	Investigation of flow instabilities in high-speed impinging jets using dual-time velocity measurements	12.20 pm
8	S. K. Karthick	Shock-shear layer interactions in hypersonic boundary layers	12.45 pm
<i>Session 3 - Turbulence Applications</i>			<i>Chair: K. Venkatasubbaiah</i>

9	Nikhil Kalkote	Performance of native GPU solver for RANS turbulent flows	2.30 pm
10	Kameswararao Anupindi	Lattice Boltzmann simulation of conjugate heat transfer for natural convection in enclosed cavities	2.55 pm
11	Saketh Athkuri	Physics-Informed Neural Networks (PINNs) for Computational Fluid Dynamics	3.20 pm
12	Gaurav Chopra	Spatio-temporal dynamics of the laminar separation bubble during drag crisis in flow past a circular cylinder	3.45 pm
<i>Plenary 1</i>			<i>Chair: Amaresh Dalal</i>
13	Vinayak Eswaran	Towards a new paradigm in Large Eddy Simulations	4.30 pm
<i>Session 4 - Canonical Turbulent Flows</i>			<i>Chair: Harish Dixit</i>
14	Amitabh Bhattacharya	Energy consistent models for entrainment in atmospheric clouds	9.30 am
15	Shivsai A. Dixit	Theory and model for friction drag in smooth-wall shear turbulence	9.55 am
16	Rajaram Lakkaraju	Particle-laden turbulent channels	10.20 am
17	Pranav Joshi	Rough boundaries in rotating convection	10.45 am
<i>Plenary 2</i>			<i>Chair: Narasimha Mangadoddy</i>
18	R. P. Chhabra	How to become a researcher: Some personal reflections	11.30 am
<i>Session 5 - Multiphase / Multiphysics</i>			<i>Chair: Lakshmana Chandrala</i>
19	Anupam Gupta	Challenges and complexities in simulating elastic turbulence in polymer solutions	2.30 pm
20	Avishek Ranjan	Modeling current-driven electro-vortex flows in OpenFOAM	2.55 pm
21	Kiritkumar Makwana	Weak and strong regimes of magnetohydrodynamic turbulence	3.20 pm
22	Chandra Sekhar Pant	Computational and multiphase challenges in turbines	3.45 pm
<i>Session 6 - Combustion</i>			<i>Chair: Saravanan Balusamy</i>

23	Pradeep Kumar	Data reduction technique for simulating radiative heat transfer for combustion applications	4.30 pm
24	Ajit Kumar Dubey	Autoignition modes for n-heptane combustion at high temperature and pressure: A 2-D DNS study	4.55 pm
25	Sayak Banerjee	Development of a Semi-Detailed Kinetic Mechanism for Ammonia-Natural Gas and Kerosene/Diesel Combustion in CI Engines and Gas Turbines	5.20 pm
<i>Posters</i>			
1	Shubham Goswami	A scalable asynchronous discontinuous Galerkin method for massively parallel flow simulations	
2	Venkata Sai Anvesh Sangadi	Lightning Stokes Solver: fast numerical approximation via rational functions for a Stokes problem in complex form	
3	Dasika Sundar	Multilayer-Perceptron based Optimal Stencil Selection and Order Detection for High-Order Shock Capturing	
4	Peddamma Vishwaja	High-order compressible flow simulations on non-uniform grids	
5	Cherishma Mallavarapu	Unsteadiness in a 2D transonic cavity flow with a deep sub-cavity and deployment of a passive control technique	
6	Vinod V	A study of shock-induced transient jets: the impact of exit conditions on Mach disk and vortex ring	
7	Anagha K	2D Unsteady Transonic Flow Dynamics Over a Curved Baseline Cavity with an Integrated Sub-Cavity	
8	Rakshit Gulati	Capturing shock interface interactions with two-phase Riemann solvers	
9	Majji Gowri Padmaja	Experimental investigation of pressure build-up behind perforated plate array due to blast wave impact	
10	Tathagat Sarangi	Active control of thermoacoustic instability using intermittent acoustic impulses	
11	Veeraraghavan Balaji	Numerical Investigation of combustion-induced unstart in SCRAMJET Isolator	
12	Ghanashyam K. C.	Development of an electrohydrodynamic solver for	

		polymer electrospinning and analytic modeling of an electrified jet subjected to insoluble surfactants.
13	Nagula Venkata Anirudh	Numerical simulations of non-spherical drops impacting a deep pool
14	Yashwanth Singh	Numerical study of a single cavitation bubble in a frustum
15	Subhasish Guchhait	Flow fields around active droplets squeezing through tight confinements
16	Lokendra Mohan Sharma	Quantitative measurements of immiscible oil jet
17	Aneesha Kajampady	Study of Rheotaxis of microswimmers in soft microchannels and their collective behaviour
18	Tejasvi Hegde	Experimental evidence of a slip near a moving contact line
19	Sidharth K Pillai	Large Eddy Simulation of Recirculating Elliptical Burner
20	Ketan Warghat	Aerodynamics effect on spray flame of a swirl stabilized gas turbine combustor
21	Y.S.A.Venkataram	Experimental investigation of the flame structure and burning velocities of hybrid aluminum flames
22	Kinshuk Hazra	Combustion Studies of Alternative Fuels for Reduced Particulate and Greenhouse Gas Emissions
23	Mahesh Ramesh Thombare	Analysis of Velocity Flow Fields in a Novel 3D-Printed Triple Swirler Burner Using Experimental and Numerical Methods
24	Kunal Supekar	Experimental & numerical investigation of sprays
25	Shikshit Nawani	Low-order thermoacoustic network modeling of Rijke tube for hydrogen flames
26	Bor Hessian	Experimental & numerical investigation of combustion using alternative fuels
27	Bhuvan Raj Maddipati	Chemical kinetic models for high-fidelity continuum-scale combustion simulations
28	Jaykumar Ashokbhai Patel	The Influence of Topographical Variations on Wind Turbine Wake Characteristics Using LES
29	Neetesh Singh Raghuvanshi	Friction in ZPG Boundary Layers Over Rough Walls

30	Utkarsh Deep Tiwari	Wind direction and yaw misalignment effects in wind farms studied using LES and a Gaussian wake model
31	Pranav Sood	Turbulent/Non-Turbulent Interface in Wall Jets
32	Kingshuk Mondal	LES of the boundary layer flow over a smooth-to-rough and a rough-to-smooth surface transition
33	Shibani Bhatt	Quantifying scale interactions in wall turbulence: comparative analysis using anemometry data
34	Kethavath Naveen Naik	Power production of a wind farm sited near an abrupt rough-to-smooth surface roughness transition
35	Harish Choudhary	Spectral investigation of the structure of plane turbulent wall jets using particle image velocimetry
36	Shiva Sai Tadikonda	An a-posteriori analysis of co-kurtosis PCA based dimensionality reduction using Neural ODE
37	Yashwanth M	On the Spatio-temporal flow patterns generated from a multi-fan wind generator