

18th Southern California Flow Physics Symposium (SoCal Fluids XVIII)

April 19, 2025 - USC

Program

08:15	Breakfast & check-in, RTH terrace		
Time	A1: Biological, bioinspired and complex flows I Chair: Mitul Luhar, USC Room: RTH 105	A2: Turbulence I Chair: Hans C. Mayer, CalPoly Room: RTH 109	A3: Environmental flows I Chair: Geoff Spedding, USC Room: RTH 217
09:00	Reynolds Number Calculation in Non-Newtonian Blood Flow Modeling: Insights from Pediatric Fontan Circulations, Coskun Bilgi, USC	Turbulence-resolving integral simulations for wall-bounded flows, Tanner Ragan, UCI	Stratified early wake of a 6:1 inclined spheroid, Madeleine Oliver, USC
09:13	Wave Intensity Analysis of Aorta-Coronary Interaction in Coronary Blood Flow, Soha Niroumandi, USC	Normality-based analysis of multiscale velocity gradients and energy transfer, Rahul Arun, Caltech	Turbulence in geophysical wakes: a parametric study, Jinyuan Liu, UCSD
09:26	Stability of a passive viscous droplet in a confined active nematic liquid crystal, Tanumoy Dhar, UCSD	Analysis of Smallest Resolved Scales in Large-Eddy Simulations, Mostafa Kamal, UCI	Investigating buoyant plume dynamics during wildland fires over plant canopies using Large-Eddy Simulations (LES), Ajinkya Desai, UCI
09:39	A bio-inspired wave pumping approach for enhancing cerebral and renal blood flows, Deniz Rafiei, USC	Wavelet-based resolvent analysis of intermittently turbulent Stokes boundary layer, Micah Nishimoto, Caltech	Probing gas-phase chemical composition in premixed stagnation flames, Joaquin Camacho, SDSU
09:52	Elasto-Viscous Dynamics of Particles on Inclined Flexible Hairy Beds, Xirui Zhang, UCR	Inner-outer interscale interactions in wall-bounded turbulence via conditional state-space trajectories, Emma Lenz, Caltech	Stratified wakes past an inclined 6:1 prolate spheroid: dominant SPOD modes and TKE budget, Sanidhya Jain, UCSD
10:05	The effect of aortic stretch and recoil pumping on cardiac output and end organ blood flow: An in vitro experimental study using a coupled LV-arterial system, Haojie Geng, USC	Consistent data-driven subgrid-scale model development for large-eddy simulation, Xinyi Huang, Caltech	Wake growth in nonlinear stratification, Adam Hall, UCSD
10:18	Subtle Differences in Rotational Noise Influence the Collective Behavior of Schooling Fish, Alyssa Chan, USC	Sensitivity analysis of two-dimensional unsteady vortical flows for parameters governing their initial condition, Lingbo Ji, Caltech	Resistive tearing: numerical exploration of nonmodal effects, Elias Pratschke, UCSD
10:30	Morning break, RTH terrace		
Time	B1: Biological, bioinspired and complex flows II Chair: Niema Pahlevan, USC Room: RTH 105	B2: Turbulence II Chair: Stefan Llewellyn Smith Room: RTH 109	B3: Environmental flows II Chair: Tirtha Banerjee, UCI Room: RTH 217
10:50	Reinforcement Learning-Based Control of Topological Defects in 2D Active Nematics, Yuchen Hou, UCSD	Biglobal resolvent analysis of turbulent flow inside a centrifugal pump, Yonghong Zhong, UCLA	Tidally dominated flow past a three-dimensional topography: Wake dynamics, energetics and mixing, H. M. Aravind, UCSD
11:03	Computational Modeling of Arteriovenous Malformation Embolization Using Lattice Boltzmann Method: Impact of AVM Morphology and Embolization Strategy, Haonan Meng, USC	Effect of subgrid-scale anisotropy on wall-modeled large-eddy simulation for separated turbulent flow, Di Zhou, Caltech	Internal Solitary Wave Attenuation by Floating Canopies, Jen-Ping Chu, USC
11:16	Time Frequency Analysis of Cerebral Perfusion in Ischemic Stroke: Preclinical Rat Models, Jiajun Li, USC	Informative/Non-Informative Decomposition (IND) of a turbulent channel flow, Gonzalo Aranz, Caltech	Direct Numerical Simulation of High-speed Droplets Interacting with a Liquid Pool, Han-Hsiang Kuo, UCSD
11:29	Quantitative Flow Visualization of Diastolic Filling Vortices Under Varying Diastolic Function States in a Clinically Relevant Left Ventricle Setup, Kagan Ucak, USC	Constructing Turbulent Field Statistics with an Ensemble of Multifractal Gaussian Fields, Mark Warnecke, UCI	Impact of Forest Canopy Structure on Buoyant Plume Dynamics During Wildland Fires, Antonio Cervantes, UCI
11:42	Surface roughness of cohesive grains in a rotating drum, Thomas Yu, UCSB	Numerical investigation of three-dimensional effects in canonical turbulent flow separation over flat plates, Benjamin Dalman, USC	Hydrodynamic impact of internal solitary waves on a cylinder close to free surface, Sai Pramod Anumula, UCSD
11:55	Creeping Flows through Confined Hair Arrays, Sean Bohling, UCSB	Slip-Velocity Characterization of Permeable Substrates in Planar Couette Flow, Idan Eizenberg, USC	On horizontal transport of turbulent kinetic energy during a wildland fire, Ekaterina Tkachenko, UCI
12:08	Hydrodynamic Lubrication of Rough Surfaces Leads to Friction-like Behavior, Jake Minten, UCR	Neural operator-enabled closure for Burgers' turbulence, Sotiris Catsoulis, Caltech	Large Eddy Simulations of a Tidally Modulated Canyon Without Stratification, Isaiah Cuadras, UCLA
12:21	High-Fidelity Simulation and Numerical Framework for Optimized Lithotripsy, Yanjun Zhang, Caltech	Localized resolvent-mode bases for turbulence statistics, Ethan Eichberger, Caltech	Withdrawn

12:33	Lunch, RTH terrace and Epstein Family Plaza			
Time	C1: Compressible flows Chair: Ivan Bermejo-Moreno, USC Room: RTH 105	C2: Transition and instabilities Chair: Perry Johnson, UCI Room: RTH 109	C3: Flow control Chair: Jeff Eldredge, UCLA Room: RTH 217	
13:30	A phase change model for interface capturing schemes and the 5-equation model, Jose Rodolfo Chreim, Caltech	Dynamics of Circular Vortex Pairs, Michael Wadas, Caltech	Machine Learning-Driven State Estimation and Uncertainty Quantification in Highly Disturbed Aerodynamics, Hanieh Mousavi, UCLA	
13:43	Immersed Boundary Method for Compressible Hyperbolic Flows, Alexander Yeh, USC	Easy Solutions to Partial Differential Equations, Geoffrey Hewitt, CSULB, Standard TLM	Dynamic passive control of turbulent drag via subsurface resonant phononic metamaterial, Ching-Te Lin, Caltech	
13:56	Noise Suppression from a High-Speed Jet using Localized Secondary Parallel Injection, Kyle Miller, UCI	Frequency responses of the Navier-Stokes equations: a perturbation analysis, Dusan Bozic, USC	Transformer-Based Reinforcement Learning for Pitch Control in Highly Disturbed Flows, Zhecheng Liu, UCLA	
14:09	Low-frequency dynamics and subgrid-scale model sensitivity in shock-wave/turbulent boundary layer interactions over diabatic walls, Vanessa Rubien, USC	Trapped acoustic waves in subsonic jets educed from large-eddy simulation and linear stability, Brandon Yeung, UCSD	Deep Reinforcement Learning Control of an Oscillating Hydrofoil to Maximize Power Extraction, Ryan Teoh, UCLA	
14:22	Investigating the Nonlinear Dynamics of an Open Cavity Flow, Eden Shokrgozar, UCSD	The Nonlinear One-Way Navier-Stokes Approach for High-Speed Boundary-Layer Flows, Michael Sleeman, Caltech	Active and Passive Aerodynamic Control of Laminar Separation, Charles Klewicki, USC	
14:35	Compression-ramp shock/turbulent-boundary-layer interaction over a flexible panel with and without air-vortex-generator flow control, Thomas Cuvillier, USC	Time & Space Symmetry Breaking in K-Type Boundary Layer Transition, Cong Lin, UCSD	Flow control of a turbulent separation bubble: Information-theoretic approach, Tristan Villanueva, Caltech	
14:48	Simulating Binary Diffusion with Interface-Capturing Schemes, Franz O'Meally, Caltech	Physics-Based RANS Model for Transition Onset Prediction of Incompressible Boundary Layers at High Reynolds Numbers, Arturo Cajal, USC	Mitigating transient growth in a decelerating channel flow with optimal wall motion, Alec Linot, UCLA	
15:00	Afternoon break, RTH terrace			
Time	D1: Multiphase, reacting flows, and combustion Chair: Rui Xu, USC Room: RTH 105	D2: Experimental methods Chair: Xiaofeng Liu, SDSU Room: RTH 109	D3: Computational methods Chair: Haithem Taha, UCI Room: RTH 217	D4: Aerodynamics Chair: Kunihiko Taira, UCLA Room: RTH 115
15:17	Numerical and Experimental Investigation of the Impact of Dissolved Air on Hydrodynamic Cavitation, Emad Hasani, Cal Poly	Leidenfrost impact on liquid surfaces, Brooklyn Asai, UCSD	Physics-Informed Neural Networks for Unsteady Flow Modeling via Using the Principle of Minimum Pressure Gradient, Abdelrahman Elmaradny, UCI	The influence of airfoil parameters on low-order representations of extreme-vortex dynamics, Barbara Lopez-Doriga, UCLA
15:30	Settling and retention of fractal aggregates in density-stratified fluid, Zachary Maches, UCSB	Microfabricated Soap Film Frames to Study Detached Liquid Sheet Evolution, Sam Hastings, Cal Poly SLO	Variational Projection of Navier-Stokes', Kshitij Anand, UCI	Airfoil separation analysis with optimal transport regularized latent embeddings, Jonathan Tran, UCLA
15:43	Collective dynamics of inertial particles in oscillatory flow, Xiaokang Zhang, UCR	Jetting from droplet impact on waves, Ryuta Hijiya, UCSD	Phase extraction of multi-frequency flows using autoencoder, Youngjae Kim, UCLA	Extreme vortex gust encounters by a square wing, Hiroto Odaka, UCLA
15:56	Energy transfer in surface breaking waves, Yifeng Mao, UCSD	Sub-Pixel Scale Structured Illumination for Flow Imaging, Hy Cao, UCSD	Adjoint-based data assimilation in a subdomain using omnidirectional-integration-enabled pressure Dirichlet boundary conditions, Mohamed Amine Abassi, SDSU	Computational analysis of sweep effects on finite wing flow at transitional Reynolds numbers, Victoria Rolandi, UCLA
16:09	Particle dispersion in oscillatory carrier flow, Polina Zhilkina, UCSB	Prandtl-D Wind-Tunnel Aerodynamic Force Analysis and Flow Survey, Yuichiro Tobita, SDSU	Physics-Informed Machine Learning for Reconstructing Temperature, Velocity, Pressure, and Species Profiles from Combustion Video Data, Benjamin Cohen, USC	Leading edge vortex dynamics in boxfish-inspired delta wing geometries, Caroline Cardinale, Caltech
16:22	Design and evaluation of 0-D plasma-assisted jet stirred chemical reactor: Modeling and experiments, Shihyao Huang, USC	Drag on a sphere while being vertically extruded from a granular medium, Marc Noujeim, UCSB	Regression and Uncertainty Quantification Based Models for D90, Christopher McCormick, UCLA	Non-intrusive flowfield reconstruction of a parameterized ONERA M6 wing via bi-calibrated Grassmann interpolation, Edward Lowell, UCSD
16:35	Effects of shear layer on unsteady premixed counterflow flame, Jose Gonzalo Rivera Lizarralde, UCSD	Investigation of Trailing Edge Shape and Thickness Effect on Atomization of Liquid film from Trailing edge of NACA0012 in a High-Speed Flow, Safiullah, UCI	Modeling Error in Data-Driven Closure Models to Quantify Performance, Imran Hayat, Caltech, MIT	A brief on the variational theory of lift, and the principle of minimum pressure gradient, Cody Gonzalez, UCI
16:48	Polyhedral hydrogen-ammonia Bunsen flames, Allen Hsing, UCSD	Withdrawn	Reconstructing Dangerous Flow Events Using the Domain of Dependence from Surface Pressure Data, Mohammad Abuwardeh, SDSU	On the Separating Flow Behind a Cylinder: Insights from the Principle of Minimum Pressure Gradient, Mohamed Shorbagy, UCI
17:00	Adjourn			