

2023 Unsteady Aerodynamics Program Review

Dr. Gregg Abate | July 10-13, 2023 | Arlington, VA -hybrid

Basic Research Innovation Collaboration Center (BRICC)
4100 N Fairfax Drive | Suite 450 | Arlington, VA 22203

Agenda Day 1 | Monday, July 10, 2023

Time	Topic	Speaker
8:10	Zoom Room opens, test communications	
8:20	Intro & Welcome	Gregg Abate
Turbulence Studies, BL Transition, and Fluid-Surface Interaction		
8:25	Data-Driven Control of Unsteady Flows	Sam Taira - University of California Los Angeles, Steve Brunton - University of Washington
8:50	Populating the wall layer, one eddy at a time: Resolvent analysis for Wall-Modelled LES (virtual)	Ugo Piomelli - Queens University, Canada Beverley McKeon - Stanford University
9:15	A wavelet-based resolvent analysis for highly-unsteady transient flows	Jane Bae - California Institute of Technology, Scott Dawson - Illinois Institute of Technology
9:40	(EOARD) Non-equilibrium cascade and large-scale dynamics in wall turbulence (virtual)	Christos Vassilicos - Centre National de Recherche Scientifique, Lille FRANCE
10:05	Break/Open Discussion	
10:20	(MURI Introduction) Fluid-Metamaterial-Interaction to Revolutionize Passive Control of Aerodynamic Flows	Kathryn Matlack (Lead PI), Andres Goza, Theresa Saxton-Fox, Phillip Ansell - University of Illinois at Urbana-Champaign, Jane Bae - California Institute of Technology, Jordan Raney - California Institute of Technology, Harold Park - Boston University
10:45	(LRIR) Resonant Metamaterials for Laminar Flow Control	Abby Juhl - AFRL/RX Caleb Barnes, Albert Medina - AFRL/RQ
11:10	Passive Control of Non-Canonical Flows with Anisotropic Porous Materials	Lou Cattafesta - Illinois Institute of Technology, Rajat Mittal, Charles Meneveau - Johns Hopkins
11:35	Harnessing phononic materials for unsteady aerodynamic flow control	Andres Goza, Katie Matlack - University of Illinois at Urbana-Champaign
12:00	Lunch	
1:00	Transonic Flow Control over Engineered Elastoacoustic Subsurfaces via Generalized Impedance Boundary Conditions	Mostafa Nouh - The State University of New York at Buffalo, Carlo Scalo - Purdue University

1:15	(EOARD) A-SURF: Acoustically self-resonating surfaces for boundary layer flow control	Woutijn Baars - Technische Universiteit Delft, NETHERLANDS
1:40	Computational interpretation of limited and noisy measurements using CFD and machine learning (virtual)	Tamer Zaki - Johns Hopkins University
2:05	Data-enhanced Hybrid Modeling for Turbulent Aerodynamics	Paul Durbin, Anupam Sharma - Iowa State
2:30	Break/Open Discussion	
2:45	Passive flow control of bypass transition by roughness shielding	David Goldstein - University of Texas at Austin, Ed White - Texas A&M University, Saikishan (Sai) Suryanarayanan - University of Akron
3:10	(YIP 20) Resolvent-based estimation for control of turbulent aerodynamic flows	Aaron Towne - University of Michigan
3:35	A Variational Theory of Aerodynamics	Haithem Taha - University of California Irvine
4:00	Break/Open Discussion	
4:15	Wrap-up, & Adjourn	

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Agenda Day 2 | Tuesday, July 11, 2023

Time	Topic	Speaker
8:10	Zoom Room opens, test communications	
8:25	Intro & Welcome	Gregg Abate
Turbulence Studies, BL Transition, and Fluid-Surface Interaction		
8:30	(EOARD) Turbulent drag reduction by fibrous permeable substrates (virtual)	Ricardo Garcia-Mayoral - University of Cambridge, UNITED KINGDOM
8:55	(YIP 23) Stochastic modeling and analysis of random surface roughness	Armin Zare - University of Texas - Dallas
9:10	Transformative prognostic wall-turbulence models for realistic spatial heterogeneities: theory, experiments and direct- and large-eddy simulation	William Anderson- University of Texas – Dallas, Kenneth Christensen - Illinois Institute of Technology, Carlos Pantano - University of Southern California
9:35	(DEPSCoR) Cluster-based estimation and control of turbulent aeroelastic flows (virtual)	Aditya Nair, Floris van Breugel - University of Nevada - Reno
9:50	(YIP 23) Extrapolative, progressive machine learning for turbulence modeling	Xiang Yang - Pennsylvania State University
10:05	Break/Open Discussion	
10:20	(YIP 22) Efficient Stabilization of the Adjoint for Turbulent Separated Flows	James Coder - Penn State University
10:45	(AOARD) Development of ultra-miniature wall-shear-stress sensors for low-speed flow applications	Duvvuri Subrahmanyam (Subbu) - Indian Institute of Science, INDIA
11:10	(DEPSCoR) Understanding Vortex-Turbulent Boundary Layer Interactions to Mitigate Separation Using Textured Surfaces	Gokul Pathikonda - Arizona State University, Vrishank Raghav - Auburn University
11:25	(AOARD) Advancing the flow physics behind the drag of riblets	Daniel Chung, Nicholas Hutchins - University of Melbourne, AUSTRALIA
11:50	Lunch	
Flow Physics for Control		
1:00	(EOARD) Rough-wall turbulent boundary layer subjected to streamwise pressure gradients (virtual)	Bharath Ganapathisubramani - University of Southampton, UNITED KINGDOM
1:25	Birth and control of three-dimensional Lagrangian separation: Optimal control	Guus Jacobs - San Diego State University, Geoff Spedding - University of Southern California, Maziar Hemati - University of Minnesota

1:50	Active Flow Control of a Complex 3D Supersonic Multi-Stream Nozzle Flow	Mark Glauser, Yiyang Sun - University of Syracuse, Datta Gaitonde - Ohio State University
2:15	Break/Open Discussion	
2:30	Bispectral Mode Decomposition for discovery and modeling of nonlinear flow physics in open cavity flows	Oliver Schmidt - University of California San Diego
2:55	Joint experimental/computational study of control of jets in crossflow	Krishnan Mahesh - University of Michigan, Ann Karagozian - University of California Los Angeles
3:20	Learning to Fly - Using Distributed Pressure Sensing and Network Strategies	David Rival - Queens University, Canada, Melissa Green - University of Minnesota
3:45	(DEPSCoR) Mitigation of vortex-foil interactions through passive shape control	Jennifer Franck - University of Wisconsin, Kenny Breuer - Brown University
4:00	Break/Open Discussion	
4:15	Wrap-up, & Adjourn	

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Agenda Day 3 | Wednesday, July 12, 2023

Time	Topic	Speaker
8:10	Zoom Room opens, test communications	
8:25	Intro & Welcome	Gregg Abate
Flow Physics for Control		
8:35	Embedded Flow Control for High Work / Low Reynolds Turbines - BFCNTUR	Guillermo Paniagua - Purdue University
9:00	Rapid (on-Demand) Control of Shock-Dominated Flows by Filamentary Plasma	Sergey Leonov - Notre Dame, Jonathan Poggie - Purdue University
9:25	(LRIR) Separation inception in high-work turbine passages	Christopher Marks - AFRL/RQ
9:50	(HBCU/MSI) Numerical Investigation of Freestream Turbulence Effect on Endwall Flow in Low-Pressure Turbine Passage	Andreas Gross - New Mexico State University
10:15	Break/Open Discussion	
10:30	Flow Physics and Control of 3-D Separation on Finite Span, Tapered and Swept Wings (virtual)	Miki Amitay - Rensselaer Polytechnic University, Vasilis Theofilis - University of Liverpool, UK, Sam Taira - University of California Los Angeles
10:55	(LRIR) High-Fidelity Simulation of Complex Multi-Disciplinary Interactions in Air Vehicles	Dan Garmann, Caleb Barnes - AFRL/RQ
11:20	Dynamics and Control of Cargo Aircraft Wakes with Bays and Doors	Datta Gaitonde - Ohio State University, Farrukh Alvi - Florida State University
11:45	Lunch	
12:45	(LRIR) Towards a Generalized Understanding of Steady Jet/Boundary Layer Interaction to Inform Rapid Predictive Capability	Albert Medina, Aaron Altman - AFRL/RQ
1:10	(YIP 21) Towards Real-Time, 3D Coherent Structure Estimation for Flow Over Finite Wings	Frank Lagor - State University of New York - Buffalo
1:35	Dissecting the Flow Physics of Store-Induced Effects on Wing Aerodynamics and Limit-Cycle Oscillations in Transonic Flows	Rajat Mittal, Jung Hee Seo - Johns Hopkins University
2:00	Wall-bounded streamwise vortex destruction	Tyler Van Buren - University of Delaware

Unsteady Aeromechanic Interactions

2:45	Break/Open Discussion	
2:40	Aerodynamically-adaptive wings using distributed bleed flow control	Ari Glezer - Georgia Tech, Massimo Ruzzene - University of Colorado Boulder
3:05	Flow Physics and Optimized Suppression of High-Speed Cavity Flow	Larry Ukeiley - University of Florida, Lou Cattafesta - Illinois Institute of Technology, Sam Taira - University of California Los Angeles
3:30	Dynamic Response of the Shear Layer to Cavity Door Operation at Supersonic	Rajan Kumar - Florida A&M University, Farrukh Alvi - Florida State University, Kenneth Granlund - North Carolina State University, Datta Gaitonde - Ohio State University
3:55	An experimental dynamical systems approach to aeroelastic instabilities of swept wings	Kenny Breuer - Brown University
4:20	Break/Open Discussion	
4:45	Wrap-up, & Adjourn	

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Agenda Day 4 | Thursday, July 13, 2023

Time	Topic	Speaker
8:10	Zoom Room opens, test communications	
8:15	Intro & Welcome	Gregg Abate
Unsteady Aeromechanic Interactions		
8:25	A coordinated experimental and computational study of global and convective gusts on swept wings	John Farnsworth, Ken Jansen - University of Colorado Boulder
8:50	Wing sweep, structural motion and their effect on separation and separation control – Simulations, wind tunnel and flight experiments	Hermann Fasel, Jesse Little - University of Arizona
9:15	A Passive Strategy for Improving Aero-Optics Through a Supersonic Shear Layer	Ed DeMauro - Rutgers University, Matthew Kemnetz - AFRL/RD
9:40	Onset and prediction of orbital motions of streamwise vortices	Justin Jaworski - Lehigh University
10:05	Break/Open Discussion	
10:20	High-Angle-of-Attack Translating and Pitching Wings Interacting with Finite Obstacles	Matt Ringuette - State University of New York Buffalo
10:45	Three-Dimensional Gust Control with Morphing Wings	Samik Bhattacharya - University of Central Florida
11:10	(SOARD) Coherent structure assessment in high-speed crossflow jets (virtual)	Guillermo Araya - University of Texas San Antonio, Ken Jansen - CU Boulder
11:35	Vortex interactions on multi-swept wing configurations	Mehdi Ghoreyshi, Juergen Seidel, Casey Fagley - United States Air Force Academy
12:00	Break/Open Discussion	
12:15	Wrap-up, & Adjourn	