



2025 AFOSR/ONR/ARO Annual High-Speed Aerodynamics Portfolio Review

Drs. Amanda Chou, Eric Marineau, Jonathan Sosa and Kenneth Granlund | June 23-27, 2025
| Arlington, VA

Holiday Inn Arlington - Ballston
4610 Fairfax Dr., Arlington, VA 22203

Agenda Day 1 | Monday, June 23, 2025 | Eastern Time (ET)

Time	Thrust Area	Title	PI/Organization
08:30-08:40	Welcome and Opening Remarks		Amanda Chou, AFOSR Eric Marineau, ONR Kenneth Granlund, ARO
08:40-08:45	Propulsion	Introduction to High Speed Propulsion	Program Officers
08:45-09:02	Propulsion	ONR - Discontinuous Galerkin Methods for Modeling Chemically Reacting Hypersonic Phenomena	R. Johnson, NRL
09:02-09:19	Propulsion	ONR - Integration of Physics-Based and Data-Driven Turbulent Combustion Models in the JENRE® Multiphysics Framework and Computational Performance Analysis	S. Demir, P. Pal, ANL
09:19-09:36	Propulsion	ONR- Evaluation, Enhancement, and Application of JENRE on Large-Scale Computing Systems	T. Dunn, LLNL
09:36-09:53	Propulsion	ONR - Combustion Behavior Within a Solid-Fuel Ramjet at High Altitudes	D. Kessler, NRL
09:53-10:10	Propulsion	ONR - Improved Flamelet Progress Variable Approach for Compressible High-Speed Flows	B. Bojko, NRL
10:10-10:27	Propulsion	ONR - Learning-based Adaptive Thrust Control in a Direct-Connect SFRJ	B. Reitz, E. Washburn, NAWCWD
10:27-10:47	BREAK		
10:47-11:04	Propulsion	ONR - Data-driven, Learning-based, Adaptive Control of Solid Fuel Ramjet	A. Goel, UMBC
11:04-11:14	Propulsion	ONR - Experimental and Numerical Investigation on the Combustion Characteristics of Solid Fuels in Supersonic Combustors (Wrap Up)	L. Massa, G. Young, Virginia Tech
11:14-11:31	Propulsion	ONR - Combustion in Solid Fuel Ramjets	C. Slabaugh, Purdue U
11:31-11:48	Propulsion	ONR - Temperature and Compositional Measurements in Model Solid Fuel Ramjet Inlet and Exhaust Flows	R. Hanson, Stanford U.
11:48-11:58	Propulsion	ONR - High Fidelity Modeling of Hypersonic Air-Breathing Propulsion	T. Taylor, APL
11:58-13:13	LUNCH		
13:13-13:30	Propulsion	ONR - Optimized Simulations of High-Speed Turbulent Combustion	G. Candler, U of MN
13:30-13:40	Propulsion	ONR - Mach 4 Inlet Unstart Investigation and Mitigation with Self Energizing Vortex Generating Jets (Wrap Up)	G. Hobson, NPS
13:40-13:57	Propulsion	ONR - Data-Driven Input-Output Models for Reacting, High-Enthalpy Flows	B. McKeon, Stanford U

13:57-14:14	Propulsion	ONR - Intrinsic Instability of Compressible Reacting Flows and Its Role in Scramjet Unstart and Transition	A. Poludnenko, UConn
14:14-14:40	Propulsion	ONR - Active Mitigation of Unstart in Scramjets	R. Acharya, UTSI
14:40-14:55	BREAK		
14:55-15:00	NEE	Introduction in Non-Equilibrium Effects (NEE)	Program Officers
15:00-15:17	NEE	AFOSR - Spectroscopic Measurements and Nonequilibrium Modeling for High-Enthalpy Air	J. Austin, Caltech R. Hanson, Stanford U.
15:17-15:27	NEE	ONR - Plasma Assisted Cooling of Thermally Intense Aerospace Surfaces (YIP) (New Start)	K. Hanquist, U of Arizona
15:27-15:44	NEE	AFOSR - Modeling of Recombination in Hypersonic Flows: A Combined Theoretical and Experimental Approach	M. Panesi, UIUC
15:44-16:01	NEE	AFOSR - Improving Diagnostic Characterization of High Hypersonic (Mach 15+) Plasmas	M. A. Rao, AFRL
16:01-16:16	BREAK		
16:16-16:33	NEE	ONR - Experimental Study of Non-Equilibrium Turbulence-Chemistry Interaction in External Hypersonic Flows	A. Veeraragavan, U of Queensland, Australia
16:33-16:43	NEE	AFOSR - Evaluation of Aerothermochemistry Models Through Sensitivity Analysis and Low-Uncertainty Experiments (Wrap Up)	D. Andrienko, U of CO
16:43-17:00	NEE	AFOSR - Fundamental Studies of Vibrationally Resolved Air Kinetics in the Vicinity of a Partially Catalytic Surface	I. Boyd, U of CO
17:00-17:17	NEE	AFOSR - Electron Density Measurements in a Plasma around a Body in High Enthalpy Hypersonic Flow by means of Radar	R. Petervari, Fraunhofer
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Agenda Day 2 Tuesday, June 24, 2025 Eastern Time (ET)			
Time	Thrust Area	Title	PI/Organization
8:30-8:40	NEE	AFOSR - Quantification and Mitigation of Thermochemical Non-Equilibrium in High-Enthalpy Hypersonic Wind Tunnels (Wrap Up)	D. Baccarella, U of TN
8:40-8:57	NEE	ONR - Deep Learning Closure of Non-Equilibrium Fluid Mechanics	J. MacArt, Notre Dame
8:57-9:14	NEE	AFOSR - Direct Molecular Simulation of Multi-Species Reacting Flows	A. Blanco, N. Bisek, AFRL
9:14-9:31	NEE	AFOSR - High-fidelity modeling of non-equilibrium gas-phase recombination for hypersonic air flows (YIP)	R. MacDonald, U of CO
9:31-9:51	BREAK		

9:51-9:56	GSI	Introduction to Gas-Surface Interaction (GSI)	Program Officers
9:56-10:06	GSI	AFOSR - Surface catalytic recombination on carbon-based TPS materials (Wrap Up)	K. Stephani, UIUC
10:06-10:23	GSI	AFOSR - Experimental/Computational Study of Gas-phase and Gas-surface Interactions for High Speed Rarefied Flow	T. Schwartzentruber, UMin
10:23-10:49	GSI	ONR - Computational and Experimental Study of the Temporal Response of UHTC Materials for Thermal Protection of Hypersonic Vehicles (Wrap Up)	I. Boyd, U of Colorado
10:49-11:06	GSI	ONR - Thermodynamic Comparative Analysis of Hypersonic Materials Response Using Oxy-torch and Plasmatron, Screening and Arc Jet Testing	E. Corral, U of Arizona
11:06-11:23	GSI	ONR - Characterization of High Enthalpy Flows and Ablation Products Surrounding Hypersonic Platforms	R. Miles, TAMU
11:23-11:40	GSI	AFOSR - Disruptive research approach for GSI-model consolidation through on-ground and in-flight analyses	J. El Rassi, T. Magin, VKI
11:40-11:45	FSI	Introduction to Fluid Structure Interactions (FSI)	Program Officers
11:45-12:02	FSI	ONR - Resolving Shock-Driven Droplet Breakup and Evaporation at Hypersonic Conditions	D. Jarrahbashi, TAMU
12:02-13:17	LUNCH		
13:17-13:27	FSI	ONR - Fluid-thermal-structure Interaction of a Finned Model at Mach 6 (Wrap Up)	D. Bodony, UIUC
13:27-13:44	FSI	ONR - Electromagnetic Launch For Hypersonic Research and Development	M. Libeau, NSWCD
13:44-14:01	FSI	ONR - Prediction of High-Velocity Droplet Damage Using Peridynamic Approaches	I. Guven, VA Commonwealth U
14:01-14:27	FSI	ONR - A Numerical Investigation of Particle and Droplet Impingement for Hypersonic Flow Conditions Including Material Response Modeling (Wrap Up) / Low- and High-Fidelity Simulations of High-Speed Droplet Aerobreakup and Impingement with Material Response Modeling (New Start)	C. Brehm, U of MD
14:27-14:42	BREAK		
14:42-14:59	FSI	AFOSR - The Role of Cavitation in Droplet Breakup: Understanding and Predicting Hypersonic Structural Loading through Multiscale Simulations and Shock-tube Experimentation	S. Grace, Boston U
14:59-15:16	FSI	ONR - Investigating the Formation of Ice Crystal Aggregates and their Impacts on Hypersonic Vehicles	H. Chelmo, U of North Dakota
15:16-15:42	FSI	ONR - Fragmentation and Melting of Ice Particles Subjected to Hypersonic Aerothermodynamic Environments (Wrap Up)	S. Poovathingal, U of Kentucky
15:42-15:57	BREAK		
15:57-16:14	FSI	ONR - Water Entry of Hypervelocity Projectiles (YIP)	B. Schmidt, Case Western U

16:14-16:24	FSI	ONR - Advancing understanding of and predictive modeling capabilities for high-speed shock-induced droplet Aerobreakup and surface damage (New Start)	J. Rabinovitch, Stevens; O. Desjardins, Cornell
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Agenda Day 3 Wednesday, June 25, 2025 Eastern Time (ET)			
Time	Thrust Area	Title	PI/Organization
8:30-8:47	FSI	ONR - Enhanced hypersonic aerodynamics and stability models through hardware in the loop ground tests in TUSQ	I. Jahn, U of SQ, Austrailia
8:47-9:04	FSI	AFOSR - Computationally tractable robust codesign of hypersonic vehicles	C. Manzie, U of Melbourne, Australia
9:04-9:14	FSI	ONR - Mechanics of hypersonic materials under hypersonic flight conditions (New Start)	S. Ravindran, U Minn
9:14-9:31	FSI	AFOSR - Topology-Aware Learning and Modeling of High-Rate Dynamic Systems	C. Hu, Iowa State U
9:31-9:51	BREAK		
9:51-10:08	FSI	AFOSR - Decoding fluid-structural coupling during shock-boundary layer interactions acting on compliant surfaces	J. McNamara, OSU
10:08-10:25	FSI	AFOSR - Hypersonic FTSI Unit Case for a Thermally-Buckled Structural Panel	A. Neely, UNSW, Australia
10:25-10:42	FSI	AFOSR - Measurement and Modeling of an Oblique Shock Grazing a Compliant Panel	D. Bodony, UIUC
10:42-10:59	FSI	AFOSR - Experiments on Hypersonic Fluid-Structure Interaction in the Wind Tunnel H2K	D. Daub, S. Willems, DLR
10:59-11:16	FSI	AFOSR - Aerothermoelastic Experiments and Simulation of High-Speed Vehicle Structures	M. Spottswood, K. Brouwer, D. Ehrhardt, AFRL
11:16-11:21	TF	Introduction to Turbulent Flows (TF)	Program Officers
11:21-11:38	TF	AFOSR - Theoretical developments in hypersonic turbulent boundary layers with application to friction and heat transfer estimation	J. Larsson, U of MD
11:38-11:55	TF	AFOSR - Theoretical developments in hypersonic turbulent boundary layers with application to friction and heat transfer estimation	S. Pirozzoli, Sapienza, Rome
11:55-13:10	LUNCH		
13:10-13:27	TF	ONR - Turbulence Quantities in Supersonic and Hypersonic Flows	N. Parziale, Stevens
13:27-13:44	TF	ONR - Simulation and Modeling of Hypersonic Turbulent Boundary Layers with Varied Reynolds Numbers and Pressure Gradients	L. Duan, OSU

13:44-14:01	TF	ONR - Subfilter-scale (SFS) analysis of hypersonic turbulence: a path towards a consistent wall-modeled LES strategy	C. Scalo, Purdue U
14:01-14:18	TF	ONR - Development of Improved WMLES Capabilities for Hypersonic Flows for Body-Fitted and IBM-based CFD Solvers	C. Brehm, U of MD
14:18-14:38	BREAK		
14:38-14:55	TF	ONR - Development of Hybrid Simulation Models for Heat Transport in Hypersonic Turbulent Flow	P. Durbin, Iowa State U
14:55-15:21	TF	ONR - Aero-Optical Studies of Mixing Flows at Supersonic and Hypersonic Speeds (Wrap Up)	S. Gordeyev, Notre Dame
15:21-15:38	TF	ARO - Aero-Optical Effects of Vortical Instabilities in Hypersonic Boundary Layers	S. Gordeyev, Notre Dame
15:38-15:58	BREAK		
15:58-16:15	TF		
16:15-16:32	TF	AFOSR - Entropy-conserving Large Eddy Simulation Models for Hypersonic Flows	J. Bellan, Cal Tech
16:32-16:49	TF	ONR - High-Speed High-Reynolds-Number Boundary Layer Measurements and Modeling	R. Bowersox, TAMU
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Agenda Day 4 Thursday, June 26, 2025 Eastern Time (ET)			
Time	Thrust Area	Title	PI/Organization
8:30-8:35	Transition	Introduction to Hypersonic Boundary Layer Transition	Program Officers
8:35-8:52	Transition	AFOSR - Linear modal and non-modal instability analyses of high-speed laminar separated flow over complex geometries. Part II: The HIFiRE-1, ROTEX-T and Oberkampf vehicles	V. Theofilis, Technion, Israel A. Burtsev, UT Austin
8:52-9:09	Transition	ONR - A probabilistic transition model for hypersonic boundary layers (YIP)	A. Towne, U of Michigan
9:09-9:35	Transition	ONR - Receptivity to Breakdown Mechanisms During Transition on Hypersonic Forebodies (Wrap Up)	D. Gaitonde, OSU, S. Unnikrishnan, FSU
9:35-9:52	Transition	ONR - Receptivity and Transition over Blunt Configurations under Noisy and Quiet Hypersonic Conditions	A. Scholten, NIA
9:52-10:09	Transition	ONR - Instability and Receptivity of Complex Hypersonic Flows using Input/Output Analysis	J. Nichols, U of MN
10:09-10:26	BREAK		
10:26-10:46	Transition	AFOSR - Stagnation Point Injection in Hypersonic Flow	B. Schmidt, Case Western U

10:46-11:03	Transition	AFOSR - Effect of Particulates and Free Stream Disturbances on Hypervelocity Boundary Layer Transition (YIP)	B. Schmidt, Case Western U
11:03-11:29	Transition	ONR - Detailed Investigation of Hypersonic Instability, Breakdown, and Natural Transition under Quiet Flow with Simulated Ablation-Gas Injection (YIP) (Wrap Up)	J. Jewell, Purdue U
11:29-11:46	Transition	AFOSR - A Numerical Investigation of Transpiration Cooling for Transitional and Turbulent Flows over Slender Bodies	C. Brehm, U of MD
11:46-12:03	Transition	AFOSR - Boundary Layer Transition 1B (BOLT-1B) Flight Experiment	B. Wheaton, JHU/APL
12:03-13:18	LUNCH		
13:18-13:35	Transition	ONR - Practical Modeling of Hypersonic Boundary Layer Transition and its Impact to Flight Vehicle Performance	N. Bitter, APL
13:35-13:52	Transition	ONR - Optimal receptivity and roughness analyses for transition in high-speed boundary layers (New Start)	T. Colonius, CalTech
13:52-14:02	Transition	ONR - Numerical Investigations of the Nonlinear Transition Stages in Boundary Layers for High Mach Numbers (Wrap Up)	H. Fasel, U of AZ
14:02-14:17	BREAK		
14:17-14:27	Transition	AFOSR - Relaminarization of Hypersonic Boundary Layers by Flow Expansion (New Start)	M. Borg, AFRL
14:27-14:44	Transition	AFOSR - Nozzle Heating and Cooling Patterns for Improved Hypersonic Quiet Wind-Tunnel Design	J. Kuehl, U of Delaware
14:44-15:01	Transition	AFOSR - Investigating the Influence of Tailored Wall Temperature Profiling on Hypersonic Boundary Layer Transition	A. Veeraragavan, U of Queensland, Australia
15:01-15:18	Transition	AFOSR - Boundary Layer Transition induced surface heating on hypersonic vehicles	S. Smith, Howard U
15:18-15:33	BREAK		
15:33-15:43	Transition	AFOSR - Transition to turbulence in high-speed flight: Incoming disturbances and particulates	T. Zaki, APL
15:43-16:00	Transition	ONR - Characterization and optimal design of measurements in transitional high-speed flow (New Start)	T. Zaki, APL
16:00-16:17	Transition	AFOSR - Efficient prediction of hypersonic transition on cones	T. Zaki, APL
16:17-16:34	Transition	ONR - A New Biorthogonal Decomposition Method and DNS Receptivity Studies for Amplitude Method in Hypersonic Boundary-Layer Transition Prediction with Atmospheric Turbulence	X. Zhong, UCLA
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Time	Thrust Area	Title	PI/Organization
8:30-8:47	DFI	AFOSR - Development of Advanced Off-Surface Flow and Thermodynamic Measurements in Hypersonic Environments	J. Sutton, OSU
8:47-8:52	SBLI	Introduction to Shock-Boundary Layer Interactions (SBLI)	Program Officers
8:52-9:09	SBLI	AFOSR - Nonlinear Flow Receptivity in Shock-Wave Boundary-Layer Interaction	G. Rigas(Flavio Savarino), Imperial College, England
9:09-9:26	SBLI	AFOSR - Mach number effects on shock-boundary layer interactions over curved surfaces of supersonic turbine cascades	W. Wolf, Universidade Estadual de Campinas, Brazil
9:26-9:43	SBLI	ONR - Investigation of Transitional SBLI at Mach 5 using Controlled Forcing: Experiments, Simulations and Theory	J. Little, Ohio State University
9:43-10:00	SBLI	ONR - Kinetic Treatment of Sources and Mechanisms that Drive Unsteady, Shock-dominated Flow Instability	D. Levin, UIUC
10:00-10:20	BREAK		
10:20-10:37	SBLI	AFOSR - Turbulent Separation and Unsteadiness in Compound Shock/Boundary Layer Interactions	F. Alvi, FSU
10:37-10:54	SBLI	ONR - Improved Simulation of Internal and External Hypersonic Flows using High-Order Implicit Shock Tracking (YIP)	M. Zahr, Notre Dame
10:54-11:11	SBLI	ARO - Investigation of High-Reynolds-Number, Hypersonic Shock-Wave /Boundary-Layer Interactions through Ballistic-Range and Ground Testing	S. Laurence, U of M
11:11-11:28	FSI	ONR - Droplet Breakup and Evaporation from Unsteady Accelerations in Hypersonic Weather Impacts	J. McFarland, TAMU
11:28-11:33	DFI	Introduction to Diagnostics, Facilities and Instrumentation (DFI)	Program Officers
11:33-11:50	DFI	ONR - Development of spontaneous Raman spectroscopy for optical diagnostics in detonation engines	P. Varghese, UT Austin
11:50-12:16	DFI	ONR - Arc-Jet Freestream Turbulence Characterization and its Influence on Laminar Heating Augmentation in the Stagnation Region ONR - Scaling of Arc-Jet Shock/Freestream Turbulence Interaction and its Effect on Stagnation Heating	L. Maddalena, UTA
12:16-13:31	LUNCH		
13:31-13:48	DFI	ONR - Spectrally-Resolved Laser Diagnostics for High-Enthalpy Flow Measurements	R. Hanson, Stanford U.
13:48-13:58	DFI	ONR - Development and Assessment of Detonation-Drivers for Hypervelocity Expansion Tube Ground Testing (Wrap Up)	J. Shepherd, J. Austin, Caltech
13:58-14:08	DFI	ONR - Masters and STEM Programs in Hypersonic Systems (New Start)	T. Corke, Notre Dame

14:08-14:38	BREAK		
14:38-14:55	DFI	AFOSR - Technology Development for High-Temperature Sensors	M. Sheplak, UF
14:55-15:21	DFI	AFOSR - New Mexico Basic Research Center of Excellence for Hypersonic Sensor Development and Testing (Wrap Up)	J. Frankel, NMSU
15:21-15:40	DFI	AFOSR - "Async-ELF": 10k USD, 1kg, 100kHz-Equivalent 3D Optical Diagnostics for Hypersonic Testing (Wrap-up) / AFOSR - AsyncELF 2.0: Hypersonic Ground-Test and Transonic Flight-Test with the Asynchronous Embedded Light-Field Paradigm (New Start)	Z.P. Tan, National Yang Ming Chiao Tung U, Taiwan
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