



Aerospace Engineering Sciences Building  
University of Colorado Boulder  
3375 Discovery Drive, Boulder, CO 80309

**Agenda Day 1 | Mon., 8 July 2019**

Time	Thrust Area	Title	PI
06:30-08:00		<b>Registration</b>	
08:00-08:10		Welcome and Opening Remarks	Ivett Leyva/ Eric Marineau, AFOSR / ONR
08:10-12:00	MURI REVIEW	Integrated Measurement and Modeling Characterization of Stratospheric Turbulence	B. Argrow, U of Colorado D. Lawrence, U of Colorado G. Rieker, U of Colorado G. Candler, U of Minn. A. Barjatya, ERAU D. Fritts, GATS Inc.
12:00-12:25	STTR Review Balloon-Based	Balloon-Based Disturbance Measurements in the Upper Atmosphere	A. Mangalam, TAO Systems S. Laurence, U of MD
12:25-13:25	<b>LUNCH</b>		
13:25-13:50	SBLI	Wall-Modeled LES for High-Speed Transitional Boundary-Layers Interacting with Incident Shock Waves	P. Moin, Stanford U
13:50-14:15	SBLI	The Effects of Strong Wall Cooling on Supersonic and Hypersonic Shock/Boundary-Layer Interactions	J. Larsson, U of MD
14:15-14:40	SBLI	Experimental Hypersonic SWBLI and Passive Hypersonic Transition Control	A. Wagner, DLR Goettingen
14:40-14:55	<b>BREAK</b>		
14:55-15:20	SBLI	Flow Instability Analyses of Shock-Induced Separation Bubbles	P. Martin, U of MD
15:20-15:45	SBLI	ONR - Experimental Investigation of Unsteadiness in Swept Hypersonic Shock-Wave / Boundary-Layer Interactions	S. Laurence, U of MD
15:45-16:10	SBLI	Investigation of SBLI to Unravel the Physics of Unstart in Axisymmetric Inlets	V. Narayanaswamy, NCSU
16:10-16:25	<b>BREAK</b>		
16:25-17:25	SBLI	A Comprehensive Study of 3-D Shock/Turbulent Boundary Layer Interaction Physics Flow Morphology and System Dynamics through Imposed Disturbances	F. Alvi, FSU D. Gaitonde, OSU N. Clemens, U of TX R. Kumar, FSU B. Thurow, Auburn
		<b>MEETING ADJOURN FOR THE DAY</b>	



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### Agenda Day 2 | Tues., 9 July 2019

Time	Thrust Area	Title	PI
07:30-08:00		<b>Badging &amp; Coffee</b>	
08:00-08:25	SBLI	Global Modal and Non-Modal Instability Analyses of Shock-Induced Separation Bubbles	V. Theofilis, U of Liverpool
08:25-08:50	SBLI	ONR - Characterization of the Structure and Dynamics of Transitional Shock/Boundary Layer Interactions	J. Schmisser, U of TN R. Glasby, U of TN C. Combs, U of TX
08:50-09:15	SBLI	Unsteady Separation Mechanism and Mitigation	J. Poggie, Purdue U
09:15-09:40	SBLI	A Comprehensive Study of Shock-wave-boundary-layer Interactions on Curved Surfaces	R. Kumar, FAMU
09:40-09:55		<b>BREAK</b>	
09:55-10:10	Transition	Instability Free Three-Dimensional Hypersonic Laminar Boundary Layer Steady-States for Linear and Nonlinear Stability Analyses	L. Alves, U Federal Fluminense
10:10-10:35	Transition	The Effect of Multi-mode Induced Transition in a Hypersonic Boundary Layers	S. Smith, Howard U
10:35-11:00	Transition	Plasma-Actuated Flow Control of Hypersonic Crossflow-Induced Boundary-Layer Transition in a Quiet Tunnel	T. Juliano, U of ND
11:00-11:25	Transition	Experimental Studies of BL Instability and Transition in the M-6 Quiet Tunnel	S. Schneider, Purdue U
11:25-12:25		<b>LUNCH</b>	
12:25-12:50	Transition	ONR - Towards a mechanism-based procedure for predicting B/L transition on slender models with highly swept fins	S. Schneider, Purdue U
12:50-13:15	Transition	Non-linear Growth and Breakdown Toward Turbulence in Hypersonic BLs: Investigation of Fundamental Physical Mechanisms	S. Girimaji, TAMU
13:15-13:30	Transition	ONR - Numerical Investigations of Particle Interactions with Navy Relevant High-Speed Flows (YIP) (new start)	C. Brehm, U of Kentucky
13:30-13:55	Transition	ONR - Predicting hypersonic laminar-turbulent transition with direct numerical simulation	J. Poggie, Purdue U L. Duan, MUS&T
13:55-14:10		<b>BREAK</b>	
14:10-14:35	Transition	ONR - Adjoint methods for understanding distributed induced transition in hypersonic B/L	J. Nichols, U of MN

<b>14:35-15:00</b>	Transition	ONR - Understanding hypersonic transition mechanisms through interactions between hydrodynamic, acoustic and thermal mode	D. Gaitonde, OSU
<b>15:00-15:25</b>	Transition	ONR - Real Gas Effects on Sound Radiation By Unstable Modes in Hypersonic Boundary Layers	A. Tumin, U of AZ X. Zhong, UCLA
<b>15:25-15:40</b>	<b>BREAK</b>		
<b>15:40-16:05</b>	Transition	Numerical Investigation of Non-linear Transition Stages in Hypersonic Boundary Layers for Wind-Tunnel and Free-Flight Conditions	H. Fasel, U of AZ
<b>16:05-16:30</b>	Transition	ONR - Numerical investigations of the nonlinear transition stages in hypersonic boundary layers for Navy relevant mach numbers and model geometries	H. Fasel, U of AZ
<b>16:30-16:55</b>	Transition	Boundary Layer Transition Control Using CC-SiC	A. Wagner, DLR Goettingen
<b>16:55-17:25</b>	Transition	Direct Numerical Simulation of Hypersonic Transition Delay Over Carbon/Carbon Ultrasonically Absorptive Coatings (AFOSR) and Progress on Ultrasonic Benchtop Experiments (ONR)	C. Scalò, Purdue U
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**Agenda Day 3 | Wed., 10 July 2019**

Time	Thrust Area	Title	PI
07:30-08:00		<b>Badging &amp; Coffee</b>	
08:00-08:25	Transition	High Reynolds Number Quiet Mach 6 Nozzle Fabrication and Natural Transition Experiments	T. Corke, U of ND
08:25-08:40	Transition	ONR - High Reynolds Number Quiet MACH 6 Swept-Fin Cone Experiments: Flow Instabilities and Transition Control (New Start)	T. Corke, Notre Dame
08:40-09:05	Transition	ONR - Nonlinear interaction between first and Mack-mode instabilities in high-supersonic flow	A. Craig, U of AZ
09:05-09:30	Transition	ONR - Secondary Instabilities of Hypersonic Crossflow Vortices (YIP)	A. Craig, U of AZ
09:30-09:45		<b>BREAK</b>	
09:45-10:10	Transition	ONR - Input/Output Analysis of Complex Hypersonic Boundary Layers	G. Candler, U of MN J. Nichols, U of MN
10:10-10:35	Transition	Laminar-to-Turbulent Transition in Hypersonic Boundary Layers with Spanwise Inhomogeneity	R. Kimmel, AFRL/RQ
10:35-10:50	Transition	Development of 3-D Freestream Receptivity DNS Database for Hypersonic Flow over Spherical and Elliptical Cones (new start)	X. Zhong, UCLA
10:50-11:15	Transition	ONR - Hypersonic Finned Cones	H. Reed, TAMU
11:15-12:15		<b>LUNCH</b>	
12:15-12:40	Transition	Radiative and Dispersive Behavior of Instabilities in a Highly Cooled Hypersonic Boundary Layer	N. Parziale, Stevens I Tech
12:40-13:05	Transition	ONR - Global stability and sensitivity analysis of a hypersonic slender cone	P. Moin, Stanford U
13:05-13:30	Transition	ONR - Nonlinear optimization in high-speed B/L: The most unstable nonlinear disturbances & robust flow design	T. Zaki, JHU
13:30-13:45	TF	T. Zaki, JHU-Fidelity Predictions of Hypersonic Transition: Embedded Measurements and Optimal Sensing (new start)	T. Zaki, JHU
13:45-14:00		<b>BREAK</b>	
14:00-14:45	TF	A Multiscale Morphing Continuum Analysis on Energy Cascade of Compressible Turbulence (YIP)	J. Chen, U of Buffalo

14:25-14:50	TF	Collaborative Research: Effects of wall curvature on hypersonic turbulent spatially-developing boundary layers	J. Araya, U of PR K. Jansen, U of Colorado
14:50-15:05	TF	HVSI - Development of a RANS-Based Wall-Modeled LES Approach for Hypersonic Flows (new start)	C. Brehm, U of Kentucky P. Ireland, Oxford U N. Ashton, Oxford U
15:05-15:20	<b>BREAK</b>		
15:20-15:35	TF	HVSI - Development of Physics-Based Turbulence Models for Hypersonic Flows (new start)	G. Candler, U of MN
15:35-15:50	TF	HSVI - Turbulence Modeling for Hypersonic Flows (new start)	J. Komives, AFIT M. Reeder, AFIT K. Gross, AFIT
15:50-16:05	TF	HVSI - Reynolds-Averaged Navier-Stokes Based Turbulence Modeling for High-Speed Configurations (new start)	D. Gaitonde, OSU G. Candler, U of MN
16:05-16:20	<b>BREAK</b>		
16:20-16:35	TF	HVSI - Development of Improved RANS and Hybrid LES/RANS Turbulence Models for Hypersonic Flow Applications (new start)	J. Edwards, NCSU D. Stefanski, U of Tennessee
16:35-16:50	TF	HVSI - Evaluation of State-of-the-Art Hypersonic Turbulence Modeling Using M = 6 Benchmark Experiments (new start)	M. Semper, USAFA J. Seidel, USAFA
16:50-17:05	TF	ONR / HVSI - Hypersonic Turbulent Heat Transfer Prediction and Validation (new start)	R. Bowersox, TAMU
17:05-17:20	TF	ONR - Simulation and Modeling of Hypersonic Turbulent Boundary Layers Subject to Pressure Gradient and Wall Cooling (new start)	L. Duan, MUS&T
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**Agenda Day 4 | Thu., 11 July 2019**

Time	Thrust Area	Title	PI
07:30-08:00		<b>Registration</b>	
08:00-08:25	TF	Structure and Modeling of Hypersonic Boundary Layers in Transitional and Turbulent Regimes	P. Subbareddy, NCSU
08:25-08:50	TF	Resolvent Analysis for Compressible Wall Turbulence	B. McKeon, CalTech
08:50-09:15	TF / NEE	Examining Growth of Turbulence over Heated Walls in Hypersonic Flows / Rapidly Expanding Non-Equilibrium Hypersonic Flow	A. Veeraragavan, U of Queensland
09:15-09:40	FSI	Structural-Scale Modeling and Experiments for Hypersonic Vehicles	M. Spottswood, AFRL/RQ
09:40-09:55		<b>BREAK</b>	
09:55-10:20	FSI	An Experimental/Computational Investigation of the Response of a Compliant Panel to Turbulent and Transitional Shockwave/ Boundary-Layer Interactions in Hypersonic Flow	S. Laurence, U of MD D. Bodony, UIUC
10:20-10:45	FSI	Reduced Order Modeling for Hypersonic Aeroelasticity	P. Tiso, ETH, Switzerland
10:45-11:10	FSI	Multi-Physics Modeling and Analysis of Munitions in Extreme Environments	D. Reasor, AFRL/RW
11:10-11:35	FSI	Dynamics of Interactions Between Turbulent Boundary Layers and Compliant Surfaces	J. McNamara, OSU
11:35-12:35		<b>LUNCH</b>	
12:35-13:00	FSI	ONR - Aero-Thermo-Servo-Elastic Analysis and Optimization for High Speed Vehicles	D. Mavriplis, U of WY R. Fertig, U of WY M. Garnich, U of WY
13:00-13:25	FSI	Unit Cases to Investigate Hypersonic Fluid-Structure Interaction	A. Neely, UNSW, Australia
13:25-13:40	FSI	Investigations of Structural and Aerodynamic coupling over panels and control surfaces of hypersonic vehicles	V. Narayanaswamy, NCSU
13:40-14:05	FSI	Luminescence-based Pressure and Strain Measurement for Fluid-structure Interactions	P. Hubner, U of AL
14:05-14:30	DFI	Imaging Non-Equilibrium States in Hypersonic Flow by Slow Light Imaging Spectroscopy (SLIS)	R. Miles, Princeton
14:30-14:45		<b>BREAK</b>	

14:45-15:10	DFI	Instantaneous Velocity Profiles of Wall-Bounded Shear Flows in Thermochemical Non-Equilibrium	N. Parziale, Stevens I Tech
15:10-15:35	DFI	High-Repetition-Rate Imaging of Hypersonic Flow, Boundary-Layer Structures, and Velocity Profiles	S. Grib, AFRL/RQ
15:35-16:00	DFI	ONR - Advancing transition experiments in high enthalpy flows	J. Austin, Caltech J. Shepherd, Caltech H. Hornung, Caltech
16:00-16:25	DFI	ONR - Laminar flow control in hypersonic quiet nozzle using wall suction: feasibility studies	S. Schneider, Purdue U
16:25-16:40	<b>BREAK</b>		
16:40-16:55	DFI	ONR - Arc-Jet Flow Characterization (new start)	L. Maddalena, UTA
16:55-17:10	Propulsion	ONR - Combustion in Solid Fuel Ramjets (New Start)	S. Heister, Purdue C. Slabaugh, Purdue
17:10-17:25	Propulsion	ONR - Combustion Behavior Within a Solid-Fuel Ramjet at High Altitudes (New Start)	D. Kessler, NRL R. Johnson, NRL G. Goodwin, NRL
17:25-17:50	Propulsion	Inlet Isolator and Combustion Physics at Take-Over Region of Scramjet Engines	T. Lee, UIUC V. Narayanaswamy, NCSU
		<b>MEETING ADJOURN FOR THE DAY</b>	





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**Agenda Day 5 | Fri., 12 July 2019**

Time	Thrust Area	Title	PI
07:30-08:00		<b>Registration</b>	
08:00-08:15	NEE	Formulation of a General Collisional-Radiative Model for NO to Study Non-Equilibrium, Hypersonic Flows (new start)	D. Levin, UIUC
08:15-08:40	NEE	Sensitivity to Model Parameters and Roughness in Finite-Rate Reacting Hypersonic Flows	P. Schmid, Imperial College
08:40-09:05	NEE	Determination of Key Physics for Nonequilibrium Modeling of Hypersonic Air	I. Wysong, AFRL/RQ
09:05-09:30	NEE	Nonequilibrium Kinetics in High-Enthalpy Air	T. Schwartzenruber, U of MN G. Candler, U on MN D. Truhlar, U on MN
09:30-09:45		<b>BREAK</b>	
09:45-10:10	NEE	Turbulence Control Through Thermal Non-Equilibrium: Molecular Relaxation Models and Implications for Turbulence	D. Donzis, TAMU
10:10-10:35	NEE	Multi-Step Computational Modeling and Shock-Tube Study of Energy Transfer Processes in High-Enthalpy Air	I. Boyd, U of MI
10:35-11:00	NEE	Molecular Energy Transfer Processes in Non-Equilibrium Hypersonic Flows	I. Adamovich, OSU
11:00-11:25	NEE	Characterizing Energy Storage and Exchange Mechanisms for High-Speed ISR Missions	E. Josyula, AFRL/RQ
11:25-12:25		<b>LUNCH</b>	
12:25-12:40	NEE	Spectroscopic Measurements and Nonequilibrium Modeling for High-Enthalpy Air (new start)	J. Austin, Caltech T. Schwartzenruber, U of MN D. Truhlar, U of MN
12:40-12:55	NEE	Compressing and Expanding Non-Equilibrium Flows	L. Doherty, Oxford
12:55-13:20	NEE	Modeling of Non-Equilibrium Hypersonic Air Flows by means of Multi-Group Maximum Entropy Method	M. Panesi, UIUC
13:20-13:45	NEE	ONR - Hybrid DSMC/CFD Method Development for High Altitude Hypersonic Flows	G. Candler, U of MN T. Schwartzenruber, U of MN
13:45-14:10	NEE	Validation of Hypersonic Flow Simulations via Molecular-Scale Physics	G. Candler, U of MN



<b>14:10-14:25</b>	<b>BREAK</b>		
<b>14:25-14:50</b>	GSI	Nonequilibrium Gas-Surface Interactions at High Temperature	T. Schwartzenruber, U of MN
<b>14:50-15:15</b>	GSI	High-Fidelity Quantitative Measurements of Hypersonic Carbon Ablation (YIP)	F. Panerai, UIUC
<b>15:15-15:40</b>	GSI	ONR - Combined Computational and Experimental Study of UHTCs for Thermal Protection of Hypersonic Vehicles	I. Boyd, U of MI D. Fletcher, U of VT
<b>15:40-15:55</b>	<b>BREAK</b>		
<b>15:55-16:20</b>	GSI	Nonequilibrium Gas-Surface Interactions at High Temperature, VKI Plasmatron facility and MUTATION++ Library	G. Bellas, VKI G. Grossir, VKI
<b>16:20-16:45</b>	GSI	Carbon Oxidation in Extreme Environments	J. Grana-Otero, U Kentucky
<b>16:45-17:10</b>	GSI	Fundamental Energy Transfer Mechanisms in High Temperature Phonon-Mediated Gas-Surface Interactions (YIP)	K. Stephani, UIUC
		<b>MEETING ADJOURN</b>	