



**Basic Research Innovation and Collaboration Center (BRICC)
4075 Wilson Blvd., Suite 350 | Liberty Room
Arlington, VA 22203**

Agenda Summary: AFOSR/ARO/NSF basic Combustion Research Review is an annual review meeting covering a wide range of on-going efforts in basic combustion research. The reviewed efforts are selected jointly by respective program officers/managers to highlight achievements from their portfolios. Presentations are also invited to provide scientific background and state-summary of special areas of interest to foster innovative ideas and establish new directions.

This year, a key focal area is turbulent combustion, including a summary presentation of the on-going workshop on turbulent flame structure and dynamics for understanding key turbulent flame attributes and defining modeling requirements/assumptions for LES and other modeling approaches. In addition, the meeting highlights efforts in rotational detonation engine, combustion diagnostics, high-pressure combustion and pathway centric combustion chemistry, especially HyChem based real fuel models and its extension to low-temperature combustion chemistry, NO_x and soot chemistry.

In view of compact time allocations, presenters should focus on key scientific contents of their research efforts, rather than obvious introductions and backgrounds. Normal 25 min slots have the presentation time around 20min, allowing about 5min Q&A/discussion. Extended 40min slots have the presentation time around 30min, allowing about 10min Q&A/discussion. Session chairs will strictly enforce the time allocation. Lunch will be provided at the meeting site at cost and lunch orders will be collected NLT the morning break before the respective lunch break.

Agenda Day 1 | June 7, 2017

Time	Title	Speaker
0730-0745	Registration	
0745-0800	Opening Remarks	Ralph Anthenien, ARO, Song-Chang Kong, NSF and Chiping Li, AFOSR
Turbulent Combustion (Chair, Chiping Li)		
0800 - 0945	Summary on Turbulent Flame Structure and Dynamics Workshop followed by Q&A and discussion	Jackie Chen, Jim Driscoll, Peter Hamlington, Alan Kerstein, Tianfen Lu, Alexei Poludnenko, Venke Sankaran, Adam, Sternberg, Jeff Sutton, Hai Wang, Forman Williams, and Xinyu, Zhao
0945 - 1000	BREAK	
1000 - 1025	Basic Turbulent Combustion Research at AFRL	Venke Sankaran, AFRL/RQ

1025 - 1050	Spatial-Temporal Behavior of Turbulent Non-Premixed Jet Flames and Auto-Igniting Fuel Jets	James Driscoll, Michigan
1050 - 1115	Interaction of Flow Turbulence with Preheat and Reaction Zones	Jeff Sutton, OSU
1115 - 1140	Premixed Flame Structure and Propagation Characteristics in Intense Turbulence and in Compressible Flows	Suresh Menon, Georgia Tech and Robert Pitz, Vanderbilt
1140 - 1205	Structure and Dynamics of Highly Turbulent, Interacting Flames	Jacqueline O'Connor, PennState
1205 - 1300	LUNCH	
Turbulent Combustion (Chair, Jim Driscoll)		
1300 - 1325	Dynamics of Turbulent, Aerodynamically Stabilized Flames	Timothy Lieuwen, GaTech
1325 - 1350	High-Speed Compressible Turbulent Combustion	Kareem Ahmed, UCF
1350 - 1415	Energy and Momentum Exchanges in Turbulent Combustion	Carlos Pantano, UIUC
1415 - 1440	Energy Backscatter and Small/Large-Scale Interactions in Turbulent Reacting Flows	Javier Urzay and Matthias Ihme, Stanford
1440 - 1500	BREAK	
AFOSR/NSF Joint Turbulent Combustion Initiative (Chairs: Song-Chang Kong)		
1500 - 1540	Spectral Energy Transfer in Turbulent Flames	Jennifer Smolke, USC, Guillaume Blanquart, Caltech and Fokion Egolfopoulos, USC
1540 - 1620	Turbulent Flame Structure of Cavity Stabilized Reacting Shear Layers	Hasha Chelliah UVa, Chris Goynes, UVa, Andrew Cuttler, GWU, and Jack Edward, NCSU
1620 - 1700	Experiments and Theory of Non-Equilibrium Processes in Turbulent Combustion	Venkat Raman, Michigan and Noel Clemens, UT Austin
1700	MEETING ADJOURN FOR THE DAY	

Agenda Day 2 | June 8, 2017

Time	Title	Speaker
0730-0755	Registration	
0755-0800	Daily Announcements	Ralph Anthenien/ARO, Song-Chang Kong, NSF and Chiping Li, AFOSR
Combustion Diagnostics (Chair, Ron Hanson)		
0800 - 0825	Ultra-Fast Optical Approaches for Fundamental Exploration of Combustion Chemistry Pathways	James Gord, AFRL/RQT and Sukesh Roy, Spectral Energy
0825 - 0850	Applications of Frequency Combining in Combustion Diagnostics	Greg Rieker, University of Colorado, Boulder
0850 - 0915	Particle-Free Spatially-Resolved Two-Component Velocimetry	Mirko Gamba, Michigan
0915 - 0940	Composition-Pressure Measurements Using Line-Shape Information	Venkateswaran Narayanaswamy, NC State
0940 - 1005	Spatially and Temporally Resolved Imaging of Primary Breakup in High-Pressure Fuel Sprays	Caroline Genzale, GaTech
1005 - 1020	BREAK	
Combustion Chemistry (Chair: Peter Lindstedt)		
1020 - 1045	Next Generation Chemical Kinetics Transport, and Reacting---Flow Software Tools for Chemical-Thermal and Chemical-Electric Energy Systems	Bob Kee, CSM
1045 - 1110	HyChem, a Pathway Centric Combustion Chemistry Model: Its Foundation and Recent Development for Low-Temperature Combustion Chemistry, NO _x and Soot	Hai Wang, Stanford
1110 - 1135	HyChem Model Details for Air Force Real Fuels: JPx and RPx	Rui Xu, Stanford
1135 - 1200	Importance of Temperature and Pressure Quantifications in Speciation Measurements, Spectroscopic Details of Simultaneously C ₂ H ₄ /CH ₄ /C ₃ H ₈ measurements and Diagnostic Road to Total Carbon Accounting	Ron Hanson, Stanford
1200 - 1225	Effects of Explosive Ozonolysis Reactions on Jet Flame Stabilization	Wenting Sun, GaTech
1225 - 1330	LUNCH	
Detonation (Chair: Malissa Lightfoot)		
1330 - 1355	Recent development in RDE Research	Fred Schauer, AFRL/RQT
1355 - 1420	AFOSR-RQR Rotational Detonation Rocket Engine (RDRE) Initiative	Alex Schumaker, AFRL/RQR

1420 - 1445	Rotational Rocket Detonation Engine Demonstration Experiments	Steve Heister, Purdue
1445 - 1510	Supersonic Combustion and Detonation	Ken Yu, Maryland
1510 - 1535	Insights into the Structure of Rotating Detonation Wave obtained from 3D Simulations	Vish Katta, AFRL/RQT
1535 - 1600	Warsar, Influence of Sizing on Rotating Detonation Combustor Performance	Piotr Wolanski, Institute of Aviation
1600 - 1615	BREAK	
1615 - 1700	Q&A on AFOSR/ARO/NSF Combustion Research Portfolios	
1700	MEETING ADJOURN FOR THE DAY	

Agenda Day 3 June 9, 2017		
Time	Title	Speaker
0730-0755	Registration	
0755-0800	Daily Announcements	Ralph Anthenien/ARO, Song-Chang Kong, NSF and Chiping Li, AFOSR
High-Pressure and Multiphase Combustion (Chair; Ralph Anthenien)		
0800 - 0825	Liquid fuel Atomization, Evaporation and Ignition at Highly Turbulent and Critical Pressure and Temperature Conditions	Yannis Hardalupas, Imperial College
0825 - 0850	Ballistic Holography under Realistic Spray Conditions	Derek Dunn-Rankin, UC Irvine
0850 - 0915	AFRL/RQR, High-Pressure Non-Equilibrium Energy Conversion	Malissa Lightfoot
0915 - 0940	High Pressure Ring Contraction of Cyclic Hydrocarbons	Ken Brezinsky, UIC
0940 - 1005	Plasma-Enhanced Flames at Elevated Pressure	Sally Bane, Purdue

1005 - 1020	BREAK	
Combustion in High-Speed Flows (Chair, Jim Miller)		
1020 - 1045	Scramjet Combustion Research	Michael Smart, Vince Wheatley and Anand Veeraragavan, University of Queensland
1045 - 1110	Flow/Shock Structure and Dynamics in High-Speed Asymmetric Duct Flow	Tonghun Lee, UIUC and Venkateswaran Narayanaswamy, NC State
1110 - 1135	Ignition in High-Speed Reacting Flows - Key Physics	Tim Ombrello, AFRL/RQH
Combustion Numerics (Chair, Jim Miller)		
1135 - 1200	Mesh-Sequenced Realizations for Evaluation of Subgrid-Scale Models for Turbulent Combustion (Short Term Innovative Research program)	Jack Edwards, NCSU
1200 - 1225	Multiscale and Correlated Dynamic Adaptive Chemistry and Transport Modeling of Ignition and Flame Regimes of Stratified Fuel Mixtures	Yiguang Ju, Princeton
1225 - 1230	Discussion and Concluding Remark	
1230	MEETING ADJOURN	