Agenda Day 1 | August 10, 2020
All times are EDT

Time	Topic	Speaker
9:30-10:00	**Zoom Login**	
10:00	**Welcome**	Col Jason Mello, AFOSR/RT Chief Dr. Fariba Fahroo, AFOSR
10:20	**(YIP)** Extracting Models with Theoretical Guarantees for Data-Driven Discovery of Dynamical Systems	Hayden Schaeffer (CMU)
10:45	**(YIP)** Learning with Arbitrary Tensor Networks	Alex Gorodetsky (University of Michigan)
11:10	**(YIP)** When and Why PINNs Fail to Train: A Neural Tangent Kernel Perspective	Paris Perdikaris (University of Pennsylvania)
11:30	**BREAK**	
11:45	**(YIP)** Data-Infused Fractional PDE Modelling and Simulation: from Uncertainty Quantification to Uncertainty Qualification	Mohsen Zayernouri (Michigan State University)
12:10	**(YIP)** Operational Dynamical Modelling: Driven Imposters	Denys Bondar (Tulane University)
12:35	**LUNCH**	
13:00	**(YIP)** Active Sampling Methods for Bayesian Learning and Rare Event Statistics	Antoine Blanchard Themis Sapsis (MIT)
13:25	Unconditionally Energy stable SAV Schemes for Gradient Systems With Global Constraints	Jie Shen (Purdue University)
13:45	More Accurate Multi-scale Higher Order Methods for Under-resolved Simulations	Jennifer Ryan (Colorado School of Mines)
14:05	Robust and Scalable Multi-Fidelity Algorithms for Model-Based Predictions	Akil Narayan (University of Utah) Alireza Doostan (UC Boulder)
14:30	**BREAK**	
15:10	New Lab Projects	Chris Schrock (AFRL/RQ) Amanda Criner (AFRL/RX) Daniel Reasor (AFRL/RW)
15:45	**MURI:** A Unified Mathematical and Algorithmic Framework for Managing Multiple Information Sources of Multi- physics Systems	Karen Willcox (UT Austin)
16:30	Discussions On UQ, ROMs, ML	

18:00	MEETING ADJOURN FOR THE DAY

Agenda Day 2 | August 11, 2020 All times are EDT		
Time	**Topic**	**Speaker**
9:30-10:00	**Zoom Login**	
10:00	A Data-Driven Approach to Correlated Quantum Many-Body Problems	George Booth (King's College)
10:25	Transfer of Quantum Information Between Scales	Brian Swingle (University of Maryland, College Park)
10:50	Structure-Preserving Reduced Order Models	Jan Hesthaven (EPFL)
11:15	Information Divergences, Mass Transport Metrics and Their Interpolations for Enhanced Learning	Markos Katsoulakis, Luc Rey-Bellet (U Mass- Amherst), Paul Dupuis (Brown University)
11:50	LUNCH	
12:40	Program Status Update	Fariba Fahroo (AFOSR)
13:00	Using Continuum Limits To Understand Data Clustering And Classification	Franca Hoffmann, Andrew Stuart (Caltech)
13:25	Games for Computation and Learning: Do ideas have shape? Idea Formation is the Continuous Limit of Artificial Neural Networks	Houman Owhadi (Caltech)
13:50	Efficient Numerical Methods for Stochastic Equations in Irregular and Moving Domains	Zhongqiang Zhang (WPI)
14:15	Data Driven Governing Equation Recovery using Deep Neural Networks	Dongbin Xiu (Ohio State University)
14: 40	BREAK	
15:10	Deep Learning for Multiscale Computing	Nathan Kutz (University of Washington)
15:35	Progress on Inverse Lax-Wendroff Procedure for Numerical Boundary Conditions	Chi-Wang Shu (Brown University)
16:00	**MURI:** Progress in the Quantum Many-Body Description of Strongly Correlated and Complex	Garnet Chan (Caltech)

	Materials	
16:45	**Discussions –** Denys Bondar	
18:00	**MEETING ADJOURN FOR THE DAY**	

Agenda Day 3 | August 12, 2020 All times are EDT		
Time	**Topic**	**Speaker**
9:30-10:00	**Zoom Login**	
10:00	Advances in O(N) Implicit Wave Solvers for Modeling Magnetrons	Andrew Christlieb (Michigan State University)
10:25	Eulerian Lagrangian Discontinuous Galerkin Method for Nonlinear Vlasov Dynamics	Jingmei Qiu (U. Delaware)
10:50	Computational Mathematics of Fiber Laser Amplifiers	Jacob Grosek (AFRL/RD)
11:15	Simulation of High Power Optical Fiber Amplifiers	Leszek Demkowicz (UT Austin) Jay Gopalakrishnan (Portland State University)
11:40	Optimal Mass Transport: Biology, Engineering, Physics	A. Tannenbaum (Stony Brook University), Tryphon Georgiou (UC Irvine)
12:05	**LUNCH**	
12:45	Fast Methods for the Boltzmann Equation	Aihua Wood (AFIT), Alex Aleseenko (CSU Northridge)
13:10	High Information Bandwidth Adaptive Hybrid Kinetic Simulation	Robert Martin (AFRL/RQRS)
13:35	SSP Two-derivative Error Inhibiting Schemes with Post-processing	Sigal Gottlieb (U Mass, Dartmouth)
14:00	Positive Asymptotic Preserving Approximation of the Radiation Transport Equation	Jean-Luc Guermond, Bojan Popov (TAMU)
14:25	**BREAK**	

14:25-16:15	**New Directions in Computational Math (10 minute presentations)**	
	Karthik Duraisamy	
	Jean-Luc Guermond	
	Chi-Wang Shu	
	Jingmei Qiu	
	Andrew Christlieb	
16:15	**BREAK**	
16:20	Tensor-structured Techniques for Large-scale Electronic-Structure Calculations	Vikram Gavini (University of Michigan)
16:45	Learning on Dynamic Manifolds	Daniel Tartakovsky (Stanford University)
17:10	Dynamic Tensor Approximation of High-dimensional Nonlinear PDEs	Daniele Venturi (UC Santa Cruz)
17:35	Discussions	
18:00	**MEETING ADJOURN FOR THE DAY**	

Agenda Day 4 | August 13, 2020 **All times are EDT**		
Time	**Topic**	**Speaker**
9:30-10:00	**Zoom Login**	
10:00	Radial Basis Functions for Numerical Simulation	Benjamin Akers (AFIT)
10:25	Adaptive Multi-Fidelity Methods for Physics-Based Decision-Making	Chris Schrock, Phil Beran, Ed Forster (AFRL/RQVC)
10:50	Koopman Mode Analysis of Spatially Extended Dynamical Systems with Applications to Agent-Based Models	Maria Fonoberova (AIMDyn Inc.)
11:15	Accelerated Stochastic Gradient Descent Algorithms	Adam Oberman (McGill University), Stan Osher (UCLA)
11:40	Beyond Noise: How Generative Models can Strengthen Computational Mathematics in Situations with Complex Noise Processes and Extremes	Neil Johnson (GWU)

12:00	LUNCH	
12:45	**MURI**: Innovations in Mean-Field Game Theory for Scalable Computation and Diverse Applications	Stan Osher (UCLA)
13:45	**MURI:** Learning and Meta-Learning of Partial Differential Equations via Physics-Informed Neural Networks: Theory, Algorithms, and Applications	George Karniadakis (Brown University)
14:10	Multi-Physics Models with Stochastic Forcing	Guus Jacobs (SD State University)
14:35	New Approach for Modeling Ductile Damage	Oana Cazacu (UFL- REEF)
15:00	BREAK	
15:25	An Integrated Computational Framework for Modeling Materials with Complex and Evolving Microstructures	Soheil Soghrati (Ohio State University)
15:50	PROM-Based Framework for MDAO Problems: Piecewise-Global Reduced-Order Bases, New Take on Active Subspaces, and Embedded Boundary Method for CFD with Smoothness	Charbel Farhat (Stanford University)
16:15	DNN Surrogates and Transport-Driven Conditional Density Estimation for Bayesian Inverse Problems and Optimal Experimental Design	O. Ghattas (UTA), Y. Marzouk (MIT)
16:50	BREAK	
17:00	Interscale Turbulence-Chemistry Dynamics with Reduced Basis Representations for Application to LES Modeling	Jim Brasseur (UC Boulder), Yuan Xuan (Penn State University
17:20	Implicit Discontinuous Galerkin Methods for Simulating Turbulent Flows at High Reynolds Number On Graphics Processors	J. Peraire, N. C. Nguyen (MIT)
17:40	Discussions on CFD for High Speed Flow	
18: 30	MEETING ADJOURN FOR THE DAY	

Propulsion and Power

High Pressure Combustion Dynamics Review, 14 August 2020, Friday

11:00 am – 12:30 pm **Center of Excellence on Rocket Combustor Dynamics**

Joint Center Propulsion and Power, Computational Mathematics, and AFRL /RQRC

Duraisamy (Univ. of Michigan), Willcox (Univ. of Texas), Peherstorfer (NYU), Anderson (Purdue University)

12:30 pm-1:00 pm **DISCUSSION**

1:00 pm - 1:30 pm **BREAK**

1:30 pm - 2:00 pm **Dynamics of High Pressure Reacting Shear Flows**

Talley, Munipalli, AFRL/RQRC

2:00 pm - 2:30 pm **High Fidelity Modeling and Simulation of Supercritical Turbulent Combustion**

Yang, Oefelein, Menon, Georgia Tech

2:30 pm - 3:00 pm **DISCUSSION / BREAK**

3:00 pm - 3:30 pm **High-Pressure LPRE Combustion Dynamics: Low-Cost Computation and Stochastic Analysis**

Sirignano, Sideris, UCI, Kassoy (Innovative Science Solutions LLC)

3:30 pm - 4:00 pm **High-pressure Chemistry, Transport and Flame Dynamics in LRE Combustion Instability**

Law, Princeton

4:00 pm - 4:30 pm **DISCUSSION / BREAK**

4:30 pm - 5:00 pm **Exploration of Acoustically Coupled Combustion Instabilities Relevant to Rocket Propulsion Systems**

Karagozian / UCLA

5:00 pm – 5:30 pm **Studies of Finite-Rate Effects Relevant to Modeling of Liquid-Propellant Rocket Combustion Instabilities**

Sanchez, Williams (UCSD)

5:30 pm – 6:00 pm **DISCUSSION**