

# 2021 Dynamical Systems and Control Theory Program Review

Dr. Fred Leve | September 20-22, 2021 | Shalimar, FL / "Hybrid"

## Agenda Day 1 | September 20, 2021

Time	Topic	Speaker
7:45-8:00	Set up	
8:00-8:10	<b>INTRODUCTIONS</b>	Frederick Leve, AFOSR
8:10-8:35	Fluid Flow on Geometric Rough Paths	James Michael Leahy, Imperial College London
8:35-9:00	Multi-agent Cooperation in Adversarial Scenarios	Eloy Garcia, AFRL/RQ
9:00-9:25	Multi-Player Pursuit-Evasion Differential Games	Meir Pachter, AFIT
9:25-9:50	Solvable Linear-Quadratic Control and Generalizations for Systems with non-Gaussian Noise	Tyrone Duncan & Bozena Pasik-Duncan, KU
9:50-10:00	<b>Coffee Break (Lobby ONLY)</b>	
10:00-10:25	Graphon Mean Field Game Theory: Recent Progress	Peter Caines, McGill
10:25-10:50	Characterizing Long-term Behavior of Population Games: New Methods and Applications	Nuno Martins, UMD
10:50-11:15	Prescribed-Time Control and Safety	Miroslav Krstic, UCSD
11:15-11:40	Attacks on Learning in Multi-agent Systems	Vijay Gupta, Notre Dame
11:40-1:10	<b>Lunch (Outside the REEF)</b>	
1:10-1:35	Recent Progress on Numerical Methods in Stochastic Systems: Adaptive Optimization, Inverse Reinforcement Learning, and Controls under Partial Observations	George Yin and Le Yi Wang, Wayne State and Uconn
1:35-2:00	V&V and Model Calibration of Data-scarce Noisy Chaotic Systems	Daniel Eckhardt, AFRL/RQ
2:00-2:25	Boundary Control of the Wave Equation via Linear Quadratic Regulation	Art Krener, UC Davis
2:25-2:50	Exponential Turnpike Property of Fractional Control Problems	Mahamadi Warma, GMU
2:50-3:00	<b>Coffee Break (Lobby ONLY)</b>	
3:00-3:25	On Distributed Observers	Steve Morse, Yale

3:25-3:50	Data-driven Estimation of Forward Reachable Sets	Murat Arcak, UC Berkeley
3:50-4:15	Conversion of Second-Order HJ PDEs into First-Order HJ PDEs	Bill McEneaney, UCSD
4:15-4:40	Mechanism Design for Multiagent Coordination	Jason Marden, UCSB
4:40	<b>MEETING ADJOURN FOR THE DAY</b>	



**Agenda Day 2 | September 21, 2021**

Time	Topic	Speaker
7:45-8:00	<b>Set-up</b>	
8:00-8:05	Morning Welcome and Discussions	Frederick Leve, AFOSR
8:05-8:30	A Systems Theory Approach to the Synthesis of Minimum Noise Non-Reciprocal Phase-Insensitive Quantum Amplifiers	Ian Peterson, ANU
8:30-8:55	Viability and Invariance in Wasserstein Space $P_2(\mathbb{R}^d)$	Helene Frankowska, CNRS U Paris
8:55-9:20	Autonomous Guidance and Targeting by Semi-algebraic Methods	Emmanuel Trelat, U Sorbonne
9:20-9:45	Dissipativity Theory for Discrete-Time Nonlinear Stochastic Dynamical Systems	Wassim Haddad, GaTech
9:45-9:55	<b>Coffee Break (Lobby ONLY)</b>	
9:55-10:20	Safe Reinforcement Learning Benchmark Environments for Aerospace Control Systems	Kerianne Hobbs, AFRL/ACT3
10:20-10:45	Interplay of Curvature and Control Towards 2D3D Vision	Romeil Sandhu, Stoneybrook U
10:45-11:10	Topological Entropy of Switched Nonlinear Systems	Sayan Mitra and Daniel Liberzon, UIUC
11:10-11:35	Spectral Uncertainty Propagation for Stochastic Hybrid System on a Lie Group	Taeyoung Lee and Melvin Leok, GWU and UCSD
11:35-1:05	<b>Lunch (Outside the REEF)</b>	

1:05-1:30	Developments in Shrinking Horizon Model Predictive Control	Ilya Kolmanvsky, U Mich
1:30-1:55	Occupation Kernels and Liouville Operators for Spectral Decomposition of Systems with Control	Rushi Kamalapurkar and Joel Rosenfeld, U Oklahoma and USF
1:55-2:20	Hilbert Space Concepts for Nonlocal and Nonlinear Dynamical Systems	Joel Rosenfeld, USF
2:20-2:45	Toward Interactive Control	David Spivak, MIT
2:45-2:55	<b>Coffee Break (Lobby ONLY)</b>	
2:55-3:20	Direct Adaptive Control of Nonlinear Systems with Uncertain Unstable Zero Dynamics	Dennis Bernstein and Jessie Hoagge, U Mich and U Kentucky
3:20-3:45	Learning-based Planning and Control for Persistent Safety of UASs	Naira Hovakimyan, UIUC
3:45-4:10	Synthesis and Analysis of Multi-Agent Systems under Spatial and Temporal Specifications	Dimitra Panagou, U Mich
4:10-4:35	Estimating High Probability Reachable Sets with Mixed Monotone Systems Theory	Sam Coogan, GaTech9
4:35	<b>MEETING ADJOURN FOR THE DAY</b>	

 <b>2021 Dynamical Systems and Control Theory Program Review</b> Dr. Fred Leve   September 20-22, 2021   Shalimar, FL / "Hybrid"		
<b>Agenda Day 3   September 22, 2021</b>		
Time	Topic	Speaker
7:45-8:00	<b>Set-up</b>	
8:00-8:05	Morning Welcome and Discussions	Frederick Leve, AFOSR
8:05-8:30	Quantifying Nonequilibrium Dynamics of Stochastic Systems with Partial Information	Gili Bisker, Tel Aviv University
8:30-8:55	Verified Optimization	Jeremy Avigad and Alexander Bentkamp, CMU
8:55-9:20	Gaussian Belief Space Path Planning for Minimum Sensing Navigation	Tanaka Takashi, UT Austin
9:20-9:45	Data Driven Systems and Control Framework for Multiway Dynamical Systems	Indika Rajapakse, et al U Mich and UTRC

<b>9:45-9:55</b>	<b>Coffee Break (Lobby ONLY)</b>	
<b>9:55-10:20</b>	Design of Robust and Accurate Biosensing Systems	Domitilla Del Vecchio, MIT
<b>10:20-10:45</b>	Linearization via Lifting of General Time-Varying Nonlinear Systems and Its Applications	Nader Motee, Lehigh U
<b>10:45-11:10</b>	Duality of Ensemble Control Systems	Jrshin Li, Wash U
<b>11:10-11:35</b>	Sparse Linear Ensemble Systems and Structural Controllability	Xudong Chen, CU Boulder
<b>11:35-1:05</b>	<b>Lunch (Outside the REEF)</b>	
<b>1:05-1:30</b>	Analysis of Spurious Trajectories for Time-varying Optimization via Nonlinear Control Theory	Javad Lavaei, UC Berkeley
<b>1:30-1:55</b>	Performance and Safety Guarantees for Adaptive Online Optimal Control	Na Li, Harvard
<b>1:55-2:20</b>	Model-based Data-driven Learning Methods for Optimal Feedback Control	Qi Gong, UCSC
<b>2:20-2:45</b>	On Gradient Flows Initialized near Maxima	Mohamed Belabbas, UIUC
<b>2:45-2:55</b>	<b>Coffee Break (Lobby ONLY)</b>	
<b>2:55-3:20</b>	Hybrid Control for Robust and Global Tracking on Smooth Manifolds	Ricardo Sanfelice, UCSC
<b>3:20-3:45</b>	Stochastic Hybrid Decision-making Networks for Global almost Sure Unanimity	Andy Teel, UCSB
<b>3:45-4:10</b>	Convexification of Motion Planning through Liftings and Hypercomplex Numbers	Behcet Acikmese and Mehran Mesbahi, University of Washington
<b>4:10-4:35</b>	On Geometric Optimal Transport Theory	Allen Tannenbaum, Stonybrook U
<b>4:35-4:40</b>	Closing Remarks	Frederick Leve, AFOSR
<b>4:40</b>	<b>MEETING ADJOURN</b>	