

2022 Dynamical Systems and Control Theory Program Review

Dr. Fred Leve | August 8-11, 2022 | Niceville, FL -hybrid

Doolittle Institute
1140 E. John Sims Pkwy, #1, Niceville, FL 32578

Agenda Day 1 | Monday, August 8, 2022 CDT (Central Daylight Time)

| Time | Topic | Presenter |
|------------------------|--|--|
| 8:00-8:30 | Registration / Login | |
| 8:30-8:40 | Welcome | AFOSR Leadership |
| 8:40-8:50 | Status Update | Frederick Leve, AFOSR |
| Technical Talks | | |
| 8:50-9:20 | Rough Euler-Poincaré equations and their calibration | James Michael Leahy, Imperial College London |
| 9:20-9:50 | Defense Differential Games and Leader-Follower Ring Formation | Eloy Garcia, AFRL/RQ |
| 9:50-10:20 | Many-on-One Pursuit-Evasion | Meir Pachter, AFIT |
| 10:20-10:40 | COFFEE BREAK (Lobby ONLY) | |
| 10:40-11:10 | Stochastic Control and Differential Games for Systems with non-Gaussian Noise | Tyrone Duncan & Bozena Pasik-Duncan, KU |
| 11:10-11:40 | Safe-by-design planner-tracker synthesis with a hierarchy of system models | Murat Arcak, UC Berkeley |
| 11:40-12:10 | Population Games: New Methods And Applications | Nuno Martins, Umaryland |
| 12:10-1:40 | LUNCH (Outside Doolittle) | |
| 1:40-2:10 | Inverse Optimal Safe Control | Miroslav Krstic, UCSD |
| 2:10-2:40 | Reaching a Consensus with Reduced Information | Steve Morse, Yale |
| 2:40-3:10 | Model-free Parameter Estimation | Eckhardt, Daniel, AFRL/RQ |
| 3:10-3:30 | COFFEE BREAK (Lobby ONLY) | |
| 3:30-4:00 | Optimal Linear-Time Algorithms in Allocation Problems | Jason Marden, UCSB |
| 4:00-4:30 | Achieving global objectives through local control with unknown system dynamics | Vijay Gupta, Notre Dame |
| MEETING ADJOURN | | |

| Agenda Day 2 Tuesday, August 9, 2022 CDT (Central Daylight Time) | | |
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| Time | Topic | Presenter |
| 8:00-8:30 | Registration / Login | |
| 8:30-8:40 | Morning Welcome and Discussions | Frederick Leve, AFOSR |
| Technical Talks | | |
| 8:40-9:10 | Embedded Graphon Mean Field Games | Peter Caines, McGill U |
| 9:10-9:40 | Network motifs and responses of nonlinear systems | Eduardo Sontag, Northeastern U |
| 9:40-10:10 | Autonomous guidance and targeting by semi-algebraic methods: From local to global shooting | Georgy Scholten, U Sorbonne |
| 10:10-10:30 | COFFEE BREAK (Lobby ONLY) | |
| 10:30-11:00 | Control of ill-posed fractional diffusion equations | Mahamadi Warma, GMU |
| 11:00-11:30 | Lyapunov-Like Functions for Almost Global Convergence in Discrete-Time Systems | Jesse Hoagg, U Kentucky |
| 11:30-12:00 | Optimal Control, Inverse Optimality, Dissipativity, and Stability Margins for Nonlinear Discrete-Time Stochastic Regulators | Wassim Haddad, GaTech |
| 12:00-1:30 | LUNCH (Outside Doolittle) | |
| 1:30-2:00 | Learning-based Planning and Control with Persistent Safety for UAS | Naira Hovakimyan, UIUC |
| 2:00-2:30 | Developments in Suboptimal Model Predictive and Constrained Control | Ilya Kolmanvsky, U Mich |
| 2:30-3:00 | Uncertainty Propagation for Stochastic Hybrid System on a Lie Group | Taeyoung Lee and Melvin Leok, GWU and UCSD |
| 3:00-3:20 | COFFEE BREAK (Lobby ONLY) | |
| 3:20-3:50 | Black-box data-driven modeling via occupation kernels | Rushi Kamalapurkar and Joel Rosenfeld, USF and Uoklahoma |
| 3:50-4:20 | Convergence Guarantees for DMD with Kernel Methods | Joel Rosenfeld, USF |
| 4:20 | MEETING ADJOURN | |

| Agenda Day 3 Wednesday, August 10, 2022 CDT (Central Daylight Time) | | |
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| Time | Topic | Presenter |
| 8:00-8:30 | Registration / Login | |
| 8:30-8:40 | Morning Welcome and Discussions | Frederick Leve, AFOSR |
| Technical Talks | | |
| 8:40-9:10 | Inferring entropy production rate from partially observed Langevin dynamics under coarse-graining | Gili Bisker, Tel Aviv University |
| 9:10-9:40 | Model-Based Machine Learning Methods for Optimal Feedback Control | Qi Gong, UCSC |
| 9:40-10:10 | Chance-Constrained Stochastic Optimal Control and Numerical Methods to HJB PDEs with Dirichlet Boundary Conditions | Tanaka Takashi, UT Austin |
| 10:10-10:30 | COFFEE BREAK (Lobby ONLY) | |
| 10:30-11:00 | Convexification of Motion Planning through Liftings and Hypercomplex Numbers | Mehran Mesbahi, U of Washington |
| 11:00-11:30 | Design of robust and accurate biosensing systems | Carlos Barajas, MIT |
| 11:30-12:00 | Mutational Control Systems on Metric Spaces | Helene Frankowska, CNRS U Paris |
| 12:00-1:30 | LUNCH (Outside Doolittle) | |
| 1:30-2:00 | Functional and Distributional Control of Ensemble Systems | Jrshin Li, Wash U |
| 2:00-2:30 | Controllability Issues of Linear Ensemble Systems | Xudong Chen, CU Boulder |
| 2:30-3:00 | Finite-Section Approximations of Carleman Linearization and Its Exponential Convergence | Nader Motee, Lehigh U |
| 3:00-3:20 | COFFEE BREAK (Lobby ONLY) | |
| 3:20-3:50 | Contraction Theory for Network Systems | Francesco Bullo, UCSB |
| 3:50-4:20 | Stochastic hybrid systems: from robust decision-making networks to distributed command for suppression of persistent adversaries | Andy Teel, UCSB |
| 4:20-4:50 | Dynamic feedback stabilization and fibre bundles | Mohamed Belabbas, UIUC |
| 4:50 | MEETING ADJOURN | |

| Agenda Day 4 Thursday, August 11, 2022 CDT (Central Daylight Time) | | |
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| Time | Topic | Presenter |
| 8:00-8:30 | Registration / Login | |
| 8:30-8:40 | Morning Welcome and Discussions | Frederick Leve, AFOSR |
| Technical Talks | | |
| 8:40-9:10 | Topological encoding of graph representations of time series | Firas Khasawneh and Elizabeth Munch, Michigan State U |
| 9:10-9:40 | Linear Quadratic Gaussian Synthesis for a Heated/Cooled Rod Using Point Actuation and Point Sensing | Art Krener, UC Davis |
| 9:40-10:10 | Data-guided Learning and Control of Higher Order Structures | Indika Rajapakse, et al U Mich and UTRC |
| 10:10-10:30 | COFFEE BREAK (Lobby ONLY) | |
| 10:30-11:00 | Target Tracking Subject to Intermittent Measurements using Attention Deep Neural Networks | Zachary Bell, AFRL/RW |
| 11:00-11:30 | Analysis of Non-convex Optimization Using Control Theory | Javad Lavaei, UC Berkeley |
| 11:30-12:00 | Is Poly the true language of computation? | David Spivak, Topos Institute |
| 12:00-1:30 | LUNCH (Outside Doolittle) | |
| 1:30-2:00 | Systematic Tools to Satisfy Temporal Logic Specifications in Hybrid Dynamical Systems | Ricardo Sanfelice, UCSC |
| 2:00-2:30 | Cislunar Catalog Maintenance and Characterization | Aaron Rosengren, UCSD |
| 2:30-3:00 | Hybrid Dynamics for Efficient Learning in Network Games: Momentum, Coordination, and Stability | Jorge Poveda, CU Boulder |
| 3:00-3:30 | Entropy in Biology and Other Subjects of Interest | Allen Tannenbaum, Stonybrook U |
| 3:30-4:00 | Runtime Assurance for Safety-Critical Systems from Fast, In-the-Loop Reachability | Sam Coogan, GaTech |
| 4:00-4:30 | Closing Remarks | Frederick Leve, AFOSR |
| 4:30 | MEETING ADJOURN | |