4th Annual Meeting of the AFRL Mathematical Modeling and Optimization Institute

MEETING PROGRAM

University of Florida
Research & Engineering Education Facility (REEF)
Shalimar, FL
July 25–28, 2016
Meeting Information

Registration

Registration is free and all meeting attendees must register. All presenters have been automatically registered. Non-presenting attendees can register by emailing the organizers at mmo.meeting.2016@gmail.com with your name and affiliation or stopping by the registration desk on-site. Registration material can be picked up on Monday–Thursday 8:30am–4:15pm in the UF-REEF lobby.

Coffee Breaks

Coffee breaks will be held at 9:45–10:00am and 2:30–2:45pm on Monday–Thursday in the UF-REEF lobby.

Luncheon

Lunch will be provided to the registered meeting attendees from 11:30am-1:00pm on Monday–Thursday in the UF-REEF lobby.

Internet Access

Internet access is available free of charge.
Network SSID: ufvisitor

Meeting Rooms

Sessions A and B - Auditorium
Sessions C1 and D1 - Auditorium
Sessions C2 and D2 - Room 117
Monday, July 25th

9:00 Opening Remarks by Vladimir Boginski (Auditorium)

9:00-9:45 Plenary Session A (Auditorium)

*A Simplified Approach to The Regularization of Control-Constrained Trajectory Optimization Problems*
Michael J. Grant, Assistant Professor, Purdue University

9:45-10:00 Coffee Break

10:00-11:30 Session B (Auditorium)

*Challenges in Modeling of Inelastic Deformation and Damage in Titanium: Multi-scale Modeling and Validation*
Oana Cazacu, University of Florida

*Role of Tension-Compression Asymmetry on Low Cycle Fatigue*
Benoit Revil-Baudard, University of Florida

*Implementation of Surface Roughness in a Pseudo-Spectral Solver for Direct Numerical Simulation of Bypass Transition*
Shanti Bhushan, Mississippi State University

11:30-1:00 Luncheon

1:00-2:30 Session C1 (Auditorium)

*Modeling the Deformation Response of Hexagonal Metals Under Strain Path Changes*
Nitin Chandola, University of Florida

*Effective Thermoelastic and Thermal Properties of Metal-Ceramic Composites with Spatially Tailored Microstructures*
Phillip Deierling, University of Iowa
Simulation of Thermal Ablation in Laminated Composite Materials with Finite Element Analysis
Yeqing Wang, University of Iowa

A Summary of High-Fidelity Numerical Studies of Flow Acoustic Resonant Interactions in Transitional Airfoils
Lap Nguyen, Embry-Riddle Aeronautical University

1:00-2:30 Session C2 (Room 117)

Relative Edge Optimization for Multi-Agent MAV Mapping
David Wheeler, Brigham Young University

Guidance-Assisted Monocular SLAM Scale Estimation
Daniel Whitten, Texas A&M University

GPS-Denied Cooperative Navigation in Real-Time
Hunter Young, Oklahoma State University

Robust Multi-Sensor GPS-Denied Navigation
Daniel Koch, Brigham Young University

2:30-2:45 Coffee Break

2:45-4:15 Session D1 (Auditorium)

Singular Value Decomposition for Rapid Simulation of a Hypersonic Vehicle
Ryan Klock, University of Michigan

Fluid-Structure-Jet Interaction Modeling for Flexible High Speed Vehicles
Ryan Kitson, University of Michigan

Variable Fidelity Aerothermodynamic Modeling for Multi-Discipline Modeling of Hypersonic Vehicles
Emily Dreyer, Ohio State University

Multi-Fidelity Unsteady Aerodynamic Modeling of Agile and Flexible High-Speed Vehicles
Dianne Zettl, Ohio State University
2:45-4:15 Session D2 (Room 117)

Geometric Adjoining Methods in Indirect Trajectory Optimization
Michael Sparapany, Purdue University

Navigation Based Path Planning Using Optimal Control Theory
Sean Nolan, Purdue University

Adaptive Gimbal Control and Fixed-wing Target Tracking
Jae Lee, Brigham Young University
Tuesday, July 26th

9:00-9:45 Plenary Session A (Auditorium)

*From GPS and Google Maps to Spatial Big Data*
Shashi Shekhar, Distinguished Professor, University of Minnesota

9:45-10:00 Coffee Break

10:00-11:30 Session B (Auditorium)

*Nonlinear Coupled Thermoelastic Beam Vibration Model and Thermoelastic Equations of Motion*
Yuri Antipov, Louisiana State University

*Modeling of Flapping Airfoils in Proximity to Walls for Lift and Thrust Generation*
Alex Povitsky, University of Akron

*On the Optimal Stackelberg-Nash Risk-Averse Control Problems*
Getachew K. Befekadu, NRC and University of Florida

11:30-1:00 Luncheon

1:00-2:30 Session C1 (Auditorium)

*Switched Control of Semi-Autonomous Vehicles*
Michael McCourt, University of Florida

*Leader-Follower Consensus with Unknown Control Direction*
Chau Ton, NRC

*Coverage Control Based Effective Jamming Strategy for Wireless Networks*
Zhen Kan, University of Florida

*Acceleration-free Nonlinear Guidance and Tracking Control of Hypersonic Missiles for Maximum Target Penetration*
Siddhartha Mehta, University of Florida
1:00-2:30 Session C2 (Room 117)

Fast Computation of Large-scale Linear Dynamical Network Learning
Xianqi Li, University of Florida

Weighted Sampling For Stochastic Optimization
Chenxi Chen, University of Florida

Convolutional Sparse Coding on Image Representation and Classification
Zhijie Feng, University of Florida

2:30-2:45 Coffee Break

2:45-4:15 Session D1 (Auditorium)

Sequential Max-Min Bilevel Linear Programming with Incomplete Information and Learning
Juan S. Borrero, University of Pittsburgh

Critical Arcs Detection in Influence Networks
Colin Gillen, University of Pittsburgh

Assignment Problem for Drone Delivery Under Bounded Rationality
Guanxiang Yun, University of Central Florida

Measuring Network Robustness Using Information Theory
Arsenios Tsokas, University of Florida

2:45-4:15 Session D2 (Room 117)

Decentralized LQT in a Limited Information Environment
Clay Robertson, Auburn University

A Reduced Element Map Representation For Path Planning And Obstacle Avoidance
Jinyoung Park, Auburn University

3D Road Geometry Recovery and Ground Target Motion Prediction by UA Using a Single Camera
Yingmao Li, University of Texas at Dallas

Camera Pose Estimation Using Quaternions
Kaveh Fathian, University of Texas at Dallas
Wednesday, July 27th

9:00-9:45 Plenary Session A (Auditorium)

Finding Critical Links for Closeness Centrality
Oleg Prokopyev, Associate Professor, University of Pittsburgh

9:45-10:00 Coffee Break

10:00-11:30 Session B (Auditorium)

An Accelerated Extended Cutting Plane Approach with Piecewise Linear Approximations for Signomial Geometric Programming
Qipeng Phil Zheng, University of Central Florida

Assessing User Engagement Capacity as a Driver of Reach of Online Health Platforms
Alexander Nikolaev, University at Buffalo

Ranking Academic Advisors: Analyzing Scientific Advising Impact using MathGenealogy Social Network
Vladimir Boginski, University of Central Florida & University of Florida

11:30-1:00 Luncheon

1:00-2:30 Session C1 (Auditorium)

Path Planning for Optimal Cooperative Navigation
Adam J. Rutkowski, Air Force Research Laboratory

Validating a Model For Detecting Magnetic Field Intensity Using Dynamic Neural Fields
Brian K. Taylor, Air Force Research Laboratory

Grant Huang, National Research Council
1:00-2:30 Session C2 (Room 117)

Modelling Social Influence
Abhinav Perla, University at Buffalo

Distributed Coalitional Learning
Rahul Gopalsamy, University at Buffalo

A Continuous-Time Actor-Oriented Model for Decentralized Communication Network Formation
Anastasia Nikolaeva, University at Buffalo

2:30-2:45 Coffee Break

2:45-4:15 Session D1 (Auditorium)

On Landscape Graphs of Large-Scale Search for Multi-Sensor Multiple Target Tracking
Alla Kammerdiner, New Mexico State University

Identifying Resilient Structures In Networks: A Two-Stage Stochastic Optimization Approach
Maciej Rysz, NRC & University of Florida

Risk Averse Weapon-Target Assignment Problems
Konstantin Pavlikov, University of Florida

Scalable Communication for Parallel Optimization
Oleg Shylo, University of Tennessee

2:45-4:15 Session D2 (Room 117)

Vision-Based Control with Unknown Time Varying State Delay and Known Time Varying Input Delay with NN based Delay Estimate
Indrasis Chakraborty, University of Florida

Utilizing Regional and Local State-Following Approximations for Online Approximate Optimal Regulation
Patryk Deptula, University of Florida

Autonomous Herding of Uncontrolled Fleeing Agents with Switching Between Multiple Targets
Ryan Licitra, University of Florida

Decentralized Motion Control to Achieve Robust Multi-Agent Networks
Zachary Hutcheson, University of Florida
Thursday, July 28th

9:00-9:45 Plenary Session A (Auditorium)

Assured Autonomy for Agents Operating in Contested Environments
Warren Dixon, Professor, University of Florida

9:45-10:00 Coffee Break

10:00-11:30 Session B (Auditorium)

Theoretical Advances and Practical Algorithms for Adaptive Autonomy in Contested Environments
Girish Chowdhary, University of Illinois at Urbana-Champaign

Cheap Approximate Localization Using FM Radio
Piyush Kumar, Florida State University

Comparison Between Stochastic and Simulation Based Optimization of Reactive Burn Models for Energetic Materials
Robert J. Dorgan, Air Force Research Laboratory

11:30-1:00 Luncheon

1:00-2:30 Session C1 (Auditorium)

High Communication Efficiency Subgraphs
Vladimir Stozhkov, University of Florida

A New Clique Relaxation Model with Small-World Properties
Jongeun Kim, University of Florida

Network Optimization on Materials Graph. Estimates For The Independent Union of Cliques Problem
Eugene Lykhovyd, Texas A&M University

TruthCore: Non-parametric Estimation of Truth From A Collection of Authoritative Sources
Tathagata Mukherjee, Florida State University
1:00-2:30 Session C2 (Room 117)

Monocular Camera Depth Filtering using Particle Filters
Zachary Bell, University of Florida

Imitating Fixed-wing Aircraft Fight Characteristics for use in Multirotor Surrogate
Christian Harris, University of Florida

Experimental Validation for Visual Servo Control of an Unmanned Ground Vehicle via a Moving Airborne Monocular Camera
Hsi-Yuan Chen, University of Florida

2:30 Concluding Remarks