

2023 AFOSR Mathematical Optimization Annual Program Review

Dr. Warren Adams | August 28-30, 2023 | Arlington, VA

Basic Research Collaboration Center (BRICC)
4100 North Fairfax Drive, Suite 450
Arlington, VA 22203

Agenda Day 1 - Monday, August 28, 2023

Time	Title of Project	Investigators
8:00 – 8:15	CHECK IN	
8:15 – 8:30	Introductory Remarks: Portfolio Status, Information Collection, Expenditures, Performance Reports	Warren Adams AFOSR
8:30 – 8:55	Convexification of Extremely Nonconvex Compositions with Norms	Nikolaos Sahinidis Georgia Tech
8:55 – 9:20	Novel Models and Methods for Optimization Problems with Tree Ensembles Embedded	Jean-Philippe Richard University of Minnesota
9:20 – 9:45	Quantifying Probabilities using Optimization Techniques	Mohit Tawarmalani Purdue University
9:45 – 10:10	Algorithms and Complexity in Mixed-Integer Polynomial Optimization (YIP)	Robert Hildebrand Virginia Tech
10:10 – 10:25	BREAK	
10:25 – 10:50	Optimal Decision Making under Tight Performance Requirements in Adversarial and Uncertain Environments: Insights from Rockafellian Functions	Johannes Royset NPS Louis Chen NPS
10:50 – 11:15	Large Scale Embedded and Combinatoric Networked Systems: Structure, Dynamics, Optimization and Redesign	Peter Caines McGill University
11:15 – 11:40	New Mathematical Challenges of the Optimization of Large Stochastic Systems	Renee Carmona Princeton University
11:40 – 12:05	Mixed-Integer Polynomial Optimization: Structure and Algorithms	Alberto Del Pia University of Wisconsin
12:05 – 1:05	LUNCH	
1:05 – 1:30	Novel Polyhedral Approaches to Integer and Quadratically Constrained Quadratic Programming	Yuri Faenza Columbia University Daniel Bienstock Columbia University
1:30 – 1:55	Quantitative Bounds for Cutting Plane and Enumeration Techniques in Mixed-Integer Optimization	Amitabh Basu Johns Hopkins University
1:55 – 2:20	Practical and Provably Optimal Methods for Large-Scale Convex-Composite Optimization	Benjamin Grimmer Johns Hopkins University

2:20 – 2:45	Novel Optimization Algorithms for Data Science Applications	Aida Khajavirad Lehigh University Antonio De Rosa University of Maryland
2:45 – 3:00	BREAK	
3:00 – 3:25	Bayesian Risk-Averse and Distributionally-Robust Approaches to Data-Drive Stochastic Optimization	Enlu Zhou Georgia Tech Alexander Shapiro Georgia Tech
3:25 – 3:50	First-Order Methods for Large Scale Convex and Nonconvex Distributed Composite Optimization Problems	Renato Monteiro Georgia Tech
3:50 – 4:15	Optimization of Sparse Polynomials and Signomials	Venkat Chandrasekaran California Institute of Tech
4:15 – 4:40	Improving Branch-and-Bound Algorithms for MILPs	Santanu Dey Georgia Tech
4:40 – 5:00	General comments, review adjourned for the day	

Agenda Day 2 - Tuesday August 29, 2023		
Time	Title of Project	Investigators
8:00 – 8:15	CHECK IN	
8:15 – 8:30	Introductory Remarks	Warren Adams AFOSR
8:30 – 8:55	Temporal Network Interdiction Problems	Cole Smith Syracuse University
8:55 – 9:20	The Dynamic Airlift Routing Problem Dynamic Military Airlift Network Design in a Contested Environment	Matthew Carlyle NPS Robert Dell University at Buffalo
9:20 – 9:45	Compression and Randomization for Extreme-Scale Training and Optimization (CREST Opt)	Harbir Antil George Mason University
9:45 – 10:10	Compression and Randomization for Extreme-Scale Training and Optimization (CREST Opt)	Drew Kouri Sandia National Laboratories
10:10 – 10:25	BREAK	
10:25 – 10:50	A Novel Graphical Method to Globally Solve Mixed-Integer Nonlinear Programs (YIP)	Danial Davarnia Iowa State University
10:50 – 11:15	Exactness and Algorithmic Efficiency for Semidefinite Programming Relaxations	Fatma Kilinc-Karzan Carnegie Mellon University

11:15 – 11:40	Finding Higher-Order Stationary Points of Nonconvex Optimization Problems in Multi-Agent, Uncertain and Adversarial Environments (YIP)	Meisam Razaviyayn University of Southern Cal
11:40 – 12:05	Predictive Stochastic Programming: A New Class of Models and Algorithms	Suvrajeet Sen University of Southern Cal
12:05 – 1:05	LUNCH	
1:05 – 1:30	More Reliable Second-Order Methods with Applications to Model Predictive Control	Oliver Hinder University of Pittsburgh
1:30 – 1:55	First-Order Optimization Methods for Stochastic Dynamic Programming	Guanghui Lan Georgia Tech Yuyuan Ouyang Clemson University
1:55 – 2:20	Efficient Primal-Dual Interior-Point Methods for Non-Symmetric Cone Programming	David Papp North Carolina State University
2:20 – 2:45	Multi-Level Multi-Objective Stochastic Methods for Learning and Optimization	Luis Nunes Vicente Lehigh University
2:45 – 3:00	BREAK	
3:00 – 3:25	Nonlinear Approaches to Discrete and Combinatorial Optimization	Sergiy Butenko Texas A&M Pavlo Krokhmal University of Arizona
3:25 – 3:50	Theories and Computational Algorithms for Optimizing Bilevel Mixed-Integer Nonlinear Programs	Ruiwei Jiang University of Michigan
3:50 – 4:15	Mixed-Integer Quadratic Optimization: Structural Results and Practical Relaxations	Andres Gomez University of Southern Cal
4:15 – 4:40	A Polyhedral Approach to Some Infinite Sequencing Problems	Thomas Lidbetter Rutgers University
4:40 – 5:00	General comments, review adjourned for the day	

Agenda Day 3 - Wednesday August 30, 2023		
Time	Title of Project	Investigators
8:00 – 8:15	CHECK IN	
8:15 – 8:40		Hao Hu Clemson University

	Facial Reduction for Semidefinite Relaxations of Combinatorial Problems	Boshi Yang Clemson University
8:40 – 9:05	A Polyhedral Approach for Multi-Parametric Linear Programming	Carla Michini University of Wisconsin James Luedtke University of Wisconsin
9:05 – 9:30	Theory and Algorithms for Two-Stage Decision Making under Conflict and Uncertainty	Susan Hunter Purdue University Margaret Wiecek Clemson University
9:30 – 9:55	Simulation Optimization: New Approaches to Gradient-Based Search and Maximum Likelihood Estimation	Michael Fu University of Maryland Steven Marcus University of Maryland
9:55 – 10:20	New Theory and New Computational Methods for Improving the Effectiveness of First-Order Methods in Optimization	Robert Freund MIT Ngoc-Cuong Nguyen MIT
10:20 – 10:35	BREAK	
10:35 – 11:00	Exact Optimization Approaches for Surveillance and Defense Operations with Unmanned Aerial Vehicles under Uncertainty	Juan Borrero Oklahoma State University Leonardo Lozano University of Cincinnati
11:00 – 11:25	Improving the Integer Linear Programming Formulation of the Orthogonal Array Problem	Dursun Bulutoglu Air Force Institute of Technology
11:25 – 11:50	Adaptive Bilevel Mixed-Integer Programming	Jourdain Lamperski University of Pittsburgh Oleg Prokopyev University of Pittsburgh
11:50 – 12:15	Efficiently Strengthening Disjunctive Cutting Planes	Aleksandr Kazachkov University of Florida
12:15 – 1:15	LUNCH	
1:15 – 1:40	Resource-Efficient Reinforcement Learning via Guaranteed Nonconvex and Stochastic Optimization	Yuxin Chen University of Pennsylvania
1:40 – 2:05	Topics in Modern Nonconvex Nondifferentiable Optimization	Jong-Shi Pang University of Southern Cal
2:05 – ???	General comments, review adjourned	