Augustinos D. Saravanos

Personal

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Research Interests

Distributed Optimization, Optimization Under Uncertainty, Learning-aided Optimization, Stochastic Optimal Control, Hierarchical Architectures, Multi-Agent Systems, Large-Scale Decision-Making Systems

Education

Georgia Institute of Technology   Atlanta, GA
Ph.D. in Machine Learning   2020-present
Thesis: Distributed Optimization Architectures for Large-Scale Decision Making
Advisor: Prof. Evangelos Theodorou
Ph.D. Proposal Committee: Profs. Evangelos Theodorou, Arkadi Nemirovski, Yao Xie
GPA: 3.92/4.00

Georgia Institute of Technology   Atlanta, GA
M.Sc. in Aerospace Engineering   2024
GPA: 3.92/4.00

University of Patras   Patras, Greece
Diploma in Electrical and Computer Engineering   2019
Thesis: Nonlinear Model Predictive Control for Space Robotic Systems
Co-advisors: Prof. Evangelos Papadopoulos, Prof. Nick Koussoulas
GPA: 8.77/10.00 (Excellent)
Class ranking: 2nd (top 1 %) out of 211 students of 2014 class

Research Experience

Georgia Institute of Technology   Atlanta, GA
Graduate Research Assistant   2020-present
Advisor: Prof. Evangelos Theodorou

- Distributed dynamic optimization architectures for large-scale multi-agent systems [J1].
- Scalable distribution steering for multi-agent systems under stochastic uncertainty [C1], [C7].
- Hierarchical distributed optimization for very-large-scale clustered systems [C5].
- Deep learning-based stochastic multi-agent control with forward-backward SDEs [C3].
- Distributed robust optimization under unknown deterministic uncertainty [P1].
- Deep learning-aided distributed optimization for large-scale decision making with guarantees [P5].

BOSCH Center for Artificial Intelligence   Pittsburgh, PA
Machine Learning Research Intern   May-Aug 2023
Mentors: Dr. Wan-Yi Lin, Dr. Zhenzhen Li

- Matching methods for aligning independently trained models on diverse image data
- Federated learning using model alignment techniques under privacy regulations

PUBLICATIONS

(*Equal contribution)

Under Review / Preprints

[P5] Deep Distributed Optimization for Large-Scale Quadratic Programming,
A.D. Saravanos, H. Kuperman, A. Oshin, A.T. Abdul, V. Pacelli, E.A. Theodorou,
Under review. [Link]

[P4] Distributed Covariance Steering for Large-Scale Multi-Agent Stochastic Systems,
A. D. Saravanos, I.M. Balci, A.T. Abdul, A. Tsolovikos, E. Bakolas, E.A. Theodorou,
Under review.

[P3] Second-Order Constrained Dynamic Optimization,
Y. Aoyama, O. So, **A.D. Saravanos**, E.A. Theodorou,
Under review. [Link]

[P2] Operator Splitting Covariance Steering for Safe Stochastic Nonlinear Control,
A. Ratheesh, V. Pacelli, **A. D. Saravanos**, E. A. Theodorou,
Under review. [Link]

[P1] Scaling Robust Optimization for Multi-Agent Robotic Systems: A Distributed Perspective,
A.T. Abdul*, **A.D. Saravanos***, E.A. Theodorou,
Under review. [Link]

Journal Papers

[J1] Distributed Differential Dynamic Programming Architectures for Large-Scale Multi-Agent Control,
A.D. Saravanos, Y. Aoyama, H. Zhu, E.A. Theodorou,
IEEE Transactions on Robotics, 2023. [Acceptance rate: ∼ 18%] [Link]

Conference Papers

[C8] Scalable Robust Optimization for Safe Multi-Agent Control Under Deterministic Uncertainty,
A.T. Abdul*, **A.D. Saravanos***, E.A. Theodorou,
American Control Conference (ACC), 2025 (Accepted)

[C7] Distributed Model Predictive Covariance Steering,
A.D. Saravanos, I.M. Balci, E. Bakolas, E.A. Theodorou,
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2024 [Link]

[C6] A Robust Differential Neural ODE Optimizer,
P. Theodoropoulos, G.H. Liu, T. Chen, **A.D. Saravanos**, E.A. Theodorou,
International Conference on Learning Representations (ICLR), 2024.
[Acceptance rate: 30.9%] [Link]

[C5] Distributed Hierarchical Distribution Control for Very-Large-Scale Clustered Multi-Agent Systems,
A.D. Saravanos, Y. Li, E.A. Theodorou,
Robotics: Science and Systems (RSS), 2023. [Acceptance rate: 33.6%] [Link]

[C4] Improved Exploration for Safety-Embedded Differential Dynamic Programming Using Tolerant Barrier States,
J.E. Kuperman, H. Almubarak, **A.D. Saravanos**, E.A. Theodorou,
International Conference on Advanced Robotics (ICAR), 2023. [Link]

[C3] Decentralized Safe Multi-Agent Stochastic Optimal Control using Deep FBSDEs and ADMM,
M.A. Pereira*, **A.D. Saravanos***, O. So, E.A. Theodorou,
Robotics: Science and Systems (RSS), 2022. [Acceptance rate: 31.8%] [Link]

[C2] Receding Horizon Differential Dynamic Programming Under Parametric Uncertainty,
Y. Aoyama, **A.D. Saravanos**, E.A. Theodorou,
IEEE Conference on Decision and Control (CDC), 2021. [Link]

[C1] Distributed Covariance Steering with Consensus ADMM for Stochastic Multi-Agent Systems,
      A.D. Saravanos, A.G. Tsolovikos, E. Bakolas, E.A. Theodorou,
      Robotics: Science and Systems (RSS), 2021. [Acceptance rate: 32.6%] [Link]

Workshop Papers & Technical Reports

[O2] Sim2Real on the Robotarium Platform Using Decentralized Multi-Agent Safe Deep FBSDEs,
      M.A. Pereira*, **A.D. Saravanos***, E.A. Theodorou,
      Robotics: Science and Systems (RSS), Workshop on Scaling Robot Learning, 2022. [Link]

[O1] Sampling-Based Optimization for Multi-Agent Model Predictive Control,
      Z. Wang, **A.D. Saravanos**, H. Almubarak, O. So, E.A. Theodorou,
      Technical Report. [Link]

Honors & Awards

2021-2025	Onassis Foundation Scholar - Doctoral Fellowship
2022	Gerondelis Foundation - Doctoral Fellowship
2019	Skouras Foundation Scholarship – Top student of the Department of ECE and in top 10 students of the University of Patras for academic year 2018-19
2019	Salutatorian, Graduating Class of 2019, Department of ECE, University of Patras
2018	1st & 2nd places, Line Following Robots (Enhanced), Robotex International 2018, Tallinn, Estonia
2017	3rd place, Line Following Robots (Enhanced), Robotex International 2017, Tallinn, Estonia
2013	Bronze medal, European Science Olympiad (EUSO) 2013, Luxembourg
2013	Gold medal, National Science Olympiad 2013, Athens, Greece

Skills

Coding Languages:	Python, MATLAB, C/C++
Packages:	PyTorch, Scikit-learn, CVX/CVXPY, MOSEK
IDEs:	Jupyter Notebook, PyCharm, Spyder, Visual Studio

Peer Review Service

Journals

- IEEE Transactions on Robotics
- IEEE Transactions on Systems, Man and Cybernetics
- IEEE Control Systems Letters (L-CSS)
- International Journal of Robust and Nonlinear Control

Conferences

- Robotics: Science and Systems (RSS)
- IEEE International Conference on Robotics and Automation (ICRA)
- International Conference on Intelligent Robots and Systems (IROS)
- International Conference on Advanced Robotics (ICAR)
- IEEE Conference on Decision and Control (CDC)
- American Control Conference (ACC)
- International Conference on Learning Representations (ICLR)
- International Conference on Machine Learning (ICML)

Leadership and Volunteering

2017-2020	Member, Robotics Club of University of Patras
2018-2020	Volunteer teacher and trainer, Robots at MET, University of Patras - Taught and trained teams of elementary school students on LEGO Robotics
2016-2020	Member, IEEE Student Branch, University of Patras - TISP (Teacher In-Service Program) Volunteer, Coordinator of Introduction to Coding course for students of the "Skagiopouleio" Orphanage

Selected Graduate-Level Coursework

Georgia Institute of Technology

Optimization & ML:	Convex Optimization, Linear Optimization, Nonlinear Optimization, Advanced Nonlinear Programming, Mathematical Foundations of ML, Statistical ML, Probabilistic Graphical Models in ML, Random Processes
Control & Robotics:	Nonlinear Stochastic Optimal Control, Optimization-Based Learning, Control and Games, Mathematical Principles of Motion Planning

University of Patras

Optimization & ML:	Applied Optimization, Linear and Combinatorial Optimization, Artificial Intelligence, Pattern Recognition, Natural Language Processing
Control & Robotics:	Linear Control, Introduction to Robotic Manipulation, Optimal Control, Estimation Theory and Stochastic Control, Fuzzy Control Systems, Digital Control

Test Scores

2019	ETS GRE General Test Scores:
	Quantitative Reasoning: 170/170 (96th percentile)
	Verbal Reasoning: 158/170 (80th percentile)
	Analytical Writing: 4.5/6.0 (81st percentile)

Languages

English (Fluent), Greek (Native), French (Advanced)

References

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