Mustafa O. Karabag

The University of Texas at Austin
201 E 24th St. Office: 5.440
Austin, TX, 78712, USA

karabag@utexas.edu
https://mustafakarabag.github.io/

Education

The University of Texas at Austin, Austin, TX, USA **2023**
Ph.D., Electrical & Computer Engineering
Thesis: Decision-Making for Autonomous Agents in Adversarial or Information-Scarce Settings
Advisor: Ufuk Topcu

The University of Texas at Austin, Austin, TX, USA **2019**
M.S., Electrical & Computer Engineering

Bogazici University, Istanbul, Turkey **2017**
B.S., Electrical & Electronics Engineering, *Salutatorian*
Minor, Economics

Academic Employment

The University of Texas at Austin, Austin, TX, USA **2025 - Present**
Research Associate, The Oden Institute for Computational Engineering and Sciences

The University of Texas at Austin, Austin, TX, USA **2025**
Lecturer, Aerospace Engineering and Engineering Mechanics

The University of Texas at Austin, Austin, TX, USA **2023 - 2025**
Postdoctoral Fellow, The Oden Institute for Computational Engineering and Sciences

The University of Texas at Austin, Austin, TX, USA **2017 - 2023**
Grad. Research Asst., The Oden Institute for Computational Engineering and Sciences

Publications

* indicates equal contribution

Preprints under review

[**1**] M. O. Karabag, J. Sobotka, and U. Topcu, "Do LLMs Strategically Reveal, Conceal, and Infer Information? A Theoretical and Empirical Analysis in The Chameleon Game", 2025.

[**2**] X. Liu, J. Li, F. Fotiadis, M. O. Karabag, J. Milzman, D. Fridovich-Keil, and U. Topcu, "Approximate Feedback Nash Equilibria with Sparse Inter-Agent Dependencies", 2025.

[**3**] S. Murthy, K. Gupta, M. O. Karabag, D. Fridovich-Keil, and U. Topcu, "DiBS-MTL: Transformation-Invariant Multitask Learning with Direction Oracles", 2025.

[**4**] C. Probine, M. O. Karabag, and U. Topcu, "Designing Inferable Signaling Schemes for Bayesian Persuasion", 2025.

[**5**] M. O. Karabag, J. Milzman, and U. Topcu, "Deceptive Planning Exploiting Inattention Blindness", 2025.

[**6**] I. A. Vurankaya, M. O. Karabag, W. A. Suttle, J. Milzman, D. Fridovich-Keil, and U. Topcu, "Deceptive Exploration in Multi-Armed Bandits", 2025.

[**7**] Y. Kim, A. Benvenuti, B. Chen, M. O. Karabag, A. Kulkarni, N. D. Bastian, U. Topcu, and M. Hale, "Deceptive Sequential Decision-Making via Regularized Policy Optimization", 2025.

[**8**] S. Murthy, M. O. Karabag, and U. Topcu, "Sequential Resource Trading Using Comparison-Based Gradient Estimation", 2024.

Journal Papers – Published and Accepted

[**9**] M. O. Karabag, S. Smith, N. Mehr, D. Fridovich-Keil, and U. Topcu, "When Should a Leader Act Suboptimally? The Role of Inferability in Repeated Stackelberg Games," *IEEE Transactions on Automatic Control (TAC)*, 2025.

[**10**] M. O. Karabag*, C. Neary*, and U. Topcu, "Designing Policies for Transition-Independent Multiagent Systems that are Robust to Communication Loss," *Autonomous Agents and Multi-Agent Systems (JAAMAS)*, 2025.

[**11**] M. O. Karabag, M. Ornik, and U. Topcu, "Identity Concealment Games: How I Learned to Stop Revealing and Love the Coincidences," *Automatica*, 2024.

[**12**] T. Wongpiromsarn, M. Ghasemi, M. Cubuktepe, G. Bakirtzis, S. Carr, M. O. Karabag, C. Neary, P. Gohari, and U. Topcu, "Formal Methods for Autonomous Systems" (Monograph), *Foundations and Trends in Systems and Control*, 2023.

[**13**] M. O. Karabag, M. Ornik, and U. Topcu, "Exploiting Partial Observability for Optimal Deception," *IEEE Transactions on Automatic Control (TAC)*, 2022.

[**14**] M. O. Karabag, M. Ornik, and U. Topcu, "Deception in Supervisory Control," *IEEE Transactions on Automatic Control (TAC)*, 2021.

[**15**] Y. Savas, M. Ornik, M. Cubuktepe, M. O. Karabag, and U. Topcu, "Entropy Maximization for Markov Decision Processes Under Temporal Logic Constraints," *IEEE Transactions on Automatic Control (TAC)*, 2019.

Peer Reviewed Conference Papers – Published and Accepted

[**16**] K. Gupta, S. Murthy, M. O. Karabag, U. Topcu, and D. Fridovich-Keil, "Cooperative Bargaining Games Without Utilities: Mediated Solutions from Direction Oracles", in *Conference on Neural Information Processing Systems (NeurIPS)*, 2025.

[**17**] W. Suttle, J. Milzman, M. O. Karabag, B. Sadler, and U. Topcu, "Value of Information-Based Deceptive Path Planning Under Adversarial Interventions", *IEEE Conference on Decision and Control (CDC)*, 2025.

[**18**] X. Liu, J. Li, F. Fotiadis, M. O. Karabag, J. Milzman, D. Fridovich-Keil, and U. Topcu, "Policies with Sparse Inter-Agent Dependencies in Dynamic Games: A Dynamic Programming Approach", *The International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, (Extended Abstract), 2025.

[**19**] Y. Kim, A. Benvenuti, B. Chen, M. O. Karabag, A. Kulkarni, N. D. Bastian, U. Topcu, and M. Hale, "Defining and Measuring Deception in Sequential Decision Systems: Application to Network Defense", *IEEE Military Communications Conference (MILCOM)*, 2024.

[**20**] C. Probine, M. O. Karabag, and U. Topcu, "A Decentralized Shotgun Approach for Team Deception", *Conference on Game Theory and AI for Security (GameSec)*, 2024.

[**21**] M. O. Karabag, S. Smith, D. Fridovich-Keil and U. Topcu, "Encouraging Inferable Behavior for Autonomy: Repeated Bimatrix Stackelberg Games with Observations," *American Control Conference (ACC)*, 2024.

[**22**] S. Chen, Y. Savas, M. O. Karabag, B. Sadler, and U. Topcu, "Deceptive Planning for Resource Allocation," *American Control Conference (ACC)*, 2024.

[**23**] A. Patil*, M. O. Karabag*, T. Tanaka, and U. Topcu, "Simulator-Driven Deceptive Control via Path Integral Approach," *IEEE Conference on Decision and Control (CDC)*, 2023.

[**24**] J. Li, C. Chiu, L. Peters, F. Palafox, M. O. Karabag, J. Alonso-Mora, S. Sojoudi, C. Tomlin, and D. Fridovich-Keil, "Scenario-Game ADMM: A Parallelized Scenario-Based Solver for Stochastic Noncooperative Games," *IEEE Conference on Decision and Control (CDC)*, 2023.

[**25**] B. Chen*, C. Hawkins*, M. O. Karabag*, C. Neary*, M. Hale, and U. Topcu,"Differential Privacy in Cooperative Multiagent Planning," *Uncertainity in Artificial Intelligence (UAI)*, 2023.

[**26**] M. O. Karabag and U. Topcu,"On the Sample Complexity of Vanilla Model-Based Offline Reinforcement Learning with Dependent Samples," *AAAI Conference on Artificial Intelligence (AAAI)*, 2023.

[**27**] M. O. Karabag, D. Fridovich-Keil, and U. Topcu,"Alternating Direction Method of Multipliers for Decomposable Saddle-Point Problems," *Annual Allerton Conference on Communication, Control, and Computing (Allerton)*, 2022.

[**28**] M. O. Karabag*, C. Neary*, and U. Topcu, "Planning Not to Talk: Multiagent Systems that are Robust to Communication Loss," *The International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2022.

[**29**] M. O. Karabag, C. Neary, and U. Topcu, "Smooth Convex Optimization Using Sub-Zeroth-Order Oracles," *AAAI Conference on Artificial Intelligence (AAAI)*, 2021.

[**30**] M. O. Karabag, M. Ornik, and U. Topcu, "Optimal Deceptive and Reference Policies for Supervisory Control," *IEEE Conference on Decision and Control (CDC)*, 2019.

[**31**] M. O. Karabag, M. Ornik, and U. Topcu, "Least Inferable Policies for Markov Decision Processes," *American Control Conference (ACC)*, 2019.

Teaching Experience

The University of Texas at Austin, Austin, TX, USA.

Lecturer	ASE 370C – Feedback Control Systems	**Spring 2025**
Teaching Assistant	ASE 370C – Feedback Control Systems	**Fall 2022**
Teaching Assistant	ASE 370C – Feedback Control Systems	**Fall 2021**

Bogazici University, Istanbul, Turkey.

Student Teaching Assistant	EE 352 – System Dynamics and Control	**Spring 2017**

Code2College, Online.

Instructor	Software Development Essentials II (Python)	**Fall 2023, Spring 2025**
Instructor	Software Development Essentials I (Python)	**Spring 2023, Spring & Fall 2024**

Presentations and Invited Talks

[**1**] "Do Large Language Models Strategically Control Information in Multi-Agent Environments?", at ACC 2025 Workshop: Data-Driven and Risk-Aware Control for Safety-Critical Autonomous Systems, Jul. 2025.

[**2**] "Do LLMs Strategically Reveal, Conceal, and Infer Information? A Theoretical and Empirical Analysis in The Chameleon Game", The Decision and Control Laboratory Seminar at Georgia Institute of Technology, Mar. 2025.

[**3**] "From comparison-based optimization to autonomous trading: Theory and applications," NSF Cognitive Autonomy for Human CPS: Turning Novices into Experts site visit, Nov. 2024.

[**4**] "Decision-Making and Learning to Control Information Flow of Autonomous Agents," University of Hawai'i at Manoa, Mar. 2024.

[**5**] "Controlling the Information Flow of Autonomous Systems," International Workshop on Trustworthy Autonomous Cyber-Physical Systems, at San Diego State University, Jan. 2024.

[**6**] "Optimization and Decision-Making with Minimal Information," The University of Michigan Intelligent Robotics and Autonomy Lab seminar, Nov. 2023 (Virtual)

[**7**] "Deceptive Decision-Making Against Adversaries: Theory, Algorithms, and User Studies," The University of Texas at Austin Center for Autonomy Mini-Workshop on Information Manipulation and Algorithmic Deception, Apr. 2023. (Virtual)

[**8**] "Deceptive Planning for Supervised Autonomous Agents," Electrical & Computer Engineering Departmental Seminar at Purdue University, Oct. 2022.

[**9**] "Deceptive Planning for Supervised Autonomous Agents," Coordinated Science Laboratory, Decision and Control Seminar at the University of Illinois at Urbana-Champaign, Oct. 2022.

[**10**] "Deceptive Planning for Supervised Autonomous Agents," Electrical & Computer Engineering Departmental Seminar at the University of Illinois Chicago, Sep. 2022.

[**11**] "Deceptive Decision-Making Against Adversaries: Theory, Algorithms, and User Studies," DEVCOM ARL Colloquium seminar, May 2022. (Virtual)

[**12**] "Planning Not to Talk: Multiagent Systems that are Robust to Communication Loss," AFOSR Center of Excellence in Assured Autonomy in Contested Environments program review, Apr. 2022.

[**13**] "Deception in Supervisory Control," SIAM Conference on Control and Its Applications mini-symposium on Tools for Analysis and Design of Autonomous Systems in Contested Environments, July 2021. (Virtual)

Industry Research and Development Experience

Temsa, Adana, Turkey.
R&D Intern — Research & Development Division — **Aug. - Sep. 2016**
Prepared a technical report on lithium-ion electric bus batteries, focusing on safety standards and tests.

Aselsan, Ankara, Turkey.
R&D Intern — Defense Systems Technologies Division — **June - July 2016**
Designed algorithms for real-time rendering from cube map projections and construction of projections.

Honors and Awards

Student Scholarship	International Conference on Autonomous Agents and Multiagent Systems	**2022**
Student Scholarship	Conference on Decision and Control	**2019**
High Honors	Bogazici University Faculty of Engineering	**2013–2017**
Outstanding Merit Scholarship	Ministry of Youth and Sports, Turkey	**2012–2017**
Merit Scholarship	Bogazici University	**2012–2017**

Service

Student Volunteer: The 60th IEEE Conference on Decision and Control (2021).

Reviewer: IEEE Transactions on Automatic Control, IEEE Transactions on Industrial Electronics, IEEE Control Systems Letters, IEEE Transactions on Games, Journal of Artificial Intelligence Research, Robotics and Autonomous Systems, Proceedings of the Royal Society A, Robotics and Autonomous Systems, International Conference on Artificial Intelligence and Statistics (2023, 2025), IEEE Conference on Decision and Control (2022), American Control Conference (2022, 2024, 2025), European Control Conference (2021, 2025), International Conference on Automated Planning and Scheduling (2021, 2023), IEEE International Conference on Robotics and Automation (2023), IFAC Workshop on Cyber-Physical and Human Systems (2022), Conference on Neural Information Processing Systems (2024, 2025), IFAC Conference on Analysis and Design of Hybrid Systems Reproducibility Evaluation (2024).

Outreach

Volunteer Instructor: Instructor for the Software Development Essentials I and II (Python) courses of Code2College, an education nonprofit organization. I instructed $\sim$ 10 students in 9-week, 17-hour online, interactive courses for five semesters (Spring & Fall 2023, Spring & Fall 2024, Spring 2025).

Speaker: Represented the Center for Autonomy of the Oden Institute for Computational Engineering & Sciences in the following outreach events.

World of Engineering at the University of Texas at Austin — **Oct. 2022**
Presented to K-12 students and gave a demonstration on machine learning.

Code @ Texas Advanced Computing Center (TACC) Summer Camp **June 2022**
Presented to high school students about STEM programs and engineering applications.

McNair Scholars Grad School Bootcamp **May 2022**
Met with McNair Scholars and answered their questions about STEM graduate programs.

Del Valle High School Visit **Mar. 2022, Nov. 2025**
Presented to high school students about electronics, STEM programs, and engineering applications.