Guni Sharon, PhD

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Assistant Professor

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I am a member of the AI scientific community where my work is highly cited. I strive to further the impact of my applicable expertise for solving real-world problems while simultaneously continuing to make theoretical advances that justify the proposed solutions. My areas of expertise include: reinforcement learning, combinatorial search, algorithmic game theory, flow and convex optimization, and multiagent modeling.

Education

Postdoctoral Fellow in Computer Science, *University of Texas at Austin , Austin, TX* — July 2018
PhD. in Information Systems Engineering, *Ben-Gurion University, Beersheba, Israel* — November 2015
MSc. in Information Systems Engineering; with Honors (top 10%), *Ben-Gurion University, Beersheba, Israel* — March 2012
BSc. in Information Systems Engineering; with Honors (top 10%), *Ben-Gurion University, Beersheba, Israel* — August 2011

Appointments

Assistant Professor — **August 2018 — Present**
Texas A&M University, Computer Science & Engineering — *College Station, TX*

- Develop and implement innovative instructional methods.
- Guide and mentor students in academic research.
- Assess, review, and evaluate students' academic activities and progress.
- Create, develop, and implement career-enhancement programs and activities.
- Supervise and support teaching assistants.
- Serve and support functional activities of departmental committees.

Mays Innovation Research Center Faculty Affiliate — **September 2020 — 2022**
Texas A&M University, Mays Business School — *College Station, TX*

- Supervise joint (Computer Science, Business School) research projects.
- Serve on a joint steering committee.

Visiting Scholar — **July 2012 — September 2012**
University of Denver, Computer Science — *Denver, CO*

- Develop, implement, and analyze novel algorithms for solving real-time agent-centered search.

Awards and Recognitions

Bergmann Memorial Research Award — **January 2024**
Binational Science Foundation

NSF 'CAREER' Award — **March 2023**
National Science Foundation

'AI 2000' Most Influential Scholar Honorable Mention in AAAI/IJCAI — **March 2022**
ArnetMiner (AMiner) www.aminer.cn

Early-Career Spotlight Invited talk ("Alleviating Road Traffic Congestion with Artificial Intelligence") — **August 2021**
the 30th International Joint Conference on Artificial Intelligence (IJCAI-21)

Invited Speaker ("Reducing Congestion through Smart Traffic Management") — **September 2021**
MOVE America 2021

Media Interviews (regarding "Smart Intersections") — **Ongoing**
WIRED, FUTURITY, KHOU-11, KBTX-TV, Настоящее Время, KAGS-TV

2020 Prominent Paper Award ("Conflict-based Search for Optimal Multi-agent Pathfinding") — **September 2020**
The journal of Artificial Intelligence (AIJ)

Faculty Teaching Excellence Award — **March 2019**
Computer science & engineering, Texas A&M University

Invited Speaker ("Roadway Pricing for Optimized Traffic Flow") — **November 2018**
Reinforcement Learning for Transportation @ International conference on intelligent transportation systems

Outstanding Paper Award ("Bidirectional Search that is Guaranteed to Meet in the Middle") — **February 2016**
AAAI Conference on Artificial Intelligence

Best Paper Award ("Meta-Agent Conflict-Based Search for Optimal Multi-Agent Path Finding") — **July 2012**
International Symposium on Combinatorial Search (SOCS-12)

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Teaching

CSCE 642: Deep Reinforcement Learning, *Texas A&M University* — Fall 2023
CSCE 689: Reinforcement Learning, *Texas A&M University* — Fall 2022
CSCE 633: Machine Learning, *Texas A&M University* — Spring 2022
CSCE 421: Machine Learning, *Texas A&M University* — Fall 2021
CSCE 689: Reinforcement Learning, *Texas A&M University* — Spring 2021
CSCE 425: Introduction to A.I., *Texas A&M University* — Fall 2020
CSCE 689: Reinforcement Learning, *Texas A&M University* — Spring 2020
CSCE 625: Introduction to A.I., *Texas A&M University* — Fall 2019
CSCE 689: Intelligent Transportation Systems, *Texas A&M University* — Fall 2018

Professorial Activities

Senior Program Committee Member
- AAAI Conference on Artificial Intelligence — 2022, 2023
- International Joint Conference on Artificial Intelligence (IJCAI) — 2021

Program Committee Board
- International Joint Conference on Artificial Intelligence (IJCAI) — 2022 – 2025 (3-year appointment)

Program Committee Member
- International Joint Conference on Artificial Intelligence (IJCAI) — 2020
- AAAI Conference on Artificial Intelligence — 2020
- International Conference on Autonomous Agents and Multiagent Systems (AAMAS) — 2019
- AAAI Conference on Artificial Intelligence — 2019
- International Conference on Automated Planning and Scheduling (ICAPS) — 2018
- International Conference on Autonomous Agents and Multiagent Systems (Doctoral Consortium) — 2017
- International Symposium on Combinatorial Search (SOCS) — 2017
- International Joint Conference on Artificial Intelligence (IJCAI) — 2017
- International Symposium on Combinatorial Search (SOCS) — 2016
- AAAI Conference on Artificial Intelligence — 2016
- International Joint Conference on Artificial Intelligence (IJCAI) — 2016
- International Symposium on Combinatorial Search (SOCS) — 2015

Journal Article Reviewer
- Artificial Intelligence Journal (AIJ) — 2015, 2021, 2022, 2023
- Autonomous Agents and Multi-Agent Systems (JAAMAS) — 2020
- Journal of Artificial Intelligence Research (JAIR) — 2016, 2017, 2018, 2019
- Journal of Intelligent Transportation Systems — 2018
- IEEE Intelligent Systems — 2015

Event Chair
- 3rd Workshop on Data-driven Intelligent Transportation (DIT 2022) — October 2022
- Special session: “Flow Optimization in Traffic Networks” at ISAIM-18 — January 2018

Federal Review Panel
- National Science Foundation: Robust Intelligence (RI) — 2022, 2023
- National Science Foundation: Predictive Intelligence for Pandemic Prevention (PIPP) — 2022

Publications

Book Chapters

1. Stephen Boyles, Kara Kockelman, Christian Claudel, Paul Avery, Wendy Wagner, Lisa Loftus-Otway, Daniel Fagnant, Prateek Bansal, Michael Levin, Rahul Patel, Tianxin Li, Yong Zhao, Michele Simoni, Lewis Clements, Guni Sharon, Duncan Stewart, Peter Stone, Aqshems Nichols, Tejas Choudhary, Josiah Hanna, Purser Sturgeon, Michael Albert, Jia Li, Krishna Murthy Gurumurthy, Kenneth A. Perrine, Qinglu Ma Marc Segal, and Hagen Fritz. *Smart Transport for Cities and Nations: The Rise of Self-Driving and Connected Vehicles*. University of Texas at Austin, 2018

   (a) Chapter 9: “Traffic Models for Automated Vehicles”

   (b) Chapter 11: “Application of Traffic Models”

   (c) Chapter 12: “Implementation of Dynamic”

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Refereed Articles in Journals

1. Sumedh Pendurkar, Taoan Huang, Brendan Juba, Jiapeng Zhang, Sven Koenig, and Guni Sharon. The (un)scalability of informed heuristic function estimation in NP-hard search problems. *Transactions on Machine Learning Research*, 2023
2. Aaron Parks-Young and Guni Sharon. Intersection management protocol for mixed autonomous and human-operated vehicles. *IEEE Transactions on Intelligent Transportation Systems*, 23(10):18315–18325, 2022
3. Roberto Capobianco, Varun Kompella, James Ault, Guni Sharon, Stacy Jong, Spencer Fox, Lauren Meyers, Peter R. Wurman, and Peter Stone. Agent-based Markov modeling for improved COVID-19 mitigation policies. *Journal of Artificial Intelligence Research (JAIR)*, 71:953–992, August 2021
4. Yuqian Jiang, Harel Yedidsion, Shiqi Zhang, Guni Sharon, and Peter Stone. Multi-robot planning with conflicts and synergies. *Autonomous Robots*, 43(8):2011–2032, 2019
5. Guni Sharon, Michael W. Levin, Josiah P. Hanna, Tarun Rambha, Stephen D. Boyles, and Peter Stone. Network-wide adaptive tolling for connected and automated vehicles. *Transportation Research Part C*, 84:142–157, September 2017
6. Robert C Holte, Ariel Felner, Guni Sharon, Nathan R Sturtevant, and Jingwei Chen. Mm: A bidirectional search algorithm that is guaranteed to meet in the middle. *Artificial Intelligence*, 252:232–266, 2017
7. Guni Sharon, Roni Stern, Ariel Felner, and Nathan R. Sturtevant. Conflict-based search for optimal multi-agent pathfinding. *Artificial Intelligence*, 219:40–66, 2015
8. Meir Goldenberg, Ariel Felner, Roni Stern, Guni Sharon, Nathan R Sturtevant, Robert C Holte, and Jonathan Schaeffer. Enhanced partial expansion A*. *J. Artif. Intell. Res.(JAIR)*, 50:141–187, 2014
9. Guni Sharon, Roni Stern, Meir Goldenberg, and Ariel Felner. The increasing cost tree search for optimal multi-agent pathfinding. *Artificial Intelligence*, 195:470–495, 2013

Peer-reviewed Conference Proceedings

1. Manal Anis, Sumedh Pendurkar, Yun Kyu Yi, and Guni Sharon. Comparison between popular genetic algorithm (GA)-based tool and covariance matrix adaptation – evolutionary strategy (CMA-ES) for optimizing indoor daylight. In *Proceedings of Building Simulation 2023: 18th Conference of IBPSA*. International Building Performance Association, 2023
2. Vaibhav Bajaj, Guni Sharon, and Peter Stone. Task phasing: Automated curriculum learning from demonstrations. In *Proceedings of the 33rd International Conference on Automated Planning and Scheduling (ICAPS 2023)*, July 2023
3. Michael Oesterle and Guni Sharon. Socially optimal non-discriminatory restrictions for continuous-action games. *Proceedings of the 37th AAAI Conference on Artificial Intelligence*, 36(01), Feb. 2023
4. Sumedh Pendurkar, Chris Chow, Luo Jie, and Guni Sharon. Bilevel entropy based mechanism design for balancing meta in video games. In *Proceedings of the 2023 International Conference on Autonomous Agents and Multiagent Systems*, AAMAS '23, pages 2134–2142, Richland, SC, USA, 2023. International Foundation for Autonomous Agents and Multiagent Systems
5. Sumedh Pendurkar, Taoan Huang, Sven Koenig, and Guni Sharon. A discussion on the scalability of heuristic approximators. In *Proceedings of the International Symposium on Combinatorial Search*, volume 15, pages 311–313, 2022
6. James Ault and Guni Sharon. Reinforcement learning benchmarks for traffic signal control. In *Proceedings of the 35th Neural Information Processing Systems (NeurIPS 2021) Track on Datasets and Benchmarks*, December 2021
7. Guni Sharon. Alleviating road traffic congestion with artificial intelligence. In Zhi-Hua Zhou, editor, *Proceedings of the Thirtieth International Joint Conference on Artificial Intelligence, IJCAI-21*, pages 4965–4969. International Joint Conferences on Artificial Intelligence Organization, August 2021. Early Career Track
8. Sheelabhadra Dey, Sumedh Pendurkar, Guni Sharon, and Josiah P. Hanna. A joint imitation-reinforcement learning framework for reduced baseline regret. In *2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 3485–3491. IEEE Press, 2021
9. Guni Sharon, James Ault, Peter Stone, Varun Kompella, and Roberto Capobianco. Multiagent epidemiologic inference through realtime contact tracing. In *Proceedings of the 20th International Conference on Autonomous Agents and MultiAgent Systems (AAMAS 2021)*, pages 1182–1190. International Foundation for Autonomous Agents and Multiagent Systems, May 2021
10. James Ault, Josiah P. Hanna, and Guni Sharon. Learning an interpretable traffic signal control policy. In *Proceedings of the 19th International Conference on Autonomous Agents and MultiAgent Systems*, AAMAS '20, pages 88–96, 2020

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11. Josiah P. Hanna, Guni Sharon, Stephen D. Boyles, and Peter Stone. Selecting compliant agents for opt-in micro-tolling. *Proceedings of the AAAI Conference on Artificial Intelligence*, 33(01):565–572, July 2019

12. Guni Sharon, Stephen D. Boyles, Shani Alkoby, and Peter Stone. Marginal cost pricing with a fixed error factor in traffic networks. In *Proceedings of the 18th International Conference on Autonomous Agents and MultiAgent Systems*, pages 1539–1546, Richland, SC, 2019. International Foundation for Autonomous Agents and Multiagent Systems

13. Hamid Mirzaei, Guni Sharon, Stephen Boyles, Tony Givargis, and Peter Stone. Enhanced delta-tolling: Traffic optimization via policy gradient reinforcement learning. In *2018 21st International Conference on Intelligent Transportation Systems (ITSC)*, pages 47–52, 2018

14. Guni Sharon, Michael Albert, Tarun Rambha, Stephen Boyles, and Peter Stone. Traffic optimization for a mixture of self-interested and compliant agents. In *Proceedings of the AAAI Conference on Artificial Intelligence*, volume 32, pages 1202–1209, 2018

15. Haipeng Chen, Bo An, Guni Sharon, Josiah P. Hanna, Peter Stone, Chunyan Miao, and Yeng Chai Soh. Dyetc: Dynamic electronic toll collection for traffic congestion alleviation. In *Proceedings of the 32nd AAAI Conference on Artificial Intelligence (AAAI-18)*, pages 757–765, February 2018

16. Shiqi Zhang, Yuqian Jiang, Guni Sharon, and Peter Stone. Multirobot symbolic planning under temporal uncertainty. In *Proceedings of the 16th International Conference on Autonomous Agents and Multiagent Sytems (AAMAS)*, pages 501–510, May 2017

17. Eyal Shimony Eli Boyarski Meir Goldenerg Guni Sharon Nathan R. Sturtevant Glenn Wagner Ariel Felner, Stern Roni and Pavel Surynek. Search-based optimal solvers for the multi-agent pathfinding problem: Summary and challenges. In *Tenth Annual Symposium on Combinatorial Search (SOCS-17)*, pages 29–37, 2017

18. Guni Sharon, Josiah P. Hanna, Tarun Rambha, Michael W. Levin, Michael Albert, Stephen D. Boyles, and Peter Stone. Real-time adaptive tolling scheme for optimized social welfare in traffic networks. In *Proceedings of the 16th International Conference on Autonomous Agents and Multiagent Systems (AAMAS-2017)*, pages 828–836, May 2017

19. Hang Ma, Craig Tovey, Guni Sharon, T. K. Kumar, and Sven Koenig. Multi-agent path finding with payload transfers and the package-exchange robot-routing problem. volume 30, pages 3166–3173, March 2016

20. Robert C Holte, Ariel Felner, Guni Sharon, and Nathan R Sturtevant. Bidirectional search that is guaranteed to meet in the middle. In *30th AAAI Conference on Artificial Intelligence (AAAI-16)*, pages 3411–3417, 2016

21. Robert C. Holte Nathan R. Sturtevant Guni Sharon, Ariel Felner. An improved priority function for bidirectional heuristic search. In *Ninth Annual Symposium on Combinatorial Search (SOCS-16)*, pages 139–140, 2016

22. Eli Boyarski, Ariel Felner, Roni Stern, Guni Sharon, Oded Betzalel, David Tolpin, and Eyal Shimony. Icbs: The improved conflict-based search algorithm for multi-agent pathfinding. In *Twenty-Fourth International Joint Conference (IJCAI 15)*, pages 740–746, 2015

23. Ofra Amir, Guni Sharon, and Roni Stern. Multi-agent pathfinding as a combinatorial auction. In *Proceedings of the Twenty-Ninth AAAI Conference on Artificial Intelligence*, AAAI'15, pages 2003–2009. AAAI Press, 2015

24. Eli Boyrasky, Ariel Felner, Guni Sharon, and Roni Stern. Don't split, try to work it out: Bypassing conflicts in multi-agent pathfinding. In *The 25th International Conference on Automated Planning and Scheduling (ICAPS 15)*, pages 47–51, 2015

25. Max Barer, Guni Sharon, Roni Stern, and Ariel Felner. Suboptimal variants of the conflict-based search algorithm for the multi-agent pathfinding problem. In *Seventh Annual Symposium on Combinatorial Search (SOCS-14)*, pages 19–27, 2014

26. Guni Sharon, Ariel Felner, and Nathan R. Sturtevant. Exponential deepening A* for real-time agent-centered search. In *Proceedings of the Twenty-Eighth AAAI Conference on Artificial Intelligence*, AAAI'14, pages 871–877. AAAI Press, 2014

27. Guni Sharon, Nathan Sturtevant, and Ariel Felner. Online detection of dead states in real-time agent-centered search. In *Sixth Annual Symposium on Combinatorial Search (SOCS 13)*, pages 167–174, 2013

28. Ariel Felner Guni Sharon, Roni Stern and Nathan Sturtevant. Conflict-based search for optimal multi-agent path finding. In *Proceedings of the Twenty-Sixth Conference on Artificial Intelligence (AAAI-12)*, pages 563–569, July 2012

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29. Ariel Felner, Meir Goldenberg, Guni Sharon, Roni Stern, Tal Beja, Nathan R Sturtevant, Jonathan Schaeffer, and Robert Holte. Partial-expansion A* with selective node generation. In *Proceedings of the Twenty-Sixth Conference on Artificial Intelligence (AAAI-12)*, pages 180–181, 2012

30. Guni Sharon, Roni Stern, Ariel Felner, and Nathan R Sturtevant. Meta-agent conflict-based search for optimal multi-agent path finding. In *Fourth Annual Symposium on Combinatorial Search (SOCS 12)*, volume 1, pages 39–40, 2012

31. Guni Sharon, Roni Tzvi Stern, Meir Goldenberg, and Ariel Felner. Pruning techniques for the increasing cost tree search for optimal multi-agent pathfinding. In *Fourth Annual Symposium on Combinatorial Search (SOCS 11)*, pages 150–157, 2011

32. Meir Goldenberg Guni Sharon, Roni Stern and Ariel Felner. The increasing cost tree search for optimal multi-agent pathfinding. In *Proceedings of the Twenty-Second International Joint Conference on Artificial Intelligence (IJCAI)*, pages 662–667, July 2011

Technical Reports

1. Kara Kockelman, Prateek Bansal Fagnant, Michael W Levin, Yong Zhao, Jun Liu, Lewis Clements, Wendy Wagner, Dr Duncan Stewart, Guni Sharon, Michael Albert, et al. Bringing smart transport to texans: Ensuring the benefits of a connected and autonomous transport system in texas. Technical report, Center for Transportation Research at the University of Texas at Austin, 2016

2. Kara Kockelman, Stephen Boyles, Peter Stone, Dan Fagnant, Rahul Patel, Michael W. Levin, Guni Sharon, Michele Simoni, Michael Albert, Hagen Fritz, Rebecca Hutchinson, Prateek Bansal, Gelb Domnenko, Pavle Bujanovic, Bumsik Kim, Elaham Pourrahmani, Sudesh Agrawal, Tianxin Li, Josiah Hanna, Aqshems Nichols, and Jia Li. An assessment of autonomous vehicles: Traffic impacts and infrastructure needs — final report. Technical Report 0-6847-1, The University of Texas at Austin Center for Transportation Research, March 2017