Zachary K. Kingston

Contact Information

Lab Website	https://commalab.org/	E-Mail	zkingston@purdue.edu
Personal Website	https://zkingston.com/	Google Scholar ID	PqcZ56cAAAAJ
LinkedIn	zachary-kingston-79421b294	DBLP ID	173/7760
ORCiD	0000-0002-3896-5110	GitHub	zkingston

Research Interests

I am interested in fast, reactive planning for robots over large time scales satisfying complex constraints. I also want these methods to generalize to any system (e.g., manipulators, soft robots, mobile robots, etc.) and provide guarantees on performance, completeness, or solution quality. I am also interested in the intersection between theory and implementation, where software engineering and hardware acceleration (e.g., SIMD, CUDA, etc.) can synergize to bring real-time performance to even heavily constrained platforms.

Professional Experience

Purdue University *at West Lafayette, IN*	Assistant Professor *in the Department of Computer Science*	Aug. 2024–Present
Kavraki Lab *at Rice University, Houston, TX*	Post-Doctoral Researcher and Lab Manager *Supervisor: Dr. Lydia Kavraki*	Dec. 2021–Aug. 2024 https://kavrakilab.org/
	Graduate Student *Advisor: Dr. Lydia Kavraki*	Aug. 2016–Dec. 2021
	Undergraduate Researcher *Advisor: Dr. Lydia Kavraki*	Feb. 2015–Aug. 2016
Dexterous Robotics Lab *at NASA JSC, Houston, TX*	NSTRF Fellow *Supervisor: Dr. Julia Badger*	Aug. 2017–Aug. 2021 https://er.jsc.nasa.gov/er4/
	USRA Intern *Supervisor: Dr. Julia Badger*	Summer 2017
	Guest Researcher *Supervisor: Dr. Julia Badger*	Summer 2016
Multi-Robot Systems Lab *at Rice University, Houston, TX*	Undergraduate Researcher *Advisor: Dr. James McLurkin*	May 2014–May 2015 http://mrsl.rice.edu/

Updated: March 20, 2025

Education

Rice University *Houston, TX*	Ph.D. in Computer Science Thesis: *Toward Efficient and General Multi-Modal Planning* Advisor: Dr. Lydia E. Kavraki	Aug. 2016–Dec. 2021
	M.S. in Computer Science Thesis: *A Unifying Framework for Constrained Sampling-Based Planning* Advisor: Dr. Lydia E. Kavraki	Aug. 2016–Dec. 2017
	B.S. in Computer Science	Aug. 2012–May 2016

Publications

All publications are available on my lab's website and my Google Scholar. Author names are ordered by contribution unless otherwise marked. Undergraduate students I advised are marked with [U]. Graduate students I advised are marked with [G]. Purdue students are marked in gold. Publications after starting at Purdue have their label marked in ***gold***. [†]marks equal contribution.

Peer-Reviewed Journal Articles

J1. S. Bora Bayraktar, Andreas Orthey, **Zachary Kingston**, Marc Toussaint, and Lydia E. Kavraki. Solving rearrangement puzzles using path defragmentation in factored state spaces. *IEEE Robotics and Automation Letters*, 8(8):4529–4536, 2023. doi:10.1109/LRA.2023.3282788. Presented at ICRA 2024

J2. **Zachary Kingston** and Lydia E. Kavraki. Scaling multi-modal planning: Using experience and informing discrete search. *IEEE Transactions on Robotics*, 39(1):128–146, 2023. doi:10.1109/TRO.2022.3197080

J3. Constantinos Chamzas, Carlos Quintero-Peña, **Zachary Kingston**, Andreas Orthey, Daniel Rakita, Michael Gleicher, Marc Toussaint, and Lydia E. Kavraki. MotionBenchMaker: A tool to generate and benchmark motion planning datasets. *IEEE Robotics and Automation Letters*, 7(2):882–889, 2021. doi:10.1109/LRA.2021.3133603

J4. **Zachary Kingston**, Mark Moll, and Lydia E. Kavraki. Exploring implicit spaces for constrained sampling-based planning. *The International Journal of Robotics Research*, 38(10–11):1151–1178, 2019. doi:10.1177/0278364919868530

J5. Neil T. Dantam, **Zachary Kingston**, Swarat Chaudhuri, and Lydia E. Kavraki. An incremental constraint-based framework for task and motion planning. *The International Journal of Robotics Research*, 37(10):1134–1151, 2018. doi:10.1177/0278364918761570

J6. **Zachary Kingston**, Mark Moll, and Lydia E. Kavraki. Sampling-based methods for motion planning with constraints. *Annual Review of Control, Robotics, and Autonomous Systems*, 1(1):159–185, 2018. doi:10.1146/annurev-control-060117-105226

Peer-Reviewed Conference Papers

C1. Lucas Chen[†U], Yitian Gao[†U], Sicheng Wang, Francesco Fuentes, Laura H. Blumenschein, and **Zachary Kingston**. Physics-grounded differentiable simulation for soft growing robots. In *IEEE-RAS International Conference on Soft Robotics*, 2025. URL https://arxiv.org/abs/2501.17963. To Appear

C2. Tyler S. Wilson, Wil Thomason, **Zachary Kingston**, Lydia E. Kavraki, and Jonathan D. Gammell. Nearest-neighbourless asymptotically optimal motion planning with fully connected informed trees (FCIT*). In *IEEE International Conference on Robotics and Automation*, 2025. URL https://arxiv.org/abs/2411.17902. To Appear

C3. Akshaya Agrawal[G], Parker Mayer, **Zachary Kingston**, and Geoffrey A. Hollinger. Constrained nonlinear Kaczmarz projection on intersections of manifolds for coordinated multi-robot mobile manipulation. In *IEEE International Conference on Robotics and Automation*, 2025. URL https://arxiv.org/abs/2410.21630. To Appear

C4. Weihang Guo[G], **Zachary Kingston**, and Lydia E. Kavraki. CaStL: Constraints as specifications through LLM translation for long-horizon task and motion planning. In *IEEE International Conference on Robotics and Automation*, 2025. URL https://arxiv.org/abs/2410.22225. To Appear

C5. Yuanchu Liang[†], Edward Kim[†], Wil Thomason[†], **Zachary Kingston**[†], Hanna Kurniawati, and Lydia E. Kavraki. Scaling long-horizon online POMDP planning via rapid state space sampling. In *International Symposium of Robotics Research*, 2024. URL https://arxiv.org/abs/2411.07032

C6. Clayton W. Ramsey[G], **Zachary Kingston**[†], Wil Thomason[†], and Lydia E. Kavraki. Collision-affording point trees: SIMD-amenable nearest neighbors for fast collision checking. In *Robotics: Science and Systems*, 2024. doi:10.15607/RSS.2024.XX.038

C7. Wil Thomason[†], **Zachary Kingston**[†], and Lydia E. Kavraki. Motions in microseconds via vectorized sampling-based planning. In *IEEE International Conference on Robotics and Automation*, pages 8749–8756, 2024. doi:10.1109/ICRA57147.2024.10611190

C8. Carlos Quintero-Peña, Wil Thomason, **Zachary Kingston**, Anastasios Kyrillidis, and Lydia E. Kavraki. Stochastic implicit neural signed distance functions for safe motion planning under sensing uncertainty. In *IEEE International Conference on Robotics and Automation*, pages 2360–2367, 2024. doi:10.1109/ICRA57147.2024.10610773

C9. Khen Elimelech, **Zachary Kingston**, Wil Thomason, Moshe Vardi, and Lydia E. Kavraki. Accelerating long-horizon planning with affordance-directed dynamic grounding of abstract strategies. In *IEEE International Conference on Robotics and Automation*, pages 12688–12695, 2024. doi:10.1109/ICRA57147.2024.10610486

C10. Rahul Shome, **Zachary Kingston**, and Lydia E. Kavraki. Robots as AI double agents: Privacy in motion planning. In *IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 2861–2868, 2023. doi:10.1109/IROS55552.2023.10341460

C11. Carlos Quintero-Peña, **Zachary Kingston**, Tianyang Pan, Rahul Shome, Anastasios Kyrillidis, and Lydia E. Kavraki. Optimal grasps and placements for task and motion planning in clutter. In *IEEE International Conference on Robotics and Automation*, pages 3707–3713, 2023. doi:10.1109/ICRA48891.2023.10161455

C12. Yiyuan Lee[G], Wil Thomason, **Zachary Kingston**, and Lydia E. Kavraki. Object reconfiguration with simulation-derived feasible actions. In *IEEE International Conference on Robotics and Automation*, pages 8104–8111, 2023. doi:10.1109/ICRA48891.2023.10160377

C13. **Zachary Kingston** and Lydia E. Kavraki. Robowflex: Robot motion planning with *MoveIt* made easy. In *IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 3108–3114, 2022. doi:10.1109/IROS47612.2022.9981698

C14. **Zachary Kingston**, Constantinos Chamzas, and Lydia E. Kavraki. Using experience to improve constrained planning on foliations for multi-modal problems. In *IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 6922–6927, 2021. doi:10.1109/IROS51168.2021.9636236

C15. Mark Moll, Constantinos Chamzas, **Zachary Kingston**, and Lydia E. Kavraki. HyperPlan: A framework for motion planning algorithm selection and parameter optimization. In *IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 2511–2518, 2021. doi:10.1109/IROS51168.2021.9636651

C16. Andrew M. Wells, **Zachary Kingston**, Morteza Lahijanian, Lydia E. Kavraki, and Moshe Y. Vardi. Finite horizon synthesis for probabilistic manipulation domains. *IEEE International Conference on Robotics and Automation*, pages 6336–6342, 2021. doi:10.1109/ICRA48506.2021.9561297

C17. Constantinos Chamzas, **Zachary Kingston**, Carlos Quintero-Peña, Anshumali Shrivastava, and Lydia E. Kavraki. Learning sampling distributions using local 3D workspace decompositions for motion planning in high dimensions. In *IEEE International Conference on Robotics and Automation*, pages 1283–1289, 2021. doi:10.1109/ICRA48506.2021.9561104

C18. **Zachary Kingston**, Andrew M. Wells, Mark Moll, and Lydia E. Kavraki. Informing multi-modal planning with synergistic discrete leads. In *IEEE International Conference on Robotics and Automation*, pages 3199–3205, 2020. doi:10.1109/ICRA40945.2020.9197545

C19. **Zachary Kingston**, Mark Moll, and Lydia E. Kavraki. Decoupling constraints from sampling-based planners. In Nancy M. Amato, Greg Hager, Shawna Thomas, and Miguel Torres-Torriti, editors, *Robotics Research*, pages 913–928. Springer International Publishing, Cham, 2020. ISBN 978-3-030-28619-4. doi:10.1007/978-3-030-28619-4_62

C20. Golnaz Habibi, Sándor P. Fekete, **Zachary Kingston**, and James McLurkin. Distributed object characterization with local sensing by a multi-robot system. In Roderich Groß, Andreas Kolling, Spring Berman, Emilio Frazzoli, Alcherio Martinoli, Fumitoshi Matsuno, and Melvin Gauci, editors, *Distributed Autonomous Robotic Systems: The 13th International Symposium*, volume 6, pages 205–218. Springer Proceedings in Advanced Robotics, 2018. doi:10.1007/978-3-319-73008-0_15

C21. William Baker, **Zachary Kingston**, Mark Moll, Julia Badger, and Lydia E. Kavraki. Robonaut 2 and you: Specifying and executing complex operations. In *IEEE Workshop on Advanced Robotics and its Social Impacts*, pages 1–8, Austin, TX, March 2017. doi:10.1109/ARSO.2017.8025204

C22. Neil T. Dantam, **Zachary Kingston**, Swarat Chaudhuri, and Lydia E. Kavraki. Incremental task and motion planning: A constraint-based approach. In *Robotics: Science and Systems*, Ann Arbor, MI, June 2016. doi:10.15607/RSS.2016.XII.002

C23. **Zachary Kingston**, Neil T. Dantam, and Lydia E. Kavraki. Kinematically constrained workspace control via linear optimization. In *IEEE-RAS International Conference on Humanoid Robots*, pages 758–764, Nov 2015. doi:10.1109/HUMANOIDS.2015.7363455

C24. Golnaz Habibi, **Zachary Kingston**, Zijian Wang, Mac Schwager, and James McLurkin. Pipelined consensus for global state estimation in multi-agent systems. In *Proceedings of the 2015 International Conference on Autonomous Agents and Multiagent Systems*, pages 1315–1323. International Foundation for Autonomous Agents and Multiagent Systems, 2015. ISBN 9781450334136. doi:10.5555/2772879.2773320

C25. Golnaz Habibi, **Zachary Kingston**, William Xie, Mathew Jellins, and James McLurkin. Distributed centroid estimation and motion controllers for collective transport by multi-robot systems. In *IEEE International Conference on Robotics and Automation*, pages 1282–1288, 2015. doi:10.1109/ICRA.2015.7139356

Book Chapters

B1. **Zachary Kingston**. *Encyclopedia of Robotics*, chapter Planning Under Manifold Constraints, pages 1–9. Springer Berlin Heidelberg, 2020. ISBN 978-3-642-41610-1. doi:10.1007/978-3-642-41610-1_174-1

Workshop Papers and Abstracts

W1. Qingxi Meng[G], Carlos Quintero-Peña, **Zachary Kingston**, Vaibhav Unhelkar, and Lydia E. Kavraki. Perception-aware planning for robotics: Challenges and opportunities. In *40th Anniversary of the IEEE Conference on Robotics and Automation (ICRA@40)*, 2024

W2. Carlos Quintero-Peña, Wil Thomason, **Zachary Kingston**, Anastasios Kyrillidis, and Lydia E. Kavraki. Stochastic implicit neural signed distance functions for safe motion planning under sensing uncertainty. In *IEEE ICRA 2024 Workshop—Back to the Future: Robot Learning Going Probabilistic*, 2024

W3. Clayton W. Ramsey[G], **Zachary Kingston**[†], Wil Thomason[†], and Lydia E. Kavraki. Dynamic motion planning from perception via accelerated point cloud collision checking. In *IEEE ICRA 2024 Workshop—Agile Robotics: From Perception to Dynamic Action*, 2024

W4. Qingxi Meng[†G], Carlos Quintero-Peña[†], **Zachary Kingston**, Nicole M. Fontenot, Shannan K. Hamlin, Vaibhav Unhelkar, and Lydia E. Kavraki. Monitoring constraints for robotic tutors in nurse education: A motion planning perspective. In *IEEE ICRA 2024 Workshop—Workshop on Nursing Robotics*, 2024

Theses

T1. **Zachary Kingston**. *Toward Efficient and General Multi-Modal Planning*. PhD thesis, Rice University, Houston, TX, 2021. URL https://hdl.handle.net/1911/111679

T2. **Zachary Kingston**. A unifying framework for constrained sampling-based planning. Master's thesis, Rice University, Houston, TX, 2017. URL https://hdl.handle.net/1911/105607

Preprints

P1. Chih H. Huang[†], Pranav Jadhav[†U], Brian Plancher, and **Zachary Kingston**. pRRTC: GPU-parallel RRT-connect for fast, consistent, and low-cost motion planning. In *IEEE/RSJ International Conference on Intelligent Robots and Systems*, 2025. URL https://arxiv.org/abs/2503.06757. Under Review

P2. Sai Coumar[U], Gilbert Chang[U], Nihar Kodkani[U], and **Zachary Kingston**. `foam`: A tool for spherical approximation of robot geometry. In *IEEE/RSJ International Conference on Intelligent Robots and Systems*, 2025. URL https://arxiv.org/abs/2503.13704. Under Review

P3. Sai Coumar[U]and **Zachary Kingston**. Evaluating machine learning approaches for ASCII art generation, 2025. URL https://arxiv.org/abs/2503.14375

P4. Weihang Guo[G], **Zachary Kingston**, Kaiyu Hang, and Lydia E. Kavraki. Efficient multi-robot motion planning for manifold-constrained manipulators by randomized scheduling and informed path generation. *IEEE Robotics and Automation Letters*, 2024. URL https://arxiv.org/abs/2412.00366. Under Review

Invited Contributor

I1. Claire Le Goues, Sebastian Elbaum, David Anthony, Z. Berkay Celik, Mauricio Castillo-Effen, Nikolaus Correll, Pooyan Jamshidi, Morgan Quigley, Trenton Tabor, and Qi Zhu. Software engineering for robotics: Future research directions; report from the 2023 workshop on software engineering for robotics, 2024. URL https://arxiv.org/pdf/2401.12317.pdf

Funding

Funding obtained after starting at Purdue has the label marked in ***gold***.

Authored

G1. **Zachary Kingston**. Industrial grant withheld for confidentiality, 2025. $136,010

G2. Rahul Shome, Jenny L. Davis, **Zachary Kingston**, and Lydia E. Kavraki. Virtues of Robot Inaction: Towards Theories of Automated Reasoning of Inaction in Human Contexts, 2023. URL https://services.anu.edu.au/research-support/funding-opportunities/computing-for-social-good-seed-grants-2023. ANU Humanising Machine Intelligence Computing for Social Good Seed Research Grant, AU$25,000

Co-Authored

cG1. Lydia E. Kavraki. Elements: Scalable Next-Generation Software Infrastructure for High-Dimensional Search, 2024–2027. URL https://www.nsf.gov/awardsearch/showAward?AWD_ID=2411219. NSF OAC 2411219, $599,302

cG2. Lydia E. Kavraki and Anshumali Shrivastava. A Framework for Manipulation Planning and Execution under Uncertainty in Partially-Known Environments, 2024–2027. URL https://www.nsf.gov/awardsearch/showAward?AWD_ID=2336612. NSF CCF 2336612, $715,312

cG3. Lydia E. Kavraki and Vaibhav Unhelkar. Collaborative Research: FW-HTF-R: The Future of Robot-Assisted Nursing: Interactive AI Frameworks for Upskilling Nurses and Customizing Robot Assistance, 2022–2023. URL https://nsf.gov/awardsearch/showAward?AWD_ID=2222876. NSF HRD 2222876, $121,713

cG4. Lydia E. Kavraki. RI: Small: A Novel Framework for Informed Manipulation Planning, 2020–2023. URL https://nsf.gov/awardsearch/showAward?AWD_ID=2008720. NSF IIS 2008720, $441,000

Awards and Honors

A1. Rice Innovation Fellow, Liu Idea Lab for Innovation and Entrepreneurship, 2024
A2. *C13.* Nominated, Best Paper in Industrial Robotics Research for Practicality, IEEE/RSJ IROS, 2022
A3. *C17.* Nominated, Best Paper in Cognitive Robotics, IEEE-RAS ICRA, 2021
A4. Future Faculty Fellowship, Rice Engineering, 2020–21
A5. Best Presentation in COMP 600, Rice University Computer Science Department, 2018, 2020
A6. NASA Space Technology Research Fellowship, NASA, 2017–2021
A7. NSF Graduate Research Fellowship Program, NSF, 2017
A8. Graduate Research Fellowship, Rice University Computer Science Department, 2016
A9. Distinction in Research and Creative Works, Rice University, 2016
A10. President's Honor Roll, Rice University, 2015–16

Research Supervision

Students who I am the primary advisor for have their label marked in ***gold***.

Ph.D. Students

D1. S. Talha Bukhari, Purdue University, 2024–Present
D2. Akshaya Agrawal, Oregon State University, 2024–Present
D3. Clayton Ramsey[1], Rice University, 2023–Present
D4. Qingxi Meng, Rice University, 2023–Present
D5. Yiyuan Lee, Rice University, 2022–2023

[1] Awarded NSTGRO and NDSEG 2024

Master's Students

- **M1.** Lucas Chen, Purdue University, 2024–Present, RA Funded
- **M2.** Yitian Gao, Purdue University, 2024–Present
- *M3.* Weihang Guo, Rice University, 2023–Present
- *M4.* Elliot Herring, Rice University, 2021–2022

Undergraduate Students

- **U1.** Isaac Fuksman, Purdue University, 2025–Present, CS 497 Project
- **U2.** Aaron Boes, Purdue University, 2025–Present, CS 497 Project
- **U3.** Andrew Liu, Purdue University, 2025–Present
- **U4.** Gilbert Chang, Purdue University, 2025–Present
- **U5.** Nihar Kodkani, Purdue University, 2025–Present
- **U6.** Joseph Ruan, Purdue University, 2025–Present
- **U7.** Andrew Lu, Purdue University, 2024–Present, CS 497 Project
- **U8.** Pranav Jadhav, Purdue University, 2024–Present
- **U9.** Alexiy Buynitsky, Purdue University, 2024–Present
- *U10.* Stefan Bukorovic, University of Belgrade, 2023
- *U11.* Sofia Paola Medina-Chica, Pontificia Universidad Javeriana, 2023
- *U12.* Andreja Andrejic, University of Belgrade, 2022
- *U13.* Aedan Cullen, Rice University, 2022
- *U14.* Luis Leal[2], Rice University, 2021

[2] Award for Excellence in Poster Presentations, Rice Summer Undergraduate Research Symposium

Visiting Scholars

- **V1.** Miras Mengdibayev, Purdue University, 2025–Present
- **V2.** Sai Coumar, Purdue University, 2024–Present

Academic Committees

- *AC1.* Phu An Pham, CS Ph.D., Advisor: Aniket Bera, Purdue University
  - Ph.D. Preliminary Exam, Feb. 2025
- *AC2.* Dipam Patel, CS Ph.D., Advisor: Aniket Bera, Purdue University
- *AC3.* Maheep Brar, CS MS, Advisor: Joseph Campbell, Purdue University
- *AC4.* Akshaya Agrawal, CS Ph.D., Advisor: Geoffrey Hollinger, Oregon State University

Service

Program Committee

- IEEE International Conference on Simulation, Modeling, and Programming for Autonomous Robots (SIMPAR), 2025

Associate Editor

- IEEE Robotics and Automation Letters (Planning and Simulation) (RA-L), 2024–Present
- IEEE International Conference on Robotics and Automation (ICRA), 2024–2025

Organizer

- RoboARCH: Robotics Acceleration with Computing Hardware and Systems, ICRA 2025
- Evaluating Motion Planning Performance Workshop, IROS 2022

Conference and Journal Referee Work

- Robotics: Science and Systems (RSS), 2024–2025
- IEEE Robotics and Automation Letters (RA-L), 2020–2025
- IEEE-RAS International Conference on Soft Robotics (RoboSoft), 2025
- IEEE International Conference on Robotics and Automation (ICRA), 2018, 2022–2025
- Journal of Artificial Intelligence Research (JAIR), 2024
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2020–2024
- IEEE Transactions on Robotics (T-RO), 2022–2023
- IEEE/ASME Transactions on Mechatronics, 2020
- IEEE Transactions on Automation Science and Engineering (T-ASE), 2020
- Workshop on the Algorithmic Foundations of Robotics (WAFR), 2020
- International Symposium on Robotics Research (ISRR), 2017

Government Activities

- Proposed topic for NSF Emerging Frontiers in Research and Innovation (EFRI), reached Blue Ribbon Panel, 2025
- Reviewer for the NASA Space Technology Graduate Research Opportunity (NSTGRO), 2025

Department Service

- Graduate Admissions Committee, AY 2024–2025

Other Service

- Maintainer of OMPL Motion Planning Software, Dec. 2021–Present
- Judge for Purdue SIGBots Slam and Jam VEXU Qualifier, Mar. 2025
- Core Contributor to the *MoveIt* Robot Motion Planning Software , Mar. 2019–Jun. 2020
- Maintainer of the *MoveIt* Robot Motion Planning Software , Sep. 2018–Mar. 2019
- Computer Science Representative, Graduate Student Association , Mar. 2018–May 2020
- Consultant for Rice's Center for Academic and Professional Communication , Aug. 2018–May 2019
- Treasurer, Computer Science Graduate Student Association , Aug. 2017–May 2019
- Consultant for Robot Revolution Exhibit at the Museum of Science and Industry, Chicago, IL, Jan. 2015–May 2015
- Summer Swarm Robotics Camp Instructor at Rice University, Jul. 2014

Teaching

T1. **Software Engineering for Robotics** (Spring 2025), Instructor of Record, CS 593-SER, Purdue University, 24 Enrolled
T2. **Robot Manipulation** (Fall 2024), Instructor of Record, CS 592-RM1, Purdue University, 5 Enrolled
T3. **Introduction to Robotics** (Fall 2024), Guest Lecturer, CS 458, Purdue University
T4. **Physical Computing** (Spring 2024), Instructor of Record, COMP 650, Rice University, 11 Enrolled
T5. **Algorithmic Robotics** (Fall 2020), Lecturer, COMP/ELEC/MECH 450/550, Rice University
T6. **Algorithmic Robotics** (Fall 2016–2019, 2022), Teaching Assistant, COMP/ELEC/MECH 450/550, Rice University
T7. **Introduction to Computer Systems** (Spring 2015, 2018), In-Lab Teaching Assistant, COMP 321, Rice University
T8. **Introduction to Computational Thinking** (Fall 2015), In-Class Teaching Assistant, COMP 140, Rice University
T9. **Introduction to Engineering Systems** (Fall 2014), In-Class Teaching Assistant, ENGI 128, Rice University

Invited Talks

Talks are organized by talk title. If available, a link to a video of the talk is provided with the ▶ link.

Efficient and General Planning for Robot Manipulation

Purdue CS Graduate Symposium	*at West Lafayette, IN*	Mar. 2025
Purdue CS Graduate Seminar	*at West Lafayette, IN*	Oct. 2024
Purdue CS Honor's Seminar	*at West Lafayette, IN*	Sep. 2024
UCSD ECE Seminar	*at La Jolla, CA*	Mar. 2024
Purdue Computer Science Seminar	*at West Lafayette, IN*	Feb. 2024
Texas A&M Computer Science Seminar	*at College Station, TX*	Feb. 2024

Motions in Microseconds via Vectorized Sampling-Based Planning

Intelligent Autonomous Systems Group	*virtual at TU Darmstadt, w/ Wil Thomason*	Jan. 2024
Pumps & Pipes ▶	*at the ION, w/ Wil Thomason*	Dec. 2023

Scaling Multi-Modal Planning

AI, ML, and Friends Seminar	*virtual at ANU School of Computing*	Feb. 2023
University of Utah Robotics Seminar	*virtual*	Jul. 2021
Learning and Intelligent Systems Lab ▶	*virtual at TU Berlin*	Jul. 2021

Robonaut 2 and You: Specifying and Executing Complex Operations

International Workshop on AI-Powered Space	*at the ION*	Nov. 2023
Humanoid Users Conference	*at NASA JSC*	May 2017

Robowflex: Simplifying Planning and Benchmarking with MoveIt

2022 MoveIt Community Meeting ▶	*virtual*	Feb. 2022

Open Source Software

Maintainer

The Open Motion Planning Library (OMPL)	https://ompl.kavrakilab.org/
Robowflex	https://github.com/KavrakiLab/robowflex
MotionBenchMaker	https://github.com/KavrakiLab/motion_bench_maker
HyperPlan	https://github.com/KavrakiLab/hyperplan
Vector-Accelerated Motion Planner (VAMP)	https://github.com/KavrakiLab/vamp
Differentiable Vine Simulator	https://github.com/CoMMALab/DiffVineSimPy
Foam	https://github.com/CoMMALab/foam
GPU-Parallel RRT-Connect	https://github.com/CoMMALab/pRRTC

Contributor

MoveIt Robot Motion Planning Software	https://moveit.ros.org/