

Wil Thomason

CONTACT INFORMATION	Rice University Department of Computer Science DH 3053, 6100 Main Street Houston, TX 77005	wbthomason@rice.edu https://wbthomason.github.io
CURRENT POSITION	CRA Computing Innovation Postdoctoral Research Fellow <i>Supervised by Dr. Lydia E. Kavraki.</i>	Since January 2022 Rice University, Houston, TX
RESEARCH INTERESTS	Robot autonomy: integrated task and motion planning, neuro-symbolic planning, planning under uncertainty, hardware accelerated planning, motion planning, ML for planning	
EDUCATION	Cornell University , Ithaca, NY <i>Ph.D. in Computer Science. Advisor: Hadas Kress-Gazit.</i>	August 2015 – December 2021
	Cornell University , Ithaca, NY <i>MS in Computer Science. Advisor: Ross A. Knepper.</i>	August 2015 – June 2019
	University of Virginia , Charlottesville, VA <i>BS (with high distinction) in Computer Science and Mathematics</i>	August 2012 – May 2015
AWARDS	Rice Innovation Fellows <i>Liu Idea Lab for Innovation and Entrepreneurship at Rice University</i>	January 2024
	Computing Innovation Postdoctoral Fellowship <i>Computing Research Association (CRA) and National Science Foundation (NSF). 29% acceptance rate</i>	August 2021
	RSS Pioneers <i>Robotics: Science and Systems. 33.7% acceptance rate</i>	April 2020
	Outstanding Teaching Assistant Award <i>Cornell University Department of Computer Science</i>	May 2017
	NDSEG Fellow <i>American Society for Engineering Education</i>	April 2017
	NSF GRFP Fellow <i>The National Science Foundation</i>	March 2017
	Outstanding Teaching Assistant Award <i>Cornell University Department of Computer Science</i>	May 2016
	NSF GRFP Honorable Mention <i>The National Science Foundation</i>	March 2016
	Louis T. Rader Outstanding Education Undergraduate Student <i>University of Virginia Department of Computer Science</i>	May 2015
	Rodman Scholar <i>University of Virginia School of Engineering</i>	January 2013
	Dean's List <i>University of Virginia</i>	2012–2015
PREPRINTS UNDER REVIEW	1. <i>Title withheld for double-blind review.</i> Clayton W. Ramsey, Zachary Kingston*, Wil Thomason* , and Lydia E. Kavraki. Submitted to RSS 2024, under review. * signifies equal contribution.	

PEER-REVIEWED CONFERENCE PUBLICATIONS	<ol style="list-style-type: none"> 1. <i>Motions in Microseconds via Vectorized Sampling-Based Planning</i>. Wil Thomason*, Zachary Kingston*, and Lydia E. Kavraki. ICRA 2024, * signifies equal contribution. 2. <i>Stochastic Implicit Neural Signed Distance Functions for Safe Motion Planning under Sensing Uncertainty</i>. Carlos Quintero-Peña, Wil Thomason, Zachary Kingston, and Lydia E. Kavraki. ICRA 2024. 3. <i>Accelerating Long-Horizon Planning with Affordance-Directed Dynamic Grounding of Abstract Skills</i>. Khen Elimelech, Zachary Kingston, Wil Thomason, Moshe Y. Vardi, and Lydia E. Kavraki. ICRA 2024. 4. <i>Object Reconfiguration with Simulation-Derived Feasible Actions</i>. Yiyuan Lee, Wil Thomason, Zachary Kingston, and Lydia E. Kavraki. ICRA 2023. 5. <i>A Unified Sampling-Based Approach to Integrated Task and Motion Planning</i>. Wil Thomason and Ross Knepper. ISRR 2019. 6. <i>Social Momentum: A Framework for Legible Navigation in Dynamic Multi-Agent Environments</i>. Christoforos Mavrogiannis, Wil Thomason, Ross Knepper. HRI 2018. 7. <i>Zero-Shot Learning for Unfamiliar Gesture Recognition</i>. Wil Thomason and Ross Knepper. ISER 2016.
JOURNAL PUBLICATIONS	<ol style="list-style-type: none"> 1. <i>Counterexample-Guided Repair for Symbolic-Geometric Action Abstractions</i>. Wil Thomason and Hadas Kress-Gazit. T-RO 2023. 2. <i>Task and Motion Informed Trees (TMIT*): Almost-Surely Asymptotically Optimal Integrated Task and Motion Planning</i>. Wil Thomason, Marlin P. Strub, Jonathan D. Gammell. IEEE RA-L 2022, also presented at IROS 2022. 3. <i>Social Momentum: Design and Evaluation of a Framework for Socially Competent Robot Navigation</i>. Christoforos Mavrogiannis, Patrícia Alves-Oliveira, Wil Thomason, Ross A. Knepper. T-HRI 2021. 4. <i>An Accurate Real-Time RFID-Based Location System</i>. Kirti Chawla, Christopher McFarland, Gabriel Robins, Wil Thomason. International Journal of Radio Frequency Identification Technology and Applications. July 2016, authors listed in alphabetical order.
THESES	<p><i>A novel perspective on efficient integrated task and motion planning via differentiable distance-based predicate representations</i>. Wil Thomason. PhD Thesis, Cornell University. 2021.</p>
TECHNICAL REPORTS	<p><i>Ensuring Progress for Multiple Mobile Robots via Space Partitioning, Motion Rules, and Adaptively Centralized Conflict Resolution</i>. Claire Liang*, Wil Thomason*, Andy Elliot Ricci, and Soham Sankaran. arXiv 2021.</p>
GRANTS	<p>NSF FRR #2336612: “A Framework for Manipulation Planning and Execution under Uncertainty in Partially-Known Environments”. Co-authored with Lydia E. Kavraki (PI), Anshumali Shrivastava (co-PI), Zachary K. Kingston, and Tianyang Pan. 2024–2027. Award amount: \$715,312.</p> <p>NSF CCF #1646417: “Coordinated Action Among Independent Mobile Cyber-Physical Systems”. Co-authored with Ross A. Knepper (PI), Greg Morrisett (co-PI), and Abhishek Anand. 2016–2022. Award amount: \$799,995.</p>
INVITED PRESENTATIONS	<p>Interactive Robot Perception and Learning Lab January 2024 <i>TU Darmstadt (virtual)</i> Invited to present my work on vector-accelerated motion planning.</p> <p>Search Based Planning Lab November 2020 <i>Carnegie Mellon University (virtual)</i> Invited to present my work on integrated task and motion planning and automatic abstraction repair.</p> <p>RSS Pioneers Workshop July 2020 <i>Robotics: Science and Systems (virtual)</i> Presented my work on “Robust, Efficient, and Flexible Robot Planning.” RSS Pioneers is a selective annual workshop in conjunction with the Robotics: Science and Systems conference, designed to “bring together a cohort of the world’s top early career researchers to foster creativity and collaborations surrounding challenges in all areas of robotics.” (33.7% acceptance rate)</p>

- Workshop on Robust Task and Motion Planning** June 2019
Robotics: Science and Systems
 “A Flexible Sampling-Based Approach to Task and Motion Planning.”
- Workshop on Exhibition and Benchmarking of Task and Motion Planners** June 2018
Robotics: Science and Systems
 “Which comes first, the task plan or the motion plan?” Joint with Ross A. Knepper.
- Workshop on Heterogeneity and Diversity for Resilience in Multi-Robot Systems** July 2017
Robotics: Science and Systems
 “Exploiting Heterogeneity in Robot Teams Through a Formalism of Capabilities.”
- Workshop on Adaptive Shot Learning for Gesture Understanding and Production** May 2017
IEEE International Conference on Automatic Face and Gesture Recognition
 “Toward Contextual Grounding of Unfamiliar Gestures for Human-Robot Interaction.”
- 2nd Workshop on Model Learning for Human-Robot Communication** June 2016
Robotics: Science and Systems
 “Recognizing Unfamiliar Gestures for Human-Robot Interaction through Zero-Shot Learning.”

TEACHING
EXPERIENCE

- CS 4750** (*Foundations of Robotics*) *Cornell University*, Fall 2016 & Fall 2017
 Graduate TA (course design, syllabus creation, course notes authoring, coding project design and implementation, grading, office hours, lecturing). Senior and graduate-level elective. Awarded “Outstanding Teaching Assistant”.
- CS 1110** (*Introduction to Computing Using Python*) *Cornell University*, Fall 2015
 Head graduate TA (coordinating staff, giving review lectures, supervising lab sessions, grading, office hours). Introductory undergraduate CS course. Awarded “Outstanding Teaching Assistant”.
- ENG 1501** (*Introduction to Aerial Robotics*) *University of Virginia*, Fall 2014
 Instructor of record. Designed and taught I-credit special-topics undergraduate elective introducing core topics in robotics. Students built and programmed their own quadrotor robots and learned about basic kinematics, control, and perception.
- CS 4610** (*Programming Languages*) *University of Virginia*, Spring 2015
 Undergraduate TA (office hours, grading). Senior-level elective.
- CS 4710** (*Artificial Intelligence*) *University of Virginia*, Spring 2015
 Undergraduate TA (assignment design and implementation, office hours, grading). Senior-level elective.
- CS 4414** (*Operating Systems*) *University of Virginia*, Spring 2014
 Undergraduate TA (office hours, assignment design and implementation, grading). Senior-level core course.
- CS 2150** (*Program and Data Representation*) *University of Virginia*, (Fall 2013 – Spring 2015).
 Undergraduate TA (office hours, lab supervision, grading). Sophomore-level core course.

RESEARCH
SUPERVISION

- PhD Students:** Clayton Ramsey, Carlos Quintero-Peña, Yiyuan Lee
Undergraduate Students: Stefan Bukorovic, Sofia Paola Medina-Chica, Priya Srikumar, Vineet Parikh

OUTREACH

- Reviewer for Black in AI:** Reviewed abstracts for BAI workshop. 2017–2021
Mentor for Black in AI: Advised mentee on Ph.D. application process. 2019–2020
Expanding Your Horizons: Workshop Organizer/Leader. Spring 2016, 2017, 2018
UVa HS Programming Contest: Organizer/volunteer. Spring 2014, 2015
UVa CS Education Week Ran intro CS workshop. Winter 2014, 2015

SERVICE

- Organizer:** IROS 2022 Workshop on Evaluating Motion Planning Performance.
Faculty Chair: RSS Pioneers 2021 workshop.
Reviewer:

- AURO (2018)
- ICRA (2016, 2019–2023)
- IJCAI (2021)
- IJRR (2022–2023)
- IROS (2019, 2021–2023)
- MRS (2019)
- RA-L (2021–2023)
- RO-MAN (2016)
- RSS (2019)
- SIMPAR (2018)
- T-ASE (2020–2021)
- WAFR (2018)

Departmental Service:

- Student representative to Cornell CIS Anti-Racism Task Force (2020–2021)
- Ph.D. Student Admissions Reviewer (2019)
- Head Colloquium Czar (2017–2019)
- Colloquium Czar (2016–2020)
- Ph.D. Mentor Czar (2016–2018)

Other Service:

- ACM@UVa Academic Chair (2014–2015)

PROFESSIONAL EXPERIENCE

- Postdoctoral Research Fellow** *January 2022 – present*
 Kavradi Lab, Department of Computer Science, Rice University.
- Graduate Research Assistant** *January 2020 – December 2021*
 VRRG, Department of Computer Science, Cornell University.
- Graduate Research Assistant** *August 2015 – December 2019*
 Robotic Personal Assistants Lab, Department of Computer Science, Cornell University.
- Software Engineering Intern** *May 2015 – August 2015*
 Fluencia, Alexandria, VA. Worked on adding voice recognition for speech practice exercises.
- Undergraduate Research Assistant** *August 2014 – July 2015*
 Department of Computer Science, The University of Virginia. Work with Professor Westley Weimer on automatic software functionality transplantation.
- Software Development Engineer Intern** *May 2014 – August 2014*
 Accounts Client Team, Microsoft, Redmond, WA. Implemented cryptographic operations and network protocol for passwordless login feature in Microsoft Accounts Android app.
- Software Development Engineer Intern** *May 2013 – August 2013*
 Xbox LIVE Cloud Security Team, Microsoft, Redmond, WA. Designed and implemented a service for real-time logging and auditing of security records in Xbox LIVE. Initiated and completed a rewrite of an internal library to improve performance and provide a better API.
- Undergraduate Research Assistant** *January 2013 – May 2014*
 Department of Computer Science, The University of Virginia. Work with Professor Gabriel Robins on real-time localization of objects using passive RFID tags.

TECHNICAL SKILLS

Programming Languages: Python, C++, Julia, Rust, Lua, C, Bash, etc.
Technologies: Linux, ROS, OMPL, Jax, PyTorch, Git, CUDA, SIMD programming, numerical optimization, etc.