

# Wil Thomason

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CONTACT INFORMATION	Rice University Department of Computer Science DH 3053, 6100 Main Street Houston, TX 77005	<a href="mailto:wbthomason@rice.edu">wbthomason@rice.edu</a> <a href="https://wbthomason.github.io">https://wbthomason.github.io</a>
CURRENT POSITION	<b>CRA Computing Innovation Postdoctoral Research Fellow</b> <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	<b>Cornell University</b> , Ithaca, NY <i>Ph.D. in Computer Science. Advisor: Hadas Kress-Gazit.</i>	August 2015 – December 2021
	<b>Cornell University</b> , Ithaca, NY <i>MS in Computer Science. Advisor: Ross A. Knepper.</i>	August 2015 – June 2019
	<b>University of Virginia</b> , Charlottesville, VA <i>BS (with high distinction) in Computer Science and Mathematics</i>	August 2012 – May 2015
AWARDS	<b>Computing Innovation Postdoctoral Fellowship</b> <i>Computing Research Association (CRA) and National Science Foundation (NSF). 29% acceptance rate</i>	August 2021
	<b>RSS Pioneers</b> <i>Robotics: Science and Systems. 33.7% acceptance rate</i>	April 2020
	<b>Outstanding Teaching Assistant Award</b> <i>Cornell University Department of Computer Science</i>	May 2017
	<b>NDSEG Fellow</b> <i>American Society for Engineering Education</i>	April 2017
	<b>NSF GRFP Fellow</b> <i>The National Science Foundation</i>	March 2017
	<b>Outstanding Teaching Assistant Award</b> <i>Cornell University Department of Computer Science</i>	May 2016
	<b>NSF GRFP Honorable Mention</b> <i>The National Science Foundation</i>	March 2016
	<b>Louis T. Rader Outstanding Education Undergraduate Student</b> <i>University of Virginia Department of Computer Science</i>	May 2015
	<b>Rodman Scholar</b> <i>University of Virginia School of Engineering</i>	January 2013
PEER-REVIEWED CONFERENCE PUBLICATIONS	<b>Dean's List</b> <i>University of Virginia</i>	2012–2015
	<ol style="list-style-type: none"><li><i>Motions in Microseconds via Vectorized Sampling-Based Planning.</i> <b>Wil Thomason*</b>, Zachary Kingston*, and Lydia E. Kavraki. ICRA 2024, * signifies equal contribution.</li><li><i>Stochastic Implicit Neural Signed Distance Functions for Safe Motion Planning under Sensing Uncertainty.</i> Carlos Quintero-Peña, <b>Wil Thomason</b>, Zachary Kingston, and Lydia E. Kavraki. ICRA 2024.</li><li><i>Accelerating Long-Horizon Planning with Affordance-Directed Dynamic Grounding of Abstract Skills.</i> Khen Elimelech, Zachary Kingston, <b>Wil Thomason</b>, Moshe Y. Vardi, and Lydia E. Kavraki. ICRA 2024.</li></ol>	

4. *Object Reconfiguration with Simulation-Derived Feasible Actions*. Yiyuan Lee, **Wil Thomason**, Zachary Kingston, and Lydia E. Kavraki. ICRA 2023.
5. *A Unified Sampling-Based Approach to Integrated Task and Motion Planning*. **Wil Thomason** and Ross Knepper. ISRR 2019.
6. *Social Momentum: A Framework for Legible Navigation in Dynamic Multi-Agent Environments*. Christoforos Mavrogiannis, **Wil Thomason**, Ross Knepper. HRI 2018.
7. *Zero-Shot Learning for Unfamiliar Gesture Recognition*. **Wil Thomason** and Ross Knepper. ISER 2016.

#### JOURNAL PUBLICATIONS

1. *Counterexample-Guided Repair for Symbolic-Geometric Action Abstractions*. **Wil Thomason** and Hadas Kress-Gazit. T-RO 2023.
2. *Task and Motion Informed Trees (TMIT\*): Almost-Surely Asymptotically Optimal Integrated Task and Motion Planning*. **Wil Thomason**, Marlin P. Strub, Jonathan D. Gammell. IEEE RA-L 2022, also presented at IROS 2022.
3. *Social Momentum: Design and Evaluation of a Framework for Socially Competent Robot Navigation*. Christoforos Mavrogiannis, Patrícia Alves-Oliveira, **Wil Thomason**, Ross A. Knepper. T-HRI 2021.
4. *An Accurate Real-Time RFID-Based Location System*. 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

*A novel perspective on efficient integrated task and motion planning via differentiable distance-based predicate representations*. **Wil Thomason**. PhD Thesis, Cornell University. 2021.

#### TECHNICAL REPORTS

*Ensuring Progress for Multiple Mobile Robots via Space Partitioning, Motion Rules, and Adaptively Centralized Conflict Resolution*. Claire Liang\*, **Wil Thomason\***, Andy Elliot Ricci, and Soham Sankaran. arXiv 2021.

#### GRANTS

**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.

#### INVITED PRESENTATIONS

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|---|---------------|
| <b>Interactive Robot Perception and Learning Lab</b>  | January 2024  |
| <i>TU Darmstadt (virtual)</i>   |               |
| Invited to present my work on vector-accelerated motion planning.   |               |
| <b>Search Based Planning Lab</b>  | November 2020 |
| <i>Carnegie Mellon University (virtual)</i>   |               |
| Invited to present my work on integrated task and motion planning and automatic abstraction repair.   |               |
| <b>RSS Pioneers Workshop</b>  | 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) |               |
| <b>Workshop on Robust Task and Motion Planning</b>  | June 2019     |
| <i>Robotics: Science and Systems</i>  |               |
| “A Flexible Sampling-Based Approach to Task and Motion Planning.”   |               |
| <b>Workshop on Exhibition and Benchmarking of Task and Motion Planners</b>  | June 2018     |
| <i>Robotics: Science and Systems</i>  |               |
| “Which comes first, the task plan or the motion plan?” Joint with Ross A. Knepper.  |               |
| <b>Workshop on Heterogeneity and Diversity for Resilience in Multi-Robot Systems</b>  | July 2017     |
| <i>Robotics: Science and Systems</i>  |               |
| “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 1-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)
- Head Colloquium Czar (2017–2019)
- Colloquium Czar (2016–2020)
- Ph.D. Student Admissions Reviewer (2019)
- Ph.D. Mentor Czar (2016–2018)

#### Other Service:

- ACM@UVa Academic Chair (2014–2015)

#### PROFESSIONAL EXPERIENCE

- Postdoctoral Research Fellow** *January 2022 – present*  
[Kavraki 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.