Wil Thomason

Contact Information

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Research Interests

Robotics: integrated task and motion planning, constrained planning, formal methods for robotics, synthesis, motion planning, multi-agent coordination
Machine Learning: learning to plan, combining ML with classical planning

Education

Cornell University, Ithaca, NY — Present
Ph.D. in Computer Science
Advisor: Hadas Kress-Gazit

Cornell University, Ithaca, NY — June 2019
MS in Computer Science
Advisor: Ross A. Knepper

University of Virginia, Charlottesville, VA — August 2012 – May 2015
BS (with high distinction) in Computer Science and Mathematics

Awards

Outstanding Teaching Assistant Award — May 2017
Cornell University Department of Computer Science

NDSEG Fellow — April 2017
American Society for Engineering Education

NSF GRFP Fellow — March 2017
The National Science Foundation

Outstanding Teaching Assistant Award — May 2016
Cornell University Department of Computer Science

NSF GRFP Honorable Mention — March 2016
The National Science Foundation

Louis T. Rader Outstanding Education Undergraduate Student — May 2015
University of Virginia Department of Computer Science

Peer-reviewed Conference Publications

5. *Ensuring Safety and Progress for Independent Multi-Robot Teams in Shared Space*. **Wil Thomason**, Claire Liang, Elizabeth Ricci, and Soham Sankaran. WAFR 2020, in submission.
4. *Automatic Distributed Multi-Agent Coordination of Single-Agent Robot Controllers*. **Wil Thomason**, Abhishek Anand, Greg Morrisett, Ross Knepper. IROS 2020, in submission.
3. *A Unified Sampling-Based Approach to Integrated Task and Motion Planning*. **Wil Thomason**, Ross Knepper. ISRR 2019.
2. *Social Momentum: A Framework for Legible Navigation in Dynamic Multi-Agent Environments*. Christoforos Mavrogiannis, **Wil Thomason**, Ross Knepper. HRI 2018.
1. *Zero-Shot Learning for Unfamiliar Gesture Recognition*. **Wil Thomason**, Ross Knepper. ISER 2016.

Journal Publications

2. *Automatic Distributed Multi-Agent Coordination of Single-Agent Robot Controllers.* **Wil Thomason**, Abhishek Anand, Greg Morrisett, Ross Knepper. Robotics and Automation Letters. February 2020, in submission.
1. *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 2016.

(Authors listed in alphabetical order)

Workshop Presentations

"A Flexible Sampling-Based Approach to Task and Motion Planning." June 23, 2019. *RSS 2019 Workshop on Robust Task and Motion Planning*

"Which comes first, the task plan or the motion plan?." June 30, 2018. *RSS 2018 Workshop on Exhibition and Benchmarking of Task and Motion Planners.* Joint with Ross A. Knepper.

"Exploiting Heterogeneity in Robot Teams Through a Formalism of Capabilities." July 15, 2017. *RSS 2018 Workshop on Heterogeneity and Diversity for Resilience in Multi-Robot Systems*

"Toward Contextual Grounding of Unfamiliar Gestures for Human-Robot Interaction." May 30, 2017. *FG 2017: First International Workshop on Adaptive Shot Learning for Gesture Understanding and Production*

"Recognizing Unfamiliar Gestures for Human-Robot Interaction through Zero-Shot Learning." June 19th, 2016. *2nd Workshop on Model Learning for Human-Robot Communication, RSS 2016*

Service

Reviewer: ICRA (2016, 2019, 2020), IROS (2019), MRS (2019), RO-MAN (2016), RSS (2019), WAFR (2018), AURO, and SIMPAR (2018).

Outreach

I have also served as a reviewer and mentor for Black in AI, a workshop at NeurIPS that works to promote and increase the presence of Black people in the field of artificial intelligence (2017–2019).

Expanding Your Horizons Spring 2016 – Spring 2019
Taught middle school girls from the community about programming
https://www.eyh.cornell.edu/

- Created interface for introducing the concept of programming with state machines
- Wrote ROS software to run state machine code on a Kuka youBot

UVa High School Programming Contest Spring 2014 – Spring 2015
Helped plan and run the biggest programming competition for high school students in the mid-Atlantic region.
http://acm.cs.virginia.edu/hspc.php

- Created contest problems
- Planned contest logistics
- Helped run contest

UVa CS Education Week Winter 2014 – Winter 2015
Visited area schools to teach workshops on introductory programming with JKarel.

Research Experience

Graduate Research Assistant January 2020 – Present
Cornell University, Department of Computer Science
I am continuing my work on integrated task and motion planning with Professor Hadas Kress-Gazit.

Graduate Research Assistant August 2015 – December 2019
Cornell University, Department of Computer Science
Work with Professor Ross Knepper on problems in the domains of integrated task and motion planning, human-robot interaction and multi-agent planning. See publications co-authored with Professor Knepper.

Undergraduate Research Assistant August 2014 – July 2015
The University of Virginia, Department of Computer Science
Work with Professor Westley Weimer on automatic software functionality transplantation. We developed an algorithm based on analyzing differences in test suite performance to identify software modules responsible for specific functionality and a combination of function dependency tracing and extraction with the GenProg program repair tool to perform transplants.

Undergraduate Research Assistant January 2013 – May 2014
The University of Virginia, Department of Computer Science
Work with Professor Gabriel Robins on efficient, scalable, real-time localization of objects in 3D space using passive RFID tags. See publication "An Accurate Real-Time RFID-Based Location System".

Teaching Experience

Graduate Teaching Assistant: CS 4750 Fall 2016 & Fall 2017
Cornell University
TA for Foundations of Robotics: A new course designed to introduce students to the knowledge they need to conduct research in robotics. I helped to create the course syllabus, textbook, and software for course assignments, and was also responsible for giving weekly office hours, grading, and assisting with lecturing.

Graduate Teaching Assistant: CS 1110 Fall 2015
Cornell University
Head TA for Cornell's introductory computer science course. Responsible for coordinating TA staff, giving review lectures, supervising lab sessions, grading, and giving weekly office hours.

Instructor: Introduction to Robotics Spring 2015
University of Virginia
I designed and taught a 1-credit course introducing undergraduate students to core topics in robotics. As a part of the course, students built and programmed their own quadrotor robots and learned about basic kinematics, control, perception, and learning.

Undergraduate Teaching Assistant: CS 4610 Spring 2015
University of Virginia
TA for UVA's undergraduate programming languages course.

Undergraduate Teaching Assistant: CS 4710 Spring 2015
University of Virginia
TA for UVA's undergraduate artificial intelligence course.

Undergraduate Teaching Assistant: CS 4414 Spring 2014
University of Virginia
TA for UVA's undergraduate operating systems course. Helped create course content using the Rust programming language as well as an automatic grading server for the class.

Undergraduate Teaching Assistant: CS 2150 Fall 2013 – Spring 2015
University of Virginia
TA for UVA's undergraduate data structures and C++ programming course.

Industry Experience

Software Engineering Intern at Fluencia May 2015 – August 2015
Worked on adding voice understanding for speech practice exercises

- Improved voice understanding software
- Integrated into language learning website
- Created test and development framework for voice exercises

Software Development Engineer Intern at Microsoft May 2014 – August 2014
Microsoft Accounts Client Team

- Implemented and tested cryptographic operations and network protocol for forthcoming feature in Microsoft Accounts Android app. The implemented feature enables more convenient and more secure sign-in for Microsoft accounts via mobile devices.
- Coordinated the work of several other interns working on related components of the same project to ensure successful integration and delivery of the fully-functional feature ahead of schedule.

Software Development Engineer Intern at Microsoft May 2013 – August 2013
Xbox LIVE Cloud Security Team

- Designed, implemented, and shipped a RESTful web service capable of logging and auditing security records in Xbox LIVE in real time. Also designed, created, and tuned associated database and procedures. Service is currently in use in the Xbox LIVE network.
- Spearheaded and completed a total rewrite of an important development library – starting with old, cobbled together library used across principal components of the Xbox LIVE network, redesigned and reimplemented the entire library to provide a faster and easier to use interface to the same core functionality.

Technical Skills

Programming Languages: C++, Python, Rust, C, CL, Haskell, OCaml, etc.
Technologies: Linux, ROS, OMPL, PyTorch, TensorFlow, Git, CUDA, etc.