

Elizabeth A. Ricci

CONTACT INFORMATION

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EDUCATION

Cornell University *June 2018 - Present*
Ph.D. in Computer Science (Expected)
Research Interests: Human-Robot Interaction

Union College *September 2015 - June 2018*
Bachelor of Science, Computer Science and Mathematics *Overall GPA: 3.9*

Member of: Phi Beta Kappa, Pi Mu Epsilon, Omicron Delta Kappa, Sigma Xi (Associate Member),
Union College Scholars Program

RESEARCH EXPERIENCE

Graduate Research Assistant *June 2018 - November 2019*
Robotic Personal Assistance Laboratory, Cornell University
Area: Robotics *Advisor: Ross Knepper, Ph.D.*

I have previously worked on path planning to maximize information gain and its application to environment monitoring. In this work, currently in submission to ICRA, I developed an approach that uses an information-theoretic algorithm and a low-rank matrix model to monitor environmental properties.

Research Fellow *April 2017 - June 2018*
Union College Social Robotics Lab, Union College
Area: Human Robot Interaction *Advisors: N. Webb, Ph.D., K. Striegnitz, Ph.D., A. Cass, Ph.D.*

As a research fellow, I ran a user study to explore how eye gaze can be used to improve a human's understanding of robots and explored how robot navigation can be socially-aware. In these projects I developed software which I used with existing packages and ROS to control a physical robot.

Research Fellow *April 2017 - June 2018*
Union College Evolutionary and Soft Robotics Lab, Union College
Area: Soft Robotics *Advisor: John Rieffel, Ph.D.*

As a research fellow I explored how tensegrity structures can be self-constructing. I generated a method for partial self-assembly using a force-directed graph drawing algorithm and simulation. I validated my method with physical materials.

INDUSTRY EXPERIENCE

Software Development Engineer Research Intern *Summer 2020*
Amazon Robotics R-D - Hardware Development

As an intern I collaborated with a team to develop solutions for a new multi-agent robotic system. I focused on the navigation and path planning of the drive units in the multi-agent system. To this end I:

- Implemented the Enhanced Conflict-Based Search (ECBS) algorithm for multi-agent path planning in simulation.

- Evaluated the performance of ECBS against the A* single-agent baseline and found a 1500% increase in throughput, and significant computational limitations.
- Developed high-level algorithms for robot flow through high-density regions of the system.
- Determined appropriate navigation infrastructure for a mixed-grid environment, given hardware constraints.
- Examined the effect of modifying the layout of the system on the overall performance of the system, using a simulation of the system.
- Completed a trade study to maximize gross cubic utilization (GCU) given structural and robotic constraints. This led to a 3% increase in GCU, and the potential for up to a 35% increase in GCU given some system modifications.

CONFERENCE PUBLICATIONS

Elizabeth A. Ricci, Madeline Udell and Ross A. Knepper. “An Information-Theoretic Approach to Persistent Environment Monitoring Through Low Rank Model Based Planning and Prediction”. Under revision.

Wil Thomason*, Claire Liang*, **Elizabeth A. Ricci***, and Soham Sankaran. “Ensuring Safety and Progress for Independent Multi-Robot Teams in Shared Space”. Under revision.

WORKSHOP PUBLICATIONS

Elizabeth A. Ricci and Ross A. Knepper. “A bounded suboptimal environmental monitoring algorithm”. In: Workshop on Informative Path Planning and Adaptive Sampling. Proceedings of the Robotics Science and Systems Conference (RSS). Freiburg, Germany, June 2019.

RELEVANT COURSEWORK

Formal Methods for Robotics, Graduate Algorithms, Numerical Methods for Data Science

TECHNICAL SKILLS

Julia, Java, Python, C, C++, Robot Operating System (ROS), V-REP, Open Dynamics Engine (ODE), L^AT_EX.

TEACHING EXPERIENCE

Head Teaching Assistant

CS 4750: Foundations of Robotics

September 2019 - November 2019

Instructor: Ross Knepper Ph.D.

As a head TA I assigned tasks to other teaching assistants, provided feedback on the content on assignments, graded problem sets and exams, held office hours and answered student questions on Piazza.

Teaching Assistant

CS 4750: Foundations of Robotics

September 2018 - December 2018

Instructor: Ross Knepper Ph.D.

As a TA for CS 4750 I developed programming projects and wrote autograding modules for those assignments. I also graded problem sets and exams, held office hours and answered student questions on Piazza. I was awarded the Outstanding Teaching Assistant award by the Cornell Computer Science department for contributions.

CAMPUS INVOLVEMENT

Communications, Graduates for Gender Inclusion in Computing *November 2019 - Present*
Communications Chair, Graduate Women in Science *June 2019 - Present*
Visit Day Leader, Cornell CS *January 2019 - March 2019*
Treasurer, Association for Women in Mathematics, Union College *April 2017 - April 2018*
Member, ACM-W Chapter, Union College *January 2016 - June 2018*