Cassandra Kent, Ph.D.

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Research Areas: Lifelong Learning, Human-Robot Interaction, Learning from Demonstration, Teleoperation, Mobile Manipulation, Crowdsourcing

Note: *My prior work may be listed under the name David Kent.*

EDUCATION

Fall 2015 – Spring 2021 — **Georgia Institute of Technology – Atlanta, GA, USA**
PhD in Robotics
Thesis – "Robot Manipulation Alongside and in Collaboration with People"
Advisor – Dr. Sonia Chernova

2012 – 2014 — **Worcester Polytechnic Institute – Worcester, MA, USA**
MS in Robotics Engineering
Thesis – "Construction of a 3D Object Recognition and Manipulation Database from Grasp Demonstrations"

2008 – 2012 — **Worcester Polytechnic Institute – Worcester, MA, USA**
BS in Robotics Engineering

WORK EXPERIENCE

Spring 2021 - Present — **Postdoctoral Researcher**
Computer and Information Science – University of Pennsylvania

Fall 2015 – Spring 2021 — **Graduate Research Assistant**
School of Interactive Computing – Georgia Tech

Summer 2017 — **Robotics Engineering Intern**
Fetch Robotics
- Developed fetch_grasp_suggestion, a human preference-guided pairwise ranking grasp calculator for the Fetch platform
- Integrated autonomous grasp suggestion with programming by demonstration interface fetch_pbd

2014 - 2015 — **Lab Manager**
Robot Autonomy and Interactive Learning Lab – WPI
- Lead software developer for mobile manipulation platform
- Managed undergraduate and graduate student projects in artificial intelligence, computer vision, HRI interface development, navigation, and teleoperation

TEACHING EXPERIENCE

Fall 2020 — **Instructor of Record**
CS 3600 Introduction to Artificial Intelligence – Georgia Tech

Fall 2020 — **Tech to Teaching Certificate**
Multi-semester preparing future faculty program that includes pedagogy training and practice, Georgia Tech, Center for Teaching and Learning

Spring 2020 — **CIRTL Associate Level Certificate**

Summer 2019 **Bootcamp Course Design**
Summer Programming Bootcamp
- Designed curriculum for a week-long bootcamp teaching programming concepts to incoming students

Fall 2017 **Graduate Teaching Assistant**
CS 7785 Introduction to Robotics Research – Georgia Tech
- Designed labs to create a new course for incoming robotics graduate students
- Guest lectured the Human-Robot Interaction course module

Spring 2016 **Graduate Teaching Assistant**
CS 3630 Introduction to Robotics and Perception – Georgia Tech
- Designed labs to teach basic robotics concepts

PUBLICATIONS

*** Presented**

Conference Papers

C1 Meghna Gummadi, **Cassandra Kent**, Jorge A Mendez, and Eric Eaton. SHELS: Exclusive Feature Sets for Novelty Detection and Continual Learning Without Class Boundaries. *Conference on Lifelong Learning Agents (CoLLAs)*, 2022.

C2 Kevin Chen, Nithin Shrivatsav Srikanth, **Cassandra Kent**, Harish Ravichandar, and Sonia Chernova. Learning Hierarchical Task Networks with Preferences from Unannotated Demonstrations. *Conference on Robot Learning (CoRL)*, 2020.

C3 Abhinav Jain, Daphne Chen, Dhruva Bansal, **Cassandra Kent**, Harish Ravichandar, and Sonia Chernova**.** Anticipatory Human-Robot Collaboration via Multi-Objective Trajectory Optimization. *Intelligent Robots and Systems (IROS), IEEE/RSJ International Conference on*, 2020.

C4 **Cassandra Kent*** and Sonia Chernova. Human-Centric Active Perception for Autonomous Observation. *Robotics and Automation (ICRA), IEEE International Conference on*, 2020.

C5 Siddhartha Banerjee, Angel Daruna, **Cassandra Kent**, Weiyu Liu, *et al.* Taking Recoveries to Task: Recovery-Driven Development for Recipe-based Robot Tasks. In *2019 International Symposium on Robotics Research (ISRR)*.

C6 **Cassandra Kent***, Siddhartha Banerjee, and Sonia Chernova. Learning Sequential Decision Tasks for Robot Manipulation with Abstract Markov Decision Processes and Demonstration-Guided Exploration. *IEEE-RAS 18th International Conference on Humanoid Robots (Humanoids)*, 2018.

C7 **Cassandra Kent*** and Russell Toris. Adaptive Autonomous Grasp Selection Via Pairwise Ranking. *Intelligent Robots and Systems (IROS), IEEE/RSJ International Conference on*, 2018.

C8 **Cassandra Kent***, Carl Saldanha, and Sonia Chernova. A Comparison of Remote Robot Teleoperation Interfaces for General Object Manipulation. *Human-Robot Interaction (HRI), Conference on*, 2017.

C9 Adrian Boteanu, **Cassandra Kent***, Anahita Mohseni-Kabir, Charles Rich, and Sonia Chernova. Towards Robot Adaptability in New Situations. In *2015 AAAI Fall Symposium Series*.

C10 Russell Toris, **Cassandra Kent**, and Sonia Chernova. Unsupervised learning of multi-hypothesized pick-and-place task templates via crowdsourcing. *Robotics and Automation (ICRA), IEEE International Conference on*, 2014.

C11 **Cassandra Kent** and Sonia Chernova. Construction of an object manipulation database from grasp demonstrations. *Intelligent Robots and Systems (IROS), IEEE/RSJ International Conference on*, 2014.

C12 **Cassandra Kent***, Morteza Behrooz, and Sonia Chernova. Crowdsourcing the construction of a 3D object recognition database for robotic grasping. *Robotics and Automation (ICRA), IEEE International Conference on*, 2014.

Journal Articles

J1 **Cassandra Kent**, Carl Saldanha, and Sonia Chernova. Leveraging depth data in remote robot teleoperation interfaces for general object manipulation. *The International Journal of Robotics Research*, vol. 39, no. 1, 2020.

J2 **Cassandra Kent** and Sonia Chernova. Construction of a 3D Object Recognition and Manipulation Database from Grasp Demonstrations. *Autonomous Robots*, vol. 40, no. 1, 2016.

J3 Russell Toris, **Cassandra Kent**, and Sonia Chernova. The robot management system: A framework for conducting human-robot interaction studies through crowdsourcing. *Journal of Human-Robot Interaction*, vol. 3, no. 2, 2014.

Workshop Papers

W1 **Cassandra Kent*** and Sonia Chernova. Schedule-based Motion Prediction for Human-Centric Autonomous Observation. In *Long-term Human Motion Prediction Workshop (LHMP) at ICRA*, 2019.

W2 **Cassandra Kent***, Siddhartha Banerjee, and Sonia Chernova. Learning Real-World Sequential Decision Tasks with Abstract Markov Decision Processes and Demonstration-Guided Exploration. In *Robotics: Science and Systems Workshop on Learning from Demonstration for High Level Robotic Tasks (RSSWLfD18)*, 2018.

W3 **Cassandra Kent**, Ung Hee Lee, Sarah Elliot, and Russell Toris. Leveraging Autonomous Segmentation and Grasp Calculation for Programming by Demonstration. In *The Third Workshop on Machine Learning in Planning and Control of Robot Motion (MLPC18) at ICRA*, 2018.

W4 **Cassandra Kent***. Leveraging the Crowd to Capture Highly Variable Task Models. In *HRI2017 Pioneers Workshop*, 2017.

W5 **Cassandra Kent** and Sonia Chernova. Construction of a 3D Object Recognition and Manipulation Database from Grasp Demonstrations. In *Robotics: Science and Systems Workshop on Human versus Robot Grasping and Manipulation*, 2014.

Patents

P1 Russell Toris, Sarah Elliott, and **Cassandra Kent**. Method and System for Selecting a Preferred Robotic Grasp of an Object-of-Interest Using Pairwise Ranking. *US Patent 10,899,011*. 2021.

SERVICES

Institutional Service

Spring '18, '19, '20 **Robotics Qualifying Exam Prep, Volunteer**

Spring '17, '18, '19 **Robotics Prospective PhD Student Visit Week, Volunteer**

2017-2018 **RoboGrads, Vice President of Communications**

- Maintained website, mailing lists, and discussion groups for robotics graduate students
- Organized academic events and social events for Georgia Tech's graduate robotics community

Spring '17 **Fernbank Museum Robot Day, Volunteer**

Conference Reviewer

- IROS (2022, 2019, 2018)

- RA-L (2022, 2021)
- RSS (2022)
- HRI Pioneers Workshop (2023, 2022, 2021)
- ICRA (2021, 2020, 2019, 2016)
- HRI (2022, 2021, 2017)
- UIST (2020)
- ISRR (2019)
- AAAI (2017)

Journal Reviewer

- RA-L (2022, 2021)
- THRI (2022)

Open Source Contributions

- Author and maintainer of 10+ open source ROS packages for robot control, manipulation, perception, and teleoperation

Professional Memberships

- Institute of Electrical and Electronics Engineers (IEEE)
- Association for Computing Machinery (ACM)

AWARDS

2020 **Best Paper in Service Robotics at ICRA 2020, Finalist**
see Conference Paper C3, above

2019 **FetchIt! Challenge at ICRA 2019, 1st Place**
Team Captain, Georgia Tech DeRAILers

2014 **WPI GRAD Day Poster Presentations, 2nd Place**
for MS students in Engineering

PROJECTS

2016 **Treeminder: SMS-based Goal Completion for the United Way Achievement Club**
HCI Course Project – Georgia Tech

- Identified and analyzed a community motivation and personal goal support problem for recently homeless veterans
- Designed, prototyped, and tested a communication-based application to help recently ex-homeless veterans reintegrate with society

2013-2014 **Construction of a 3D Object Recognition and Manipulation Database from Grasp Demonstrations**
MS Thesis – Worcester Polytechnic Institute

- Designed and implemented a system for constructing an object recognition and manipulation database from crowdsourced data
- Developed a graph-based point cloud registration algorithm for small objects
- Showed grasps learned from expert and non-expert users can outperform purely vision-based grasp planners

2011-2012 **Autonomous Multi-Robot Soccer**
BS Major Qualifying Project – Worcester Polytechnic Institute

- Designed and implemented computer vision, probabilistic localization, and multi-robot coordination algorithms for an autonomous soccer team of four humanoid robots (Aldebaran NAOs)

- Competed in the 2011 international RoboCup Standard Platform League competition and the 2011 and 2012 RoboCup US Open competitions

2011 **Conducting an Effective Housing Survey to Inform Planning in the Royal Borough of Kingston**
BS Interactive Qualifying Project – Worcester Polytechnic Institute
- Worked with a small group of students on an interdisciplinary project for the Royal Borough of Kingston government in London, UK
- Designed and performed a cross-departmental survey of new housing in the borough

MENTORING

Spring '19-Summer '20 **Nithin Shrivatsav Srikanth**
MS Electrical Engineering

Spring '19-Spring '20 **Abhinav Jain**
MS Computer Science

Fall 2019 **Kevin Chen**
BS Computer Science, now Software Engineer at Waymo

Summer 2017 **Sae Buck Lim Won**
BS Computer Science

Spring '16-Fall '17 **Carl Saldanha**
MS Computer Science, now Robotics Engineer at Fetch Robotics

Spring '16 **Weiyu Liu**
BS Computer Science, now Robotics PhD Student at Georgia Tech