

# Ross A. Knepper

## Curriculum Vitae

### Personal

205 Bryant Ave  
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rak@cs.cornell.edu  
<http://www.cs.cornell.edu/~rak>  
US citizen; born January 8, 1977 in Boston, Massachusetts, USA

### Experience

2014–present **Assistant Professor**, Computer Science Dept., Cornell University.  
2013–2014 **Research Scientist**, Distributed Robotics Lab, MIT.  
2011–2013 **Postdoctoral Associate**, Distributed Robotics Lab, MIT.  
2004–2006 **Software Engineer**, National Robotics Engineering Center, CMU.  
2000–2003 **Systems Software Engineer**, Compaq Computer Corporation.

### Education

**Ph.D., Robotics**, August 2011  
Robotics Institute, Carnegie Mellon University, Pittsburgh, PA  
Thesis title: *On the Fundamental Relationships Among Path Planning Alternatives*.  
Advisor Matthew Mason

**M.S., Robotics**, December 2007  
Robotics Institute, Carnegie Mellon University, Pittsburgh, PA  
Advisor Matthew Mason

**B.S., Computer Science and Social History**, December 1999  
Computer Science Dept., Carnegie Mellon University, Pittsburgh, PA  
Minor in Robotics

### Awards and Honors

2019 Amazon Research Award.

2018 Amazon Research Award.

2017 Invited Speaker, National Academy of Engineering China-America Frontiers of Engineering Symposium.

2017 Best Technical Paper Award (Finalist), ACM/IEEE International Conference on Human-Robot Interaction (HRI), for “Implicit Communication in a Joint Action”

2016 Young Investigator Program Award, Air Force Office of Scientific Research.

2016 Invited Speaker, National Academy of Science Kavli Frontiers of Science Indonesian-American Symposium.

2015 Finalist, Rethink Robotics Video Challenge, for “CS 4752 Robotic Manipulation.”

2014 Best Paper, Robotics: Science and Systems (RSS) conference, for “Asking for Help Using Inverse Semantics.”

- 2014 KUKA Innovation in Mobile Manipulation Award (Finalist)
- 2013 Best Automation Paper (Finalist), IEEE International Conference on Robotics and Automation (ICRA), for “IkeaBot: An Autonomous Multi-Robot Coordinated Furniture Assembly System.”

## Teaching Experience

- Cornell CS 4750 Foundations of Robotics, Fall 2016, Fall 2017, Fall 2018.  
Enrollment: 80 (F ’16), 57 (F ’17), 98 (F ’18)
- CS 4752 Robotic Manipulation, Spring 2015, Fall 2015.  
Enrollment: 36 (S ’15), 49 (F ’15)
- INFO 4410 Human Robot Interaction, Spring 2015.  
Enrollment: 18
- CS 6751 Introduction to Robotic Mobile Manipulation, Fall 2014, Spring 2016, Spring 2017, Spring 2018.
- CS 7790 Artificial Intelligence Seminar, Fall 2015, Spring 2016, Fall 2016, Spring 2017, Fall 2017.
- CS 7796 Robotics Seminar, Spring 2016, Fall 2016, Spring 2017, Fall 2017.
- MIT 6.142 Robotics: Science and Systems 2, Fall 2012.  
Enrollment: 12

## Publications Thesis

- [1] Ross A. Knepper. “On the Fundamental Relationships Among Path Planning Alternatives”. PhD thesis. Technical Report CMU-RI-TR-11-19: Robotics Institute, Carnegie Mellon University, Aug. 2011.

## Peer-Reviewed Journal Papers

- [2] Christoforos I. Mavrogiannis and Ross A. Knepper. “Multi-Agent Path Topology in Support of Socially Competent Navigation Planning”. In: *International Journal of Robotics Research* (2018). **Invited Submission.**
- [3] Huichan Zhao, Jonathan Jalving, Rukang Huang, Ross A. Knepper, Andy Ruina, and Robert Shepherd. “A Helping Hand: Soft Orthosis with Integrated Optical Strain Sensors and EMG Control”. In: *IEEE Robotics and Automation Magazine* 23.3 (Sept. 2016), pp. 55–64.
- [4] Mehmet Dogar, Ross A. Knepper, Andrew Spielberg, Changhyun Choi, Henrik I. Christensen, and Daniela Rus. “Multi-Scale Assembly with Robot Teams”. In: *International Journal of Robotics Research* 34.13 (Nov. 2015). **Invited Submission.**
- [5] Ross A. Knepper, Stefanie Tellex, Adrian Li, Nicholas Roy, and Daniela Rus. “Recovering from Failure by Asking for Help”. In: *Autonomous Robots* 39.3 (Oct. 2015). **Invited Submission**, pp. 347–362.
- [6] Thomas Howard, Mihail Pivtoraiko, Ross A. Knepper, and Alonzo Kelly. “Model-Predictive Motion Planning for Autonomous Mobile Robots”. In: *IEEE Robotics and Automation Magazine* 21.1 (Mar. 2014), pp. 64–73.

- [7] Ross A. Knepper and Matthew T. Mason. “Realtime Informed Path Sampling for Motion Planning Search”. In: *International Journal of Robotics Research* 31.11 (Sept. 2012). **Invited Submission**, pp. 1231–1250.
- [8] Ross A. Knepper, Siddhartha S. Srinivasa, and Matthew T. Mason. “Toward a deeper understanding of motion alternatives via an equivalence relation on local paths”. In: *International Journal of Robotics Research* 31.2 (Feb. 2012). **Invited Submission**, pp. 168–187.
- [9] Siddhartha S. Srinivasa, Dmitry Berenson, Maya Cakmak, Alvaro Collet, Mehmet R. Dogar, Anca D. Dragan, Ross A. Knepper, Tim Niemueller, Kyle Strabala, Mike Vande Weghe, and Julius Ziegler. “HERB 2.0: Lessons Learned From Developing a Mobile Manipulator for the Home”. In: *Proceedings of the IEEE* 100.8 (Aug. 2012). **Invited Submission**, pp. 2410–2428.
- [10] Mihail Pivtoraiko, Ross A. Knepper, and Alonzo Kelly. “Differentially Constrained Mobile Robot Motion Planning in State Lattices”. In: *Journal of Field Robotics* 26.3 (2009), pp. 308–333.

### Peer-Reviewed Conference Papers

- [11] Claire Liang, Julia Proft, Erik Andersen, and Ross A. Knepper. “Implicit Communication of Actionable Information in Human-AI teams”. In: *Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI)*. Glasgow, United Kingdom, May 2019.
- [12] Christoforos I. Mavrogiannis, Alena Hutchinson, John Macdonald, Patrícia Alves-Oliveira, and Ross A. Knepper. “Effects of Distinct Robot Navigation Strategies on Human Behavior in a Crowded Environment”. In: *Proceedings of the ACM/IEEE International Conference on Human-Robot Interaction*. Daegu, South Korea, Mar. 2019.
- [13] Valts Blukis, Nataly Brukhim, Andrew Bennett, Ross A. Knepper, and Yoav Artzi. “Following High-level Navigation Instructions on a Simulated Quadcopter with Imitation Learning”. In: *Proceedings of the Robotics Science and Systems Conference*. Pittsburgh, USA, June 2018.
- [14] Valts Blukis, Dipendra Misra, Ross A. Knepper, and Yoav Artzi. “Mapping Navigation Instructions to Actions with Position Visitation Prediction”. In: *Proceedings of the Conference on Robot Learning*. Zurich, Switzerland, Oct. 2018.
- [15] Christoforos I. Mavrogiannis and Ross A. Knepper. “Multi-Agent Trajectory Prediction and Generation with Topological Invariants Enforced by Hamiltonian Dynamics”. In: *Proceedings of the Workshop on the Algorithmic Foundations of Robotics*. Mérida, Mexico, Dec. 2018.
- [16] Christoforos I. Mavrogiannis, Wil Thomason, and Ross A. Knepper. “Social Momentum: A Framework for Legible Navigation in Dynamic Multi-Agent Environments”. In: *Proceedings of the ACM/IEEE International Conference on Human-Robot Interaction*. Chicago, USA, Mar. 2018.
- [17] Euisun Yoon, Erik Andersen, Bharath Hariharan, and Ross A. Knepper. “Design Mining for Minecraft Architecture”. In: *AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment*. Edmonton, Canada, Nov. 2018.

- [18] Ross A. Knepper, Christoforos I. Mavrogiannis, Julia Proft, and Claire Liang. “Implicit Communication in a Joint Action”. In: *Proceedings of the ACM/IEEE International Conference on Human-Robot Interaction*. **Best Paper Finalist**. Vienna, Austria, Mar. 2017.
- [19] Christoforos I. Mavrogiannis, Valts Blukis, and Ross A. Knepper. “Socially Competent Navigation Planning by Deep Learning of Multi-Agent Path Topologies”. In: *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems*. Vancouver, Canada, Sept. 2017.
- [20] Minae Kwon, Malte F. Jung, and Ross A. Knepper. “Human Expectations of Social Robots”. In: *Late Breaking Report at the ACM/IEEE International Conference on Human-Robot Interaction*. Christchurch, New Zealand, Mar. 2016.
- [21] Christoforos I. Mavrogiannis and Ross A. Knepper. “Decentralized Multi-Agent Navigation Planning with Braids”. In: *Proceedings of the Workshop on the Algorithmic Foundations of Robotics*. San Francisco, USA, Dec. 2016.
- [22] Wil Thomason and Ross A. Knepper. “Recognizing Unfamiliar Gestures for Human-Robot Interaction through Zero-Shot Learning”. In: *Proceedings of the International Symposium of Experimental Robotics*. Tokyo, Japan, Oct. 2016.
- [23] Javier Alonso-Mora, Ross A. Knepper, Roland Siegwart, and Daniela Rus. “Local Motion Planning for Collaborative Multi-Robot Manipulation of Deformable Objects”. In: *Proceedings of the IEEE International Conference on Robotics and Automation*. Seattle, USA, May 2015.
- [24] Abhishek Anand and Ross Knepper. “ROSCoq: Robots powered by constructive reals”. In: *The 6th Conference on Interactive Theorem Proving*. Nanjing, China, Aug. 2015.
- [25] Ian Lenz, Ross A. Knepper, and Ashutosh Saxena. “DeepMPC: Learning Deep Latent Features for Model Predictive Control”. In: *Proceedings of the Robotics Science and Systems Conference*. Rome, Italy, July 2015.
- [26] Mehmet Dogar, Ross A. Knepper, Andrew Spielberg, Changhyun Choi, Henrik I. Christensen, and Daniela Rus. “Towards Coordinated Precision Assembly with Robot Teams”. In: *Proceedings of the International Symposium of Experimental Robotics*. Marrakesh and Essaouira, Morocco, June 2014.
- [27] Laura Lindzey, Ross A. Knepper, Howie Choset, and Siddhartha S. Srinivasa. “The Feasible Transition Graph: Encoding Topology and Manipulation Constraints for Multirobot Push-Planning”. In: *Proceedings of the Workshop on the Algorithmic Foundations of Robotics*. Istanbul, Turkey, Aug. 2014.
- [28] Stefanie Tellex, Ross A. Knepper, Adrian Li, Daniela Rus, and Nicholas Roy. “Asking for Help Using Inverse Semantics”. In: *Proceedings of the Robotics Science and Systems Conference*. **Best Paper**. Berkeley, USA, July 2014.
- [29] Dan Feldman, Stephanie Gil, Ross A. Knepper, Brian Julian, and Daniela Rus. “K-Robots Clustering of Moving Sensors Using Coresets”. In: *Proceedings of the IEEE International Conference on Robotics and Automation*. Karlsruhe, Germany, May 2013.
- [30] Ross L. Hatton, Ross A. Knepper, Howie Choset, David Rollinson, Chaohui Gong, and Enric Galceran. “Snakes on a Plan: Toward Combining Planning and Control”. In: *Proceedings of the IEEE International Conference on Robotics and Automation*. Karlsruhe, Germany, May 2013.

- [31] Ross A. Knepper, Todd Layton, John Romanishin, and Daniela Rus. “IkeaBot: An Autonomous Multi-Robot Coordinated Furniture Assembly System”. In: *Proceedings of the IEEE International Conference on Robotics and Automation*. **Best Automation Paper Finalist**. Karlsruhe, Germany, May 2013.
- [32] Ross A. Knepper and Daniela Rus. “On the Completeness of Ensembles of Motion Planners for Decentralized Planning”. In: *Proceedings of the IEEE International Conference on Robotics and Automation*. Karlsruhe, Germany, May 2013.
- [33] Ross A. Knepper, Stefanie Tellex, Adrian Li, Nicholas Roy, and Daniela Rus. “Single Assembly Robot in Search of Human Partner: Versatile Grounded Language Generation”. In: *Late Breaking Report at the ACM/IEEE International Conference on Human-Robot Interaction*. Tokyo, Japan, Mar. 2013.
- [34] Jue Wang, Fadel Adib, Ross A. Knepper, Dina Katabi, and Daniela Rus. “RF-Compass: Robot Object Manipulation using RFIDs”. In: *MobiCom: International Conference on Mobile Computing and Networking*. Miami, USA, Oct. 2013.
- [35] Ross A. Knepper and Daniela Rus. “Pedestrian-Inspired Sampling-Based Multi-Robot Collision Avoidance”. In: *Proceedings of the IEEE International Symposium on Robot and Human Interactive Communication*. Paris, France, Sept. 2012.
- [36] Ross A. Knepper and Matthew T. Mason. “Improved Hierarchical Planner Performance Using Local Path Equivalence”. In: *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems*. San Francisco, USA, Sept. 2011.
- [37] Ross A. Knepper and Matthew T. Mason. “Realtime Informed Path Sampling for Motion Planning Search”. In: *Proceedings of the International Symposium on Robotics Research*. Flagstaff, USA, Aug. 2011.
- [38] Ross A. Knepper, Siddhartha S. Srinivasa, and Matthew T. Mason. “An Equivalence Relation for Local Path Sets”. In: *Proceedings of the Workshop on the Algorithmic Foundations of Robotics*. Singapore, Dec. 2010.
- [39] Ross A. Knepper, Siddhartha S. Srinivasa, and Matthew T. Mason. “Hierarchical Planning Architectures for Mobile Manipulation Tasks in Indoor Environments”. In: *Proceedings of the IEEE International Conference on Robotics and Automation*. Anchorage, USA, May 2010.
- [40] Ross A. Knepper and Matthew T. Mason. “Path Diversity is Only Part of the Problem”. In: *Proceedings of the IEEE International Conference on Robotics and Automation*. Kobe, Japan, May 2009.
- [41] Michael S. Branicky, Ross A. Knepper, and James J. Kuffner. “Path and Trajectory Diversity: Theory and Algorithms”. In: *Proceedings of the IEEE International Conference on Robotics and Automation*. Pasadena, USA, May 2008.
- [42] Ross A. Knepper and Matthew T. Mason. “Empirical Sampling of Path Sets for Local Area Motion Planning”. In: *Proceedings of the International Symposium of Experimental Robotics*. Athens, Greece, July 2008.
- [43] Thomas M. Howard, Ross A. Knepper, and Alonzo Kelly. “Constrained Optimization Path Following of Wheeled Robots in Natural Terrain”. In: *Proceedings of the International Symposium of Experimental Robotics*. Rio de Janeiro, Brazil, July 2006.
- [44] Ross A. Knepper and Alonzo Kelly. “High Performance State Lattice Planning Using Heuristic Look-Up Tables”. In: *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems*. Beijing, China, Oct. 2006.

- [45] Howie Choset, Ross Knepper, Joleen Flasher, Sean Walker, Andrew Alford, Dean Jackson, David Kortenkamp, Jaime J. Fernandez, and Robert R. Burridge. “Path Planning and Control for AERCam, a Free-Flying Inspection Robot in Space”. In: *Proceedings of the IEEE International Conference on Robotics and Automation*. Detroit, USA, May 1999.

## Workshop Papers

- [46] Minae Kwon, Melissa Ferguson, Thomas Mann, and Ross A. Knepper. “An Exploration of Implicit Attitudes Towards Robots Using Implicit Measures”. In: *Workshop on Explainable Robotic Systems*. Proceedings of the ACM/IEEE International Conference on Human-Robot Interaction. Mar. 2018.
- [47] Christoforos I. Mavrogiannis and Ross A. Knepper. “Decentralized navigation planning using multi-agent trajectory prediction governed by Hamiltonian dynamics”. In: *Workshop on Multi-Robot Perception-Driven Control and Planning. Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems*. Madrid, Spain, Oct. 2018.
- [48] Minae Kwon, Melissa Ferguson, Thomas Mann, and Ross A. Knepper. “Forming and Updating Implicit Impressions of Robot Competence”. In: *Workshop on Morality and Social Trust in Autonomous Robots*. Proceedings of the Robotics Science and Systems Conference. July 2017.
- [49] Claire Liang, Julia Proft, and Ross A. Knepper. “Implicature-Based Inference for Socially-Fluent Robotic Teammates”. In: *Workshop on Mathematical Models, Algorithms, and Human-Robot Interaction*. Proceedings of the Robotics Science and Systems Conference. July 2017.
- [50] Christoforos Mavrogiannis, Valts Blukis, and Ross A. Knepper. “Inferring Strategies of Avoidance: Towards Socially Competent Navigation in Human Environments”. In: *Workshop on Mathematical Models, Algorithms, and Human-Robot Interaction*. Proceedings of the Robotics Science and Systems Conference. July 2017.
- [51] Wil Thomason and Ross Knepper. “Toward Contextual Grounding of Unfamiliar Gestures for Human-Robot Interaction”. In: *First International Workshop on Adaptive Shot Learning for Gesture Understanding and Production*. IEEE Conference on Automatic Face and Gesture Recognition. Arlington, Va., USA, May 2017.
- [52] Wil Thomason and Ross A. Knepper. “Exploiting Heterogeneity in Robot Teams Through a Formalism of Capabilities”. In: *Workshop on Heterogeneity and Diversity for Resilience in Multi-Robot Systems*. Proceedings of the Robotics Science and Systems Conference. July 2017.
- [53] Ross A. Knepper. “On the Communicative Aspect of Human-Robot Joint Action”. In: *Workshop: Toward a Framework for Joint Action, What about Common Ground?* Proceedings of the IEEE International Symposium on Robot and Human Interactive Communication. New York, USA, Aug. 2016.
- [54] Minae Kwon, Malte F. Jung, and Ross A. Knepper. “Human Expectations of Social Robots”. In: *Workshop on Challenges and best practices to study HRI in natural interaction settings*. Proceedings of the ACM/IEEE International Conference on Human-Robot Interaction. Christchurch, New Zealand, Mar. 2016.

- [55] Christoforos I. Mavrogiannis and Ross A. Knepper. “Interpretation and Communication of Pedestrian Intentions Using Braid Groups”. In: *Workshop on Intention Recognition in HRI*. Proceedings of the ACM/IEEE International Conference on Human-Robot Interaction. Christchurch, New Zealand, Mar. 2016.
- [56] Christoforos I. Mavrogiannis and Ross A. Knepper. “Towards Socially Competent Navigation of Pedestrian Environments”. In: *Workshop on Social Trust in Autonomous Robots*. Proceedings of the Robotics Science and Systems Conference. Ann Arbor, USA, June 2016.
- [57] Wil Thomason and Ross A. Knepper. “Recognizing Unfamiliar Gestures for Human-Robot Interaction through Zero-Shot Learning”. In: *Workshop on Model Learning for Human-Robot Communication*. Proceedings of the Robotics Science and Systems Conference. Ann Arbor, USA, June 2016.
- [58] Ross A. Knepper, Dishaan Ahuja, Geoffrey Lalonde, and Daniela Rus. “Distributed Assembly with AND/OR Graphs”. In: *Workshop on AI Robotics*. Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems. Chicago, USA, Sept. 2014.
- [59] Ross A. Knepper and Daniela Rus. “Human-Inspired Distributed Collision Avoidance”. In: *Workshop on Many-Robot Systems: Crossing the Reality Gap*. Proceedings of the IEEE International Conference on Robotics and Automation. St. Paul, USA, May 2012.

## Technical Reports

- [60] Laura Lindzey, Howie Choset, Siddhartha Srinivasa, and Ross A. Knepper. *Multi-robot Pushing — How Many Robots are Sufficient?* Tech. rep. CMU-RI-TR-12-15. Robotics Institute, Carnegie Mellon University, May 2012.
- [61] Mihail Pivtoraiko, Ross A Knepper, and Alonzo Kelly. *Optimal, Smooth, Nonholonomic Mobile Robot Motion Planning in State Lattices*. Tech. rep. CMU-RI-TR-07-15. Robotics Institute, Carnegie Mellon University, May 2007.

## Invited Talks

“Which comes first, the task plan or the motion plan?”, Exhibition and Benchmarking of Task and Motion Planners. Workshop at Robotics: Science and Systems conference (RSS), Pittsburgh, PA, USA, June 30, 2018.

“Communicative Actions in Human-Robot Teams”, Workshop on Models and Representations for Natural Human-Robot Communication. Robotics: Science and Systems conference (RSS), Pittsburgh, PA, USA, June 29, 2018.

“Adaptation in Team Strategies for Implicit Communication”, Towards a framework for Joint Action: What about Theory of Mind? Workshop at Robotics: Science and Systems conference (RSS), Pittsburgh, PA, USA, June 29, 2018.

“Communicative Actions in Human-Robot Teams”

- Emerging Topic: Human-AI Collaboration, AAAI Conference on Artificial Intelligence, February 5, 2018.
- Intelligent Systems Center Seminar Series, Applied Physics Laboratory, Johns Hopkins University, February 1, 2018.
- GRASP Seminar Series, University of Pennsylvania, January 26, 2018.

- Computer Science Seminar, Colorado School of Mines, January 18, 2018.
- “Learning Competent Social Navigation”, IEEE International Conference on Intelligent Robots and Systems (IROS), Workshop on Synergies Between Learning and Interaction, September 28, 2017.
- “Enabling Technologies to Rethink Factory Automation”, China-America Frontiers of Engineering Symposium, Shanghai, China, June 23, 2017.
- “Implicit Communication in a Joint Action”, Department of Computer Science Seminar Series, University of Rochester, Rochester, NY, USA, October 24, 2016.
- “Understanding People: Implicit Communication in Collaborative Autonomy”, IEEE International Conference on Intelligent Robots and Systems (IROS), Workshop on Perspectives on Analysis and Design of Human-Centered Robotics, Daejeon, Korea, October 10, 2016.
- “Theory of Implicit Communication”, IEEE International Conference on Intelligent Robots and Systems (IROS), Workshop on Human-Robot Collaboration: Towards Co-Adaptive Learning Through Semi-Autonomy and Shared Control, Daejeon, Korea, October 10, 2016.
- “How can robots get along with people?”, Kavli Frontiers of Science Indonesian-American Symposium, Malang, Indonesia, August 4, 2016.
- “BlimpIt: Persistent Autonomy for the Developing World,” Lightning talk and poster, 4th International Conference on Computational Sustainability, Ithaca, NY, USA, July 6, 2016.
- “Duality of Robot Actions in a Collaborative Context”
- Workshop on Human-Robot Interaction, INRIA, Paris, France, July 21, 2016.
  - Workshop on Planning for Human-Robot Interaction: Shared Autonomy and Collaborative Robotics, Robotics: Science and Systems conference (RSS), Ann Arbor, MI, USA, June 18, 2016.
- “Inverting Human Behavior Models in Context,” World Robot Conference, Beijing, China, November 23, 2015.
- “The Modern Prometheus,” *AI for Human-Robot Interaction*, AAAI Fall Symposium, Alexandria, VA, USA, November 12, 2015.
- “Asking for Help Using Inverse Semantics,” Robotics Presentations, AAAI Conference on Artificial Intelligence, Austin, TX, USA, January 29, 2015.
- “Autonomous Assembly In a Human World”
- Computer Science Colloquium, Cornell University, Ithaca, USA. April 17, 2014.
  - Computer Science Colloquium, University of Texas, Austin, USA. April 10, 2014.
  - Mechanical Engineering and Materials Science Seminar, Yale University, New Haven, USA. March 26, 2014.
  - Computer Science and Engineering Seminar, University of Minnesota Twin Cities, Minneapolis, USA. March 14, 2014.
  - Computer Science Seminar, University of Massachusetts Amherst, Amherst, MA, USA. March 11, 2014.
  - Computer Science Colloquium, University of Colorado, Boulder, USA. March 6, 2014.



- Woodruff School of Mechanical Engineering Seminar, Georgia Institute of Technology, Atlanta, USA. February 27, 2014.
  - Department of Computer Science Colloquium, Rutgers University, New Brunswick, NJ, USA. February 25, 2014.
  - Robotics Colloquium, University of Washington, Seattle, USA. November 7, 2013.
- “Making Robots Move Like People”
- School of Computer Science, Carnegie Mellon University, Pittsburgh, USA. April 16, 2012.
  - Robotics Engineering Colloquium, Worcester Polytechnic Institute, Worcester, MA, USA. March 1, 2012.
- “On the Fundamental Relationships Among Path Planning Alternatives”
- Robotics and Intelligent Machines Seminar Series, Georgia Institute of Technology, Atlanta, USA. January 18, 2012.
  - Rice University, Houston, USA. May 17, 2011.
  - Computer Science and Artificial Intelligence Laboratory, Massachusetts Institute of Technology, Cambridge, MA, USA. April 27, 2011.

## Professional Service

### Committees

- **Publicity chair** Robotics: Science and Systems (RSS) 2017
- **Co-chair** IEEE RAS Technical Committee on Robot Learning

### Organizer

- **Co-organizer** Northeast Robotics Colloquium (NERC) October 29–30, 2016, Cornell University, Ithaca, NY, USA.
- **Co-organizer** RSS 2015 Workshop on negative results in experimental robotics: learning the right lessons from robots.

### Editorial Duties

- **Program Committee Member**, IEEE/ACM International Conference on Human-Robot Interaction (HRI) 2018.
- **Associate Editor**, International Conference on Intelligent Robots and Systems (IROS) 2014–2016.
- **Associate Editor**, International Conference on Robotics and Automation (ICRA) 2012–2013, 2016–2017.
- **Associate Editor**, IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN), 2016.
- **Program Committee Member**, Conference on Artificial Intelligence (AAAI) 2014–2015.
- **Program Committee Member**, Robotics Track, Conference on Artificial Intelligence (AAAI) 2012–2013.

### Reviewing Activities

- International Journal of Robotics Research (IJRR)
- IEEE Transactions on Robotics
- Journal of Artificial Intelligence Research (JAIR)

- Robotics and Autonomous Systems Journal
- Autonomous Robots Journal
- International Joint Conference on Artificial Intelligence (IJ-CAI)
- ACM/IEEE International Conference on Human-Robot Interaction (HRI)
- Workshop on the Algorithmic Foundations of Robotics (WAFR)
- IEEE International Conference on Robotics and Automation (ICRA)
- International Conference on Field and Service Robotics (FSR)
- Robotics: Science and Systems Conference (RSS)
- Neural Information Processing Systems Conference (NIPS)

### **Departmental Service**

2016-2018	Graduate Admissions Committee, Department of Computer Science, Cornell University.
2015-present	Organizer, Robotics Seminar, Department of Computer Science, Cornell University.
2015-present	Organizer, Artificial Intelligence Seminar, Department of Computer Science, Cornell University.
2014-2015	Faculty Search Committee. Department of Computer Science, Cornell University.
2009-2011	Ph.D. Admissions Committee. Robotics Institute, Carnegie Mellon University.

### **Funding**

2019-2020	Amazon Research Award, "Learning High-level Robot Behaviors by Predicting State Visitation Distributions"
2018-2019	Amazon Research Award, "Transferring Policies from Simulation to Real World Manipulation"
2017-2019	Air Force Office of Scientific Research FA9550-17-1-0109, "Enabling Robust Persistent Autonomy in Robots"
2016-2019	National Science Foundation CCF-1646417, "CPS: Synergy: Coordinated Action Among Independent Mobile Cyber-Physical Systems"
2016-2017	Cornell University Seed Grant, "Towards a New Robotic Manipulation Formalism for the Real World"
2016-2019	National Science Foundation IIS-1563705, "CHS: Medium: Improving Distributed Teamwork Through Mobile Robotic Telepresence Systems"
2016-2019	Office of Naval Research N00014-16-1-2080, "Dexterous Manipulation Specification Via Language and Context Constraints"
2015-2016	HIT Robot Group

2015–2018      National Science Foundation IIS-1526035, “CHS: Small: Collaborative Research: Modeling Social Context to Improve Human-Robot Interaction”

### Professional Memberships

Institute of Electrical and Electronics Engineers  
Robotics and Automation Society  
ACM SIGMOBILE

### Doctoral Student Supervision

Cornell      Claire Liang.    Computer Science Field, 2017–present.  
                Julia Proft.    Computer Science Field, 2016–present.  
                Valts Blukis.    Computer Science Field, jointly supervised, 2016–present.  
                William Thomason.    Computer Science Field, 2015–present.  
                Christoforos Mavrogiannis.    Mechanical Engineering Field, 2014–present.  
                Ian Lenz.    Computer Science Field, 2014–2016, Thesis title: Deep Learning for Robotic Perception and Control.

### Postdoctoral Associate Supervision

Cornell      Abhishek Anand.    Computer Science, jointly supervised, 2016–2018.

### Thesis Committees (not chair)

Cornell      – Catherine Wong, Mechanical Engineering Field, Thesis title: “Robot Controllers: Online and Offline Adaption, and Automatic Code Transfer”, Chair: Hadas Kress-Gazit, 2018.  
                – Gangyuan Jing, Mechanical Engineering Field, Thesis title: “High-Level Control of Modular Robot Systems”, Chair: Hadas Kress-Gazit, 2018.  
                – Bryan Peele, Mechanical Engineering Field, Thesis title: “Imparting Dexterity, Touch, and Visual Expression in Soft Robotics”, Chair: Rob Shepherd, 2017.  
                – Chris Larson, Mechanical Engineering Field, Thesis title: “Deformable Media for Visual and Tactile Interfaces”, Chair: Rob Shepherd, 2017.  
                – Abhishek Anand, Computer Science Field, Thesis title: “Trust in Proof Assistants : Opportunities and Limitations”, Ph.D., Chair: Bob Constable, 2016.  
                – Ian Lenz, Computer Science Field, Thesis title: “Deep Learning for Robotic Perception and Control”, Ph.D., Chair: Ashutosh Saxena, 2015.  
                – Jonathan DeCastro, Mechanical Engineering Field, Ph.D., Chair: Hadas Kress-Gazit, 2016.  
                – Benjamin Reinhardt, Mechanical Engineering Field, Thesis title: “Induction Couplers: Contactless On-Orbit Actuation for Space Robotics”, Ph.D., Chair: Mason Peck, 2015.  
                – Elijah Lee, Mechanical Engineering Field, M.S., Chair: Brian Kirby, 2015.

External      – Yu-Han Lyu, *Dartmouth College*, Department of Computer Science, Thesis title: “Implications of Motion Planning: Optimality and  $K$ -Survivability”, Ph.D., Chair: Devin Balkcom, 2016.

## Masters Project Supervision

- Cornell
- Rebecca Adara, M.Eng., 2017–2018.
  - Kevin Hui and Alan Wu, “HRI: Building an Interactive Scrabble Robot”, M.Eng., 2017.
  - Willie Xu, “Creating a Controls System for an Autonomous Blimp”, M.Eng., 2017.
  - Paul Ammann, M.Eng., 2017.
  - Ben Anderson, “Robotic Hand Design”, M.Eng., 2017.
  - Achintya Sakthi Sankarraman, Kirill Rudenko, Sayge Schell, “Robotics Education”, M.Eng., 2017.
  - Chang Jiao, Elly Nakahara, and Sayge Schell, “Robotics Education”, M.Eng., 2016.
  - Heting Liu, “Moon Pointer”, 2016.
  - Gabriel Abrams, Yuanyuan “Amy” Chen, and Lingjun “Linda” Pei, “Baxter K12 Program Educational Tool”, M.Eng., 2016. **Received CS M.Eng. Project Award.**
  - Ashish Bhatnagar and Samuel Giampa, “Trust Building and Deception in Human-Robot Cooperation”, M.Eng., 2016.
  - Zhuo “Andy” Li, “Robotic Torsion Gripper for Furniture Assembly”, M.Eng., 2016.
  - Yuhao “Collin” Qian, “Robot Navigation Stack for Social Navigation”, M.Eng., 2016.
  - Derek Faust, “Environment-Assisted Manipulation”, M.Eng., 2015.
  - Daniel Nam, “Pedestrian Environment Simulator and Predicting Algorithm”, M.Eng., 2015.

## Undergraduate Project Supervision

- Cornell
- Claire Liang. Implicature as a collaborative strategy in the game Hanabi, 2016.
  - Chelsea Sidrane, Undergraduate Thesis, 2016.
  - Rebecca Adara, Trevor MacDonald, Alexander Volkov, Alexander Ueki, Stephen Stover, Hon Wei Khor, Willie Xu, Ashley Xue, Matthew Luebbbers, Alex Lui, Abraham Magana, Shuqing (Coco) Wu, Sattvik Kansal, Alice Pham, Kyra Patton, Ian Kranz, Autonomous Solar-Powered Airship, 2016–present.
  - Vitthyr Pong, Samantha Chen, Katey Huddleston, Melody Li, Alyssa Trigg, Parsing Ikea Instructions, 2015–2016.
  - Yogisha Dixit, Daryl Sew, Samantha Chen, Liele Getachew, Shiv Malhotra, Zachary Vinegar, Detecting and Tracking Human Pedestrians, 2015–present.
  - Alexander Volkov and Ian Kranz, Miniature Autonomous Car, 2015–2016.
  - Minae Kwon, Lydia Holley, Andrew Matsumoto, Elizabeth Yam, Managing Human Expectations of Robots, 2014–present.
  - Maheer Iqbal, Haptic Robot Control Interface, 2014–2015.
- MIT
- Dishaan Ahuja, Geoff Lalonde, Multi-Robot Distributed Assembly Planning, 2012–2014.
  - José Pacheco, KUKA youBot Inverse Kinematics, 2012–2013.
  - John Romanishin, Undergraduate Thesis Title: “Development of a Robotic Torque Application Gripper for Automated Furniture Assembly”, 2012.

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