

# Bradley Hayes

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## Education

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<b>Yale University</b> Doctor of Philosophy, Computer Science Committee: Brian Scassellati*, Dan Spielman, Julie Dorsey, Rod Grupen Dissertation: <i>Supportive Behaviors for Human-Robot Teaming</i> Master of Philosophy, Computer Science Master of Science, Computer Science	September 2009 – October 2015
<b>Boston College</b> Bachelor of Science with Honors, Computer Science Bachelor of Arts, Mathematics Concentration, Scientific Computation	September 2004 - May 2008

## Professional Experience

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<b>Massachusetts Institute of Technology</b> ; Cambridge, MA <i>Postdoctoral Associate, Interactive Robotics Group, CSAIL</i>	October 2015 - Present
<b>Yale University</b> ; New Haven, CT <i>Research Assistant / PhD Candidate, Social Robotics Lab, Computer Science Department</i>	August 2009 – October 2015
<b>BAE Systems, Inc. Advanced Information Technology</b> ; Burlington, MA <i>Research Engineer, Multi-Sensor Exploitation Directorate</i>	June 2008 – August 2009
<b>Microsoft</b> ; Redmond, WA <i>Software Development Engineer Intern - Anti-Malware Lower Engine Team</i>	June 2007 – August 2007
<b>IBM Extreme Blue Labs</b> ; Austin, TX <i>Extreme Blue Technical Intern</i>	June 2006 – August 2006
<b>IBM</b> ; Cambridge, MA <i>Software Development Engineer Intern</i>	June 2005 – August 2005

## Honors and Awards

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- GRAKN.AI Top 5 Breakthroughs in Deep Learning in 2016.
- ACM Dissertation Award Nominee for Yale University, 2015.
- NSF Travel Award, IROS 2015.
- Yale University Kempner Fellowship. September 2014 – August 2015.
- NSF Travel Award, IROS 2014.
- Best Paper Finalist, RSJ/KROS Distinguished Interdisciplinary Research Award, RO-MAN 2014.
- 1<sup>st</sup> Place, Yale Entrepreneurial Society Elevator Pitch Competition, 2012.
- 2<sup>nd</sup> Place, Boston College Venture Challenge, 2009.
- US Patent # [7877700](#) -- "Adding accessibility to drag-and-drop web content", 2009.
- Finalist, Boston College Venture Challenge, 2008.
- The Accenture Award for outstanding performance in Computer Science, Boston College, 2008.

## Invited Seminars and Colloquia

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- **University of Oxford.** April 28, 2017.
- **University of New Hampshire.** April 21, 2017.
- **Boston University.** April 3, 2017.
- **Stanford University.** March 16, 2017.
- **University of California Berkeley.** March 15, 2017.
- **Oregon State University.** March 13, 2017.
- **Cornell University.** March 3, 2017.
- **Northeastern University.** March 1, 2017.
- **Tufts University.** February 27, 2017.
- **University of Colorado Boulder.** February 23, 2017.
- **UC Berkeley / INRIA Paris: “Algorithms for Human-Robot Interaction” Workshop.** July 21, 2016.
- **University of Massachusetts, Amherst.** April 14, 2016.
- **Vicarious.** March 22, 2016.
- **Oregon State University.** November 17, 2015.
- **JSF Joint Program Office.** November 13, 2015.
- **Cornell University.** April 3, 2015.
- **Worcester Polytechnic Institute.** November 21, 2014.
- **University of Edinburgh.** August 27, 2014.

## Grants and Funding Sources

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- NAVAIR Grant: Human-Automation Interaction to Support Multiple Platform Mission Planning (\$24,990) 1/2017 – 4/2017
  - Co-authored with PI Julie Shah
- ONR Grant #N00014-12-1-0822: Social Hierarchical Learning (\$600,000) 4/2012 – 4/2015
  - Co-authored with PI Brian Scassellati
- NSF HCC Small #1117801: Manipulating Perceptions of Robot Agency (\$500,000) 9/2011 – 8/2014
  - Co-authored with PI Brian Scassellati

## Teaching Experience

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### Guest Lecturer

- Massachusetts Institute of Technology, 16.422J -- Human Supervisory Control of Automated Systems (2015)
- Worcester Polytechnic Institute, RBE526 – Human Robot Interaction (2014)

### Teaching Assistant

2010-2011

*Department of Computer Science, Yale University.*

Graded written and programming assignments, conducted study sessions and held office consultations with undergraduate and graduate students. Managed multiple teams of undergraduate and graduate researchers during semester-long research efforts. Lead teaching assistant for Intelligent Robotics and Artificial Intelligence courses.

### Teaching Assistant

2006-2008

*Department of Computer Science, Boston College.*

Graded written and programming assignments and tutored undergraduate students. Held teaching assistant responsibilities for classes ranging from Introduction to Computer Science to senior-level electives.

## Academic Service, Memberships, and Public Outreach

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- Grant Review:
  - NSF Panel (2x 2016)
- Conference and Workshop Committee Leadership:
  - Senior Program Committee, 32<sup>nd</sup> AAAI Conference on Artificial Intelligence, 2018.
  - Organizing Committee, AAAI Fall Symposium on “AI for Human-Robot Interaction”, 2017.
  - Senior Program Committee, International Joint Conference on Artificial Intelligence, 2017.
  - Program Committee, 1<sup>st</sup> Conference on Artificial Intelligence, 2017.
  - Program Committee, 31<sup>st</sup> AAAI Conference on Artificial Intelligence, 2017.
  - Program Committee, ACM/IEEE International Conference on Human-Robot Interaction, 2017.
  - Organizing Committee, AAAI Fall Symposium on “AI for Human-Robot Interaction”, 2016.
  - Associate Editor, IEEE International Conference on Intelligent Robots and Systems, 2016.
  - Associate Editor, IEEE International Symposium on Robot and Human Interactive Communication, 2016.
  - Program Committee, IJCAI Workshop on Interactive Machine Learning, 2016.
  - Program Committee, International Joint Conference on Artificial Intelligence, 2016.
  - Program Committee, AAAI Robotics Fellowship Program, 2016.
  - Program Committee, Human-Robot Interaction Pioneers Workshop, 2016.
  - Program Committee, ACM/IEEE International Conference on Human-Robot Interaction, 2016.
  - **General Chair, AAAI Fall Symposium on “AI for Human-Robot Interaction”, 2015.**
  - **General Chair, Human Robot Teaming Workshop at HRI 2015.**
  - Program Committee Chair, Human-Robot Interaction Pioneers Workshop, 2014.
- Conference and Journal Review:
  - Robotics and Automation Letters.
  - International Journal of Robotics Research.
  - International Journal of Robotics Research: Special Issue on HRI.
  - ACM Transactions on Interactive Intelligent Systems.
  - Journal of Human-Robot Interaction.
  - Robotics: Science and Systems.
  - Autonomous Robots.
  - IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
  - ACM/IEEE International Conference on Human-Robot Interaction (HRI)
  - IEEE International Conference on Robotics and Automation (ICRA)
  - IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN).
  - International Joint Conference on Artificial Intelligence (IJCAI).
  - IEEE-RAS International Conference on Humanoid Robots (Humanoids).
  - IEEE International Conference on Development and Learning and Epigenetic Robotics (ICDL-EPIROB)
- Membership in Professional Societies:
  - Association for the Advancement of Artificial Intelligence.
  - IEEE.
- Outreach:
  - Invited Public Science Q&A for Reddit.com on Human-Robot Collaboration and @DeepDrumpf Twitterbot (front page, 45k views). 2016.
  - Led international charity drive benefiting GirlsWhoCode. 2016.
  - HackMIT International Hackathon Mentor, Cambridge, MA 2016.
  - Boston Museum of Science Podcast. 2016.
  - MIT Centennial Open House Organizer and Exhibitor, Cambridge, MA 2016.
  - World Science Festival Exhibitor, New York City, NY, 2014.

## Publications

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### Papers in Submission

- S1. M. Gombolay, J. Yang, B. Hayes, N. Seo, S. Wadhwanian, Z. Liu, T. Yu, N. Shah, T. Golen, J. Shah. (2017). Robotic Assistance in Coordination of Patient Care. In submission: International Journal of Robotics Research (IJRR).

## Conference Papers

- C1. B. Hayes and J. Shah. (2017). Interpretable Models for Fast Activity Recognition and Anomaly Explanation During Collaborative Robotics Tasks. To appear: 2017 IEEE International Conference on Robotics and Automation (ICRA 2017).
- C2. B. Hayes and J. Shah. (2017). Improving Robot Controller Transparency Through Autonomous Policy Explanation. 12th ACM/IEEE International Conference on Human-Robot Interaction (HRI 2017).
- C3. M. Gombolay, J. Yang, B. Hayes, N. Seo, S. Wadhwanian, Z. Liu, T. Yu, N. Shah, T. Golen, J. Shah. (2016). Robotic Assistance in Coordination of Patient Care. Proceedings of Robotics: Science and Systems (RSS 2016), Michigan, USA, June 2016.
- C4. B. Hayes and B. Scassellati. (2016). Autonomously Constructing Hierarchical Task Networks for Planning and Human-Robot Collaboration. Proceedings of 2016 IEEE International Conference on Robotics and Automation (ICRA 2016), Stockholm, Sweden, May 2016.
- C5. H. Admoni, T. Weng, B. Hayes, and B. Scassellati. (2016). Robot Nonverbal Behavior Improves Task Performance in Difficult Collaborations. Proceedings of the 11th ACM/IEEE International Conference on Human-Robot Interaction (HRI 2016). Christchurch, New Zealand, March 2016.
- C6. B. Hayes and B. Scassellati. Effective Robot Teammate Behaviors for Supporting Sequential Manipulation Tasks. IEEE/RSJ International Conference on Intelligent Robots and Systems. Hamburg, Germany, September 2015.
- C7. B. Rosman, B. Hayes, and B. Scassellati. Enhancing Agent Safety through Autonomous Environment Adaptation. IEEE International Conference on Development and Learning and Epigenetic Robotics. Providence, Rhode Island, USA, August 2015.
- C8. B. Hayes and B. Scassellati. Social Hierarchical Learning. In Proceedings of the AAAI 2015 Doctoral Consortium. Austin, Texas, January 2015.
- C9. B. Hayes, E.C. Grigore, A. Litoiu, A. Ramachandran, B. Scassellati. A Developmentally Inspired Transfer Learning Approach for Predicting Skill Durations. In *Proceedings of the 4th joint IEEE International Conference on Development and Learning and Epigenetic Robotics*. Genoa, Italy, October 2014.
- C10. B. Hayes and B. Scassellati. Discovering Task Constraints through Observation and Active Learning. In *2014 IEEE/RSJ International Conference on Intelligent Robots and Systems*. Chicago, Illinois, USA, September 2014.
- C11. B. Hayes, D. Ullman, E. Alexander, C. Bank, and B. Scassellati. People Help Robots Who Help Others, Not Robots Who Help Themselves. Proceedings of the 23rd IEEE International Symposium on Robot and Human Interactive Communication. Edinburgh, Scotland, August 2014.
- C12. E. Alexander, C. Bank, J.J. Yang, B. Hayes, and B. Scassellati. Asking for Help from a Gendered Robot. In *Proceedings of the 36th Annual Conference of the Cognitive Science Society (CogSci 2014)*. Quebec City, Canada, July 2014.
- C13. B. Hayes and B. Scassellati. Improving Implicit Communication In Mixed Human-Robot Teams With Social Force Detection. In *Proceedings of the 3rd joint IEEE International Conference on Development and Learning and Epigenetic Robotics*. Osaka, Japan, August 2013.
- C14. H. Admoni, B. Hayes, D. Feil-Seifer, D. Ullman, and B. Scassellati. Dancing With Myself: The effect of majority group size on perceptions of majority and minority robot group members. In: *M. Knauff, M. Pauen, N. Sebanz, & I. Wachsmuth (eds.), Proceedings of the 35th Annual Conference of the Cognitive Science Society (CogSci 2013)*. Austin, TX: Cognitive Science Society. Berlin, Germany, July 2013.
- C15. H. Admoni, B. Hayes, D. Feil-Seifer, D. Ullman, and B. Scassellati. Are You Looking At Me? Perception of Robot Attention is Mediated by Gaze Type and Group Size. In *Proceedings of the 8th ACM/IEEE International Conference on Human-Robot Interaction (HRI 2013)*. Tokyo, Japan, March 2013.

## Tutorials

- T1. B. Hayes, E. Kamar, and M. Taylor. Interactive Machine Learning: From Classifiers to Robotics. At the 16th International Conference on Autonomous Agents and Multiagent Systems (AAMAS 2017).

- T2. B. Hayes, E. Kamar, and M. Taylor. Interactive Machine Learning: From Classifiers to Robotics. At the International Joint Conference on Neural Networks (IJCNN 2017).
- T3. B. Hayes, E. Kamar, and M. Taylor. Interactive Machine Learning: From Classifiers to Robotics. At the 31st AAAI Conference on Artificial Intelligence (AAAI 2017).

### Workshops, Symposia, and Posters

- W1. B. Hayes, M.C. Gombolay, M.F. Jung, K. Hindriks, J. de Greeff, C. Jonker, M. Neerincx, J.M. Bradshaw, M. Johnson, I. Kruijff-Korbayova, M. Sierhuis, J.A. Shah, B. Scassellati. HRI Workshop on Human-Robot Teaming. In *Proceedings of the Tenth Annual ACM/IEEE International Conference on Human-Robot Interaction Extended Abstracts*. Portland, Oregon, March 2015.
- W2. B. Scassellati and B. Hayes. Human-robot collaboration. *AI Matters* 1, 2 (December 2014), 22-23.
- W3. B. Hayes and B. Scassellati. Developing Effective Robot Teammates for Human-Robot Collaboration. In Proceedings of the "Artificial Intelligence and Human-Robot Interaction" (AI-HRI) Fall Symposium. Arlington, Virginia, November 2014.
- W4. B. Hayes and B. Scassellati. Social Hierarchical Learning: Enabling Human-Robot Teamwork. Poster and interactive demonstration in the "Robotics Exhibition" at CogSci/AAAI 2014. Quebec City, Canada, July 2014.
- W5. B. Hayes and B. Scassellati. Online Development of Assistive Robot Behaviors for Collaborative Manipulation and Human-Robot Teamwork. *Proceedings of the "Machine Learning for Interactive Systems" (MLIS) Workshop at AAAI 2014*. Quebec City, Canada, July 2014.
- W6. B. Hayes and B. Scassellati. Challenges in Shared-Environment Human-Robot Collaboration. In *Proceedings of the "Collaborative Manipulation" Workshop at HRI 2013*. Tokyo, Japan, March 2013.
- W7. B. Hayes and B. Scassellati. Social Hierarchical Learning. In: *Proceedings of the "HRI Pioneers" Workshop at HRI 2013*. Tokyo, Japan, March 2013.

### Advising and Student Mentoring

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|----------------------|-------------------------|
| • Jason Perlow       | Oct 2016 – Present      |
| • George Wildridge   | Summer 2014, 2015       |
| • Jack Gartland      | Summer 2014, 2015       |
| • Dylan Visher       | Spring 2013 – Fall 2014 |
| • Iulia Tamas        | Spring 2013 – Fall 2014 |
| • Terin Patel-Wilson | Spring 2013 – Fall 2014 |
| • Daniel Ullman      | Oct 2012 – May 2015     |
| • Emma Alexander     | Oct 2012 – May 2013     |
| • Caroline Bank      | Oct 2012 – May 2013     |