

Ece Kamar

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RESEARCH INTERESTS

I work on several subfields of Artificial Intelligence (AI); including planning, machine learning, multi-agent systems and human-computer teamwork. I particularly focus on real-world applications that can benefit from the complementary abilities of humans and machines.

Areas of expertise: Formal models of teamwork, planning under uncertainty, supervised learning, crowdsourcing, incentive design, multi-agent systems

EDUCATION

- 2010 Ph.D. in Computer Science, Harvard University
- 2007 M.S. in Computer Science, Harvard University
- 2005 B.S. in Computer Science and Engineering, Sabanci University (magna cum laude)

PROFESSIONAL EXPERIENCE

- 2010-present **Microsoft Research Redmond**
Researcher, Adaptive Systems and Interaction Group
- 2005-2010 **Harvard University School of Engineering and Applied Sciences**
Ph.D. Candidate (advised by Prof. Barbara Grosz)
Thesis: Reasoning Effectively Under Uncertainty for Human-Computer Teamwork
- Fall 2008 **Microsoft Research Redmond**
Research fellow, Adaptive Systems and Interaction Group
- Summer 2007 **Microsoft Research Redmond**
Research intern, Adaptive Systems and Interaction Group

Summer 2004 **Procter&Gamble Istanbul**
Intern, IT department

Summer 2003 **Sabanci University**
Intern, Human Language and Speech Technologies Laboratory

TUTORIALS & TEACHING EXPERIENCE

Winter 2017 Tutorial on *Interactive Machine Learning* at AAAI 2017
With Matthew Taylor and Brad Hayes

Fall 2009 Teaching Assistant for "*Intelligent Interactive Systems*"
Harvard University

Spring 2009 Teaching Assistant for "*Intelligent Machines: Perception, Learning, and Uncertainty*"
Harvard University

Fall 2006 Teaching Assistant for "*Introduction to Formal Systems and Computation*"
Harvard University

PUBLICATIONS

Public Report Peter Stone, Rodney Brooks, Erik Brynjolfsson, Ryan Calo, Oren Etzioni, Greg Hager, Julia Hirschberg, Shivaram Kalyanakrishnan, Ece Kamar, Sarit Kraus, Kevin Leyton-Brown, David Parkes, William Press, AnnaLee Saxenian, Julie Shah, Milind Tambe, and Astro Teller. "*Artificial Intelligence and Life in 2030.*" One Hundred Year Study on Artificial Intelligence: Report of the 2015-2016 Study Panel, Stanford University, Stanford, CA, September 2016. Doc: <http://ai100.stanford.edu/2016-report>.

Journal Articles Ece Kamar, Ya'akov (Kobi) Gal and Barbara J. Grosz. *Modeling Information Exchange Opportunities For Effective Human-Computer Teamwork*. In *Artificial Intelligence Journal*, 2013.

Full-length Conference Articles Himabindu Lakkaraju, Ece Kamar, Rich Caruana and Eric Horvitz. *Identifying Unknown Unknowns in the Open World: Representations and Policies for Guided Exploration*, AAAI 2017.

Besmira Nushi, Ece Kamar, Donald Kossmann and Eric Horvitz. *On Human Intellect and Machine Failures: Troubleshooting Integrative Machine Learning Systems*, AAAI 2017.

Joseph Chee Chang, Saleema Amershi and Ece Kamar. *Revolt: Collaborative Crowdsourcing for Labeling Machine Learning Datasets*, CHI 2017

Niloufar Salehi, Jaime Teevan, Shamsi Iqbal and Ece Kamar. *Communicating Context to the Crowd for Complex Writing Tasks*, CSCW 2017 (Honorable mention award).

Cathy Wu, Ece Kamar and Eric Horvitz. *Clustering for Set Partitioning with a Case Study in Ridesharing*, IEEE Intelligent Transportation Systems Conference (IEEE ITSC), November 2016. (Best paper award).

Cathy Wu, K. Shankari, Ece Kamar, Randy Katz, David Culler, Christos Papadimitriou, Eric Horvitz and Alexandre Bayen. *Optimizing the Diamond Lane: A More Tractable Carpool Problem and Algorithms*, IEEE Intelligent Transportation Systems Conference, 2016.

Avi Segal, Ya'akov Gal, Ece Kamar, Eric Horvitz, Alex Bower and Grant Miller. *Intervention Strategies for Increasing Engagement in Volunteer-Based Crowdsourcing*. In Proceedings of IJCAI 2016.

Ofra Amir, Ece Kamar, Andrey Kolobov and Barbara Grosz. *Interactive Teaching Strategies for Agent Training*. In Proceedings of IJCAI 2016.

Shayan Doroudi, Ece Kamar, Emma Brunskill and Eric Horvitz. *Toward a Learning Science for Complex Crowdsourcing Tasks*. In Proceedings of CHI 2016.

Ece Kamar, Ashish Kapoor and Eric Horvitz. *Identifying and Accounting for Task-Dependent Bias in Crowdsourcing*. In Proceedings of HCOMP 2015.

Christopher Lin, Andrey Kolobov, Ece Kamar and Eric Horvitz. *Metareasoning for Planning Under Uncertainty*. In Proceedings of IJCAI 2015.

Ece Kamar and Eric Horvitz. *Planning for Crowdsourcing Hierarchical Tasks*. In Proceedings of AAMAS 2015.

Margaret Mitchell, Dan Bohus and Ece Kamar. *Crowdsourcing Language Generation Templates for Dialogue Systems*. In Proceedings of INLG and SIGDIAL 2014.

Christopher Lin, Ece Kamar and Eric Horvitz. *Signals in the Silence: Models of Implicit Feedback in a Recommendation System for Crowdsourcing*. In Proceedings of AAAI 2014

Adish Singla, Eric Horvitz, Ece Kamar and Ryen White. *Stochastic Privacy*. In Proceedings of AAAI 2014 (Extended Version with Proofs).

Debadeepta Dey, Andrey Kolobov, Rich Caruana, Ece Kamar, Eric Horvitz, and Ashish Kapoor. *Gauss Meets Canadian Traveler: Shortest-Path Problems with Natural Dynamics*. In Proceedings of AAMAS 2014.

Walter Lasecki, Jamie Teevan and Ece Kamar. *Information Extraction and Manipulation Threats in Crowd-Powered Systems*. In Proceedings of CSCW 2014.

Andrew Mao, Ece Kamar, Yiling Chen, Eric Horvitz, Megan E. Schwamb, Chris J. Lintott, and Arfon M. Smith. *Volunteering vs. Work for Pay: Incentives and Tradeoffs in Crowdsourcing*. In Proceedings of HCOMP 2013.

Andrew Mao, Ece Kamar, and Eric Horvitz. *Why Stop Now? Predicting Worker Engagement in Online Crowdsourcing*. In Proceedings of HCOMP 2013.

Ece Kamar, Ashish Kapoor and Eric Horvitz. *Lifelong Learning for Acquiring the Wisdom of the Crowd*. In Proceedings of IJCAI 2013.

Stephanie Rosenthal, Dan Bohus, Ece Kamar and Eric Horvitz. *Look versus Leap: Computing Value of Information with High-Dimensional Streaming Evidence*. In Proceedings of IJCAI 2013.

Ece Kamar and Eric Horvitz. *Light at the End of the Tunnel: A Monte Carlo Approach to Computing Value of Information*. In Proceedings of AAMAS 2013.

Ece Kamar, Severin Hacker and Eric Horvitz. *Combining Human and Machine Intelligence in Large-scale Crowdsourcing*. In Proceedings of AAMAS 2012.

William Wang, Dan Bohus, Ece Kamar and Eric Horvitz. *Crowdsourcing the Acquisition of Natural Language Corpora: Methods and Observations*. In Proceedings of SLT 2012.

Ece Kamar, Ya'akov Gal and Barbara J. Grosz. *Modeling User Perception of Interaction Opportunities for Effective Teamwork*. SIN09, In Proceedings of IEEE SocialCom 2009.

Ece Kamar and Eric Horvitz. *Generating Shared Transportation Plans Under Varying Preferences: Ridesharing Models and Mechanisms*. Microsoft Research Technical report, MSR-TR-2009-2011, April 2009.

Ece Kamar, Ya'akov Gal and Barbara J. Grosz. *Incorporating Helpful Behavior into Collaborative Planning*. In Proceedings of AAMAS 2009.

Ece Kamar, Eric Horvitz and Chris Meek. *Mobile Opportunistic Commerce: Mechanisms, Architecture, and Application*. In Proceedings of AAMAS 2008.

Short Conference Papers Ece Kamar and Eric Horvitz. *Incentives for Truthful Reporting in Crowdsourcing*. In Proceedings of AAMAS 2012.

Ece Kamar and Eric Horvitz. *Jogger: Models for Context-Sensitive Reminding*. In Proceedings of AAMAS 2011.

- Workshop Papers Besmira Nushi, Ece Kamar, Donald Kossmann and Eric Horvitz. *A Human-in-the-loop Approach for Troubleshooting Machine Learning Systems*, NIPS Workshop on Future of Interactive Learning Machines 2017.
- Himabindu Lakkaraju, Ece Kamar, Rich Caruana and Eric Horvitz. *Discovering Unknown Unknowns of Predictive Models*, NIPS Workshop on Reliable Machine Learning in the Wild 2017.
- Ece Kamar and Lydia Manikonda. *Complementing the Execution of AI Systems with Human Computation*, AAAI Workshop on Crowdsourcing, Deep Learning and Artificial Intelligence Agents 2017.
- Ece Kamar. *Hybrid Intelligence and the Future of Work*. In Proceedings of the Productivity Decomposed: Getting Big Things Done with Little Microtasks Workshop at CHI 2016.
- Cathy Wu, Ece Kamar and Eric Horvitz. *Clustering for Set Partitioning: A Case Study in Carpooling*. In Proceedings of the Workshop on Optimization for Machine Learning (OPT) at NIPS 2015.
- Walter S. Lasecki, Jaime Teevan and Ece Kamar. *The Cost of Asking Crowd Workers to Behave Maliciously*. In Proceedings of the Workshop on Human-Agent Interaction Design and Models (HAIDM 2015) at AAMAS 2015.
- Walter S. Lasecki, Mitchell Gordon, Jaime Teevan, Ece Kamar and Jeff P. Bigham. *Preserving Privacy in Crowd-Powered Systems*. In Proceedings of the Workshop on Human-Agent Interaction Design and Models (HAIDM 2015) at AAMAS 2015.
- Walter Lasecki, Ece Kamar and Dan Bohus. *Conversations in the Crowd: Collecting Data for Task-Oriented Dialog Learning*. In Proceedings of the Human Computation Workshop on Scaling Speech and Language Understanding and Dialog through Crowdsourcing at HCOMP 2013.

Dan Bohus, Ece Kamar and Eric Horvitz. *Towards Situated Collaboration*. In NAACL Workshop on Future Directions and Challenges in Spoken Dialog Systems: Tools and Data, 2012.

Paul Bennett, Ece Kamar and Gabriella Kazai. *MSRC at TREC 2011 Crowdsourcing Track*. In Proceedings of TREC 2011.

Ece Kamar and Barbara J. Grosz. *Applying MDP Approaches For Estimating Outcome of Interaction in Collaborative Human-Computer Settings*. In Proceedings of Workshop on Multi-agent Sequential Decision Making in Uncertain Domains (MSDM) 2007.

- Magazine Articles Ece Kamar. *Hybrid workplaces of the future*. XRDS: The ACM Magazine for Students 2016.
- Thesis Ece Kamar. *Reasoning Effectively Under Uncertainty for Human-Computer Teamwork*. Ph.D. Thesis, Harvard University, May 2010.
- Technical Reports Ece Kamar and Eric Horvitz. *Investigation of Principles of Context-Sensitive Reminding*. Microsoft Research Technical report, MSR-TR-2010-174, October 2010.

Ece Kamar and Eric Horvitz. *Generating Shared Transportation Plans Under Varying Preferences: Ridesharing Models and Mechanisms*. Microsoft Research Technical report, MSR-TR-2009-2011, April 2009.

PATENTS

- 2016 (granted) *Monte-Carlo Approach to Computing Value of Information*. Eric J. Horvitz and Semiha E. Kamar Eden. Patent Number: 9367815.
- 2016 (applied) *Providing Rewards and Metrics for Completion of Microtasks*. Jaime Teevan, Saleema Amershi, Shamsi Iqbal, Dan Liebling, Semiha Ece Kamar Eden, Kristina Toutanova, Robert Gruen, Darren Gehring, Pallavi Choudhury, Ann Paradiso, and Tony Carbary.
- 2014 (applied) *Stochastic Privacy*. Eric J. Horvitz, Ece Kamar, Ryen W. White, Adish Singla. Application Number: 14/447563.

Travel Path Identification Based Upon Statistical Relationships between Path Costs. Ashish Kapoor, Debadeepta Dey, Andrey

Kolobov, Semiha Ece Kamar Eden, Richard Caruana, Eric Horvitz.
Application Number:14/324861.

Evaluating Workers in a Crowdsourcing Environment. Semiha Ece Kamar Eden, Rajesh Patel, Steven Shelford, Hai Wu, David Molnar, Eric Horvitz. Application Number: 14/300115.

2013 (applied) *Value of Information with Streaming Evidence.* Dan Bohus, Eric J. Horvitz, Stephanie Rosenthal Pomerantz, Semiha E. Kamar Eden.
Application Number: 13/831688

Hiring, Routing , Fusing and Paying for Crowdsourcing Contributions. Eric J. Horvitz and Semiha E. Kamar Eden.
Application Number: 13/843293

Spatiotemporal Crowdsourcing. Eric Horvitz, John Krumm, Semiha Ece Kamar Eden, Adam Sadilek. Application Number: 13/831652.

2011 (granted) *Combining predictive models of forgetting, relevance, and cost of interruption to guide automated reminding.* Semiha Ece Kamar and Eric J. Horvitz. U.S. Patent No. 7,996,338.

2011 (applied) *Multi-step Impression Campaigns.* Eric Horvitz, Lili Cheng, Roger Barga, Xuedong Hiang, Zachary Apter, Semiha Ece Kamar.
Application Number: 13/174329.

2009 (applied) *Mechanisms and Architecture for Mobile Opportunistic Commerce.* Semiha Ece Kamar, Eric Horvitz and Christopher Meek. Application Number: 12/492861.

Generation of Impression Plans for Presenting and Sequencing Advertisement and Sales Opportunities along Potential Routes. Semiha Ece Kamar, Eric Horvitz, Christopher Meek, Stephen Lombardi. Application Number: 12/492861.

Collaborative Plan Generation based on Varying Preferences and Constraints. Ece Kamar and Eric Horvitz. Application Number: 12/491635.

INVITED TALKS AND PANELS

- February 2017 *Peering into the Crystal Ball: Preparing for New Directions in Science*, University of Washington Women in Science and Engineering Conference
- Directions in Hybrid Intelligence: Complementing AI Systems with Human Intelligence*, Diversity of AI Workshop, AAAI 2017
- Career Panel*, Diversity of AI Workshop, AAAI 2017
- Humans to the Rescue: Troubleshooting AI Systems with Human-in-the-loop*, Crowdsourcing, Deep Learning and Artificial Intelligence Agents Workshop, AAAI 2017
- Panel on Challenges and Opportunities in Human computation*, Crowdsourcing, Deep Learning and Artificial Intelligence Agents Workshop, AAAI 2017
- April 2016 *Directions in Hybrid Intelligence: Complementing AI Systems with Human Intelligence*, University of Washington AI Seminar
- January 2016 *Directions in Hybrid Intelligence*, NYU Future of AI Symposium
- November 2015 *Towards Hybrid Systems: Developing and Improving Interactive Systems with the Help of the Crowd*, Crowdsourcing Breakthroughs Workshop, HCOMP 2015
- October 2015 *Towards Hybrid Systems for Combining and Machine and Human Intelligence*, AI Seminar, University of Southern California
- February 2015 *Synergy of Machine Intelligence and Human Computation*, University of Washington AI Seminar
- February 2014 *Synergy of Machine Intelligence and Human Computation*, Carnegie Mellon University Crowdsourcing Seminar

RESEARCH ADVISEES & INTERNS

- 2016-present Jonathan Bragg (University of Washington, thesis committee)
- 2016 Himabindu Lakkaraju (Stanford University, MSR intern)

- Elliot Salisbury (University of Southampton, MSR intern)
 Joseph Chee Chang (Carnegie Mellon University, MSR intern)
- 2015 Ofra Amir (Harvard University, MSR intern)
 Besmira Nushi (ETH Zurich, MSR intern)
 Lydia Manikonda (Arizona State University, MSR intern)
 Cathy Wu (University of California at Berkeley, MSR intern)
 Niloufar Salehi (Stanford University, MSR intern)
- 2014 Shayan Doroudi (Carnegie Mellon University, MSR intern)
- 2013, 2014 Christopher Lin (University of Washington, MSR intern)
- 2012, 2013 Walter Lasecki (University of Rochester, MSR intern)
- 2013 Andrew Mao (Harvard University, MSR intern)
- 2011, 2012 William Wang (Carnegie Mellon University, MSR intern)

AWARDS AND HONORS

- 2017 ACM CSCW Honorable Mention
- 2016 IEEE Intelligent Transportation Systems Conference (IEEE ITSC)
 Best Paper Award
- 2008 Microsoft Research Graduate Research Fellowship Award
- 2006 Robert L. Wallace Prize Fellowship
- 2005 Harvard University Graduate Fellowship
- 2001 Sabanci University Undergraduate Fellowship
 (Awarded for success in the National University Entrance Exam,
 ranked 21st among a million students)

PROFESSIONAL ACTIVITIES

- Study Panel One Hundred Year Study on Artificial Intelligence (AI100)
 Member
- Program Co-chair HCOMP Work in Progress Track HCOMP 2016, 2017
- Area Chair IJCAI 2016

Senior Program Committee Member	IJCAI 2011, 2017 AAMAS 2014, 2015, 2016
Program Committee Member	Collective Intelligence 2017 Workshop on Crowdsourcing, Deep Learning and Artificial Intelligence Agents 2017 AAAI 2013, 2014, 2016, 2017 WWW 2014 UAI 2011, 2012, 2013 HCOMP 2012, 2013 AAMAS 2011,2012 IUI 2010 Mixed-Initiative Multi-agent Systems Workshop, AAMAS 2009 Grace Hopper 2012
Organizer	Workshop on Human-Agent Interaction Design and Models at AAMAS, 2015; at IJCAI 2016
Reviewer	IUI 2012, 2013 CHI 2013 CSCW 2012 Transactions on Pattern Analysis and Machine Intelligence Journal of Artificial Intelligence Research