Dan Bohus

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RESEARCH INTERESTS

My work is focused on the study and development of computational models for multimodal, physically situated interaction. The long-term question that drives my research is how we can create systems that reason about their surroundings and interact and collaborate with people in the physical world? Examples include human-robot interactive systems, embodied conversational agents, intelligent spaces, augmented and virtual reality systems, etc.

PROFESSIONAL EXPERIENCE

Microsoft Research AI   2007 – present
Senior Principal Researcher
Perception and Interaction Group

Microsoft Research   2003
Summer Internship
Adaptive Systems and Interaction Group

NASA Ames Research Center   2002
Summer Internship

EDUCATION

Carnegie Mellon University   2000 – 2007
PhD, Computer Science Department
Error Awareness and Recovery in Conversational Spoken Language Interfaces
Advisors: Alex Rudnicky, Roni Rosenfeld

Politechnica University of Timisoara, Romania   1996 – 2000
Bachelor of Science, Computer Science Department

AWARDS

ICMI'2019 Community Service Award   2019
Award for invaluable social-organizational contributions that have collectively had a major impact on improving the multimodal interaction community and its annual events

ICMI'2019 Ten-Year Technical Impact Award Runner-Up   2019
Bohus, D., and Horvitz, E. (2009) - *Dialog in the Open World: Platform and Applications*

ICMI'2017 Best Demonstration Award   2017
Bohus, D., Andrist, S., and Jalobeanu, M., (2017) - *Rapid Development of Multimodal Interactive Systems: A Demonstration of Platform for Situated Intelligence*

SIGDIAL'2009 Best Paper Award   2009
Bohus, D., and Horvitz, E. (2009) - *Models for Multiparty Engagement in Open-World Dialog*

ICMI'2009 Best Paper Award   2009
Bohus, D., and Horvitz, E. (2009) - *Dialog in the Open World: Platform and Applications*

PUBLICATIONS   Zhi Tan, X., Andrist, S., Bohus, D., and Horvitz, E., (2020) – *Now, Over Here: Leveraging Extended Attentional Capabilities in Human-Robot Interaction*, late breaking report, in Companion of the 2020 ACM/IEEE International Conference on Human-Robot Interaction, Cambridge, United Kingdom.   [58]

Bohus, D., and Horvitz, E., (2019) - *Situated Interaction*, chapter in *The Handbook of Multimodal-Multisensor Interfaces: Language Processing, Software, Commercialization, and Emerging Directions - Volume 3.*   [57]

Andrist, S., Bohus, D., and Feniello, A., (2019) - *Demonstrating a Framework for Rapid Development of Physically Situated Interactive Systems*, demonstration, in Proceedings of HRI'2019, Daegu, South Korea.   [56]

Andrist, S., Bohus, D., Kamar, E., and Horvitz, E., (2017) - *What Went Wrong and Why? Diagnosing Situated Interaction Failures in the Wild*, in Proceedings of ICSR'2017, Tsukuba, Japan.   [55]

Bohus, D., Andrist, S., and Jalobeanu, M., (2017) - *Rapid Development of Multimodal Interactive Systems: A Demonstration of Platform for Situated Intelligence*, in Proceedings of ICMI'2017, Glasgow, Scotland ★ Best Demonstration Award   [54]

Bohus, D., Andrist, S., and Horvitz, E., (2017) - *A Study in Scene Shaping: Adjusting F-formations in the Wild*, in Proceedings of AAAI Fall Symposium 2017, Arlington, VA, USA.   [53]

Andrist, S., Bohus, D., Mutlu, B., and Schlangen, D., (2016) - *Turn-Taking and Coordination in Human-Machine Interaction*, in AI Magazine, Winter Issue, vol. 34, no. 4.   [52]

Yu, Z., Bohus, D., and Horvitz, E., (2015) - *Incremental Coordination: Attention-Centric Speech Production in a Physically Situated Conversational Agent*, in Proceedings of SigDIAL'2015, Prague, Czech Republic.   [51]

Andrist, S., Bohus, D., Yu, Z., and Horvitz, E., (2015) - *Are You Messing with Me? Querying about the Sincerity of Interactions in the Open World*, late breaking report, in Proceedings of HRI'2015, Christchurch, New Zealand.   [50]

Bohus, D., and Horvitz, E., (2014) - *Managing Human-Robot Engagement with Forecasts and … um … Hesitations*, in Proceedings of ICMI'2014, Istanbul, Turkey.   [49]

Pejsa, T., Bohus, D., Cohen, M., Saw, C.W., Mahoney, J., and Horvitz, E. (2014) - *Natural Communication about Uncertainties in Situated Interaction*, in Proceedings of ICMI'2014, Istanbul, Turkey.   [48]

Mitchell, M., Bohus, D., and Kamar, E., (2014) - *Crowdsourcing Language Generation Templates for Dialogue Systems*, in Proceedings of INLG'2014, Philadelphia, PA, USA.   [47]

Bohus, D., Saw, C.W., and Horvitz, E., (2014) - *Directions Robot: In-the-Wild Experiences and Lessons Learned*, in Proceedings of AAMAS'2014, Paris, France   [46]

Rosenthal, S., Bohus, D., Kamar, E., and Horvitz, E., (2013) - *Look versus Leap: Computing Value of Information with High-Dimensional Streaming Evidence*, in Proceedings of IJCAI'2013, Beijing, China.   [45]

Metallinou, A., Bohus, D., and Williams, J.D., (2013) - *Discriminative state tracking for spoken dialog systems*, in Proceedings of ACL'2013, Sofia, Bulgaria.   [44]

Lasecki, W.S., Kamar, E., and Bohus, D. (2013) - *Conversations in the Crowd: Collecting Data for Task-Oriented Dialog Learning*, in Proceedings of HCOMP'2013, Palm Springs, CA, USA.　[43]

Loomis-Thompson, A., and Bohus, D. (2013) - *A Framework for Multimodal Data Collection, Visualization, Annotation and Learning*, in Proceedings of ICMI'2013, Sydney, Australia.　[42]

Wang, W.Y., Bohus, D., Kamar, E., and Horvitz, E. (2012) - *Crowdsourcing the Acquisition of Natural Language Corpora: Methods and Observations,* in Proceedings of SLT'2012, Miami, FL, USA.　[41]

Vinyals, O., Bohus, D., and Caruana, R. (2012) - *Learning Speaker, Addressee and Overlap Detection Models from Multimodal Streams*, in Proceedings of ICMI'2012, Santa Monica, CA, USA.　[40]

Bohus, D., Kamar, E., and Horvitz, E. (2012) - *Towards Situated Collaboration*, in Proceedings of NAACL Workshop on Future Directions and Challenges in Spoken Dialog Systems: Tools and Data, Montreal, Canada.　[39]

Bohus, D., and Horvitz, E. (2011) - *Decisions about Turns in Multiparty Conversation: From Perception to Action*, in Proceedings of ICMI-2011, Alicante, Spain.　[38]

Bohus, D., and Horvitz, E. (2011) - *Multiparty Turn Taking in Situated Dialog: Study, Lessons, and Directions*, in Proceedings of SIGdial-2011, Portland, OR, USA.　[37]

Bohus, D., and Horvitz, E. (2010) - *On the Challenges and Opportunities of Physically Situated Dialog*, in Proceedings of AAAI Fall Symposium on Dialog with Robots, Arlington, VA, USA.　[36]

Bohus, D., and Horvitz, E. (2010) - *Facilitating Multiparty Dialog with Gaze, Gesture and Speech*, in Proceedings of ICMI'10, Beijing, China.　[35]

Bohus, D., and Horvitz, E., (2010) - *Computational Models for Multiparty Turn-Taking*, Microsoft Technical Report MSR-TR-2010-115　[34]

Bohus, D., and Horvitz, E. (2009) - *Dialog in the Open World: Platform and Applications*, in Proceedings of ICMI'09, Boston, MA, USA. ★ ICMI'09 Outstanding Paper Award, ★ ICMI'19 Ten-Year Technical Impact Award Runner-up　[33]

Bohus, D., and Horvitz, E. (2009) - *Learning to Predict Engagement with a Spoken Dialog System in Open-World Settings*, in Proceedings of SIGdial'09, London, UK.　[32]

Bohus, D., and Horvitz, E. (2009) - *Models for Multiparty Engagement in Open-World Dialog*, in Proceedings of SIGdial'09, London, UK. ★ SIGdial'09 Best Paper Award　[31]

Bohus, D., and Horvitz, E. (2009) - *Open-World Dialog: Challenges, Directions, and Prototype*, in Proceedings of IJCAI'2009 Workshop on Knowledge and Reasoning in Practical Dialogue Systems, Pasadena, CA, USA.　[30]

Li, X., Nguyen, P., Zweig, G., and Bohus, D. (2009) - *Leveraging Multiple Query Logs to Improve Language Models for Spoken Query Recognition*, in Proceedings of ICASSP'09, Taipei, Taiwan.　[29]

Bohus, D., Zweig, G., Nguyen, P., and Li, X. (2008) - *Joint N-Best Rescoring for Repeated Utterances in Spoken Dialog Systems*, in Proceedings of SLT'08, Goa, India.　[28]

Zweig, G., Bohus, D., Li, X., and Nguyen, P. (2008) - *Structured Models for Joint Decoding of Repeated Utterances*, in Proceedings of InterSpeech'08, Brisbane, Australia.

[27]

Bohus, D., Li, X., Nguyen, P., and Zweig, G. (2008) - *Learning N-Best Correction Models from Implicit User Feedback in a Multi-modal Local Search Application*, in Proceedings of SIGdial'08, Columbus, OH, USA.

[26]

Bohus, D., and Rudnicky, A. (2008) - *The RavenClaw dialog management framework: architecture and systems*, in Computer Speech and Language, DOI:10.1016/j.csl.2008.10.001

[25]

Bohus, D. (2007) - *Error Awareness and Recovery in Conversational Spoken Language Interfaces*, Ph.D. Dissertation, CS-07-124, Carnegie Mellon University, Pittsburgh, PA, USA.

[24]

Bohus, D., and Rudnicky, A. (2007) - *Implicitly-supervised learning in spoken language interfaces: an application to the confidence annotation problem*, in Proceedings of SIGdial 2007, Antwerp, Belgium.

[23]

Ai, H., Raux, A., Bohus, D., Eskenazi, M., and Litman, D. (2007) - *Comparing Spoken Dialog Corpora Collected with Recruited Subjects versus Real Users*, in Proceedings of SIGdial 2007, Antwerp, Belgium.

[22]

Bohus, D., Raux, A., Harris, T., Eskenazi, M., and Rudnicky, A. (2007) - *Olympus: an open-source framework for conversational spoken language interface research*, in HLT-NAACL 2007 workshop on Bridging the Gap: Academic and Industrial Research in Dialog Technology, Rochester, NY, USA.

[21]

Bohus, D., Grau, S., Huggins-Daines, D., Keri, V., Krishna, G., Kumar, R., Raux, A., and Tomko, S. (2007) - *Conquest - an Open-Source Dialog System for Conferences*, in Proceedings of HLT-NAACL 2007, Rochester, NY, USA.

[20]

Tetreault, J., and Bohus, D., (2007) - *Estimating the Reliability of MDP Policies: a Confidence Interval Approach*, in Proceedings of HLT-NAACL 2007, Rochester, NY, USA.

[19]

Bohus, D., Langner, B., Raux, A., Black, A., Eskenazi, M. and Rudnicky A. (2006) - *Online Supervised Learning of Non-understanding Recovery Policies*, in Proceedings of SLT-2006, Palm Beach, Aruba.

[18]

Bohus, D., and Rudnicky, A. (2006) - *A K Hypotheses + Other Belief Updating Model*, in Proceedings of AAAI Workshop on Statistical and Empirical Approaches to Spoken Dialogue Systems, 2006, Boston, MA, USA.

[17]

Raux, A., Bohus, D., Langner, B., Black, A., and Eskenazi, M. (2006) - *Doing Research in a Deployed Spoken Dialog System: One Year of Let's Go! Public Experience*, in Proceedings of Interspeech-2006, Pittsburgh, PA, USA.

[16]

Bohus, D., and Rudnicky, A. (2005) - *Constructing Accurate Beliefs in Spoken Dialog Systems*, in Proceedings of ASRU-2005, San Juan, Puerto Rico.

[15]

Bohus, D., and Rudnicky, A. (2005) - *Error Handling in the RavenClaw dialog management architecture*, in Proceedings of HLT-EMNLP-2005, Vancouver, Canada.

[14]

Bohus, D., and Rudnicky, A. (2005) - *Sorry, I Didn't Catch That! - An Investigation of Non-understanding Errors and Recovery Strategies*, in Proceedings of SIGdial-2005, Lisbon, Portugal.

[13]

Bohus, D., and Rudnicky, A. (2005) - *A Principled Approach for Rejection Threshold Optimization in Spoken Dialog Systems*, in Proceedings of Interspeech-2005, Lisbon, Portugal. [12]

Raux, A., Langner, B., Bohus, D., Black, A., and Eskenazi, M. (2005) - *Let's Go Public! Taking a Spoken Dialog System to the Real World*, in Proceedings of Interspeech-2005, Lisbon, Portugal. [11]

Aist, G., Bohus, D., Boven, B., Campana, E., Early, S., and Phan, S. (2004) - *Initial Development of a Voice-Activated Astronaut Assistant for Procedural Tasks: From Need to Concept to Prototype*, in Journal of Interactive Instruction Development, Volume 16, Nr. 3, Winter 2004, pp 32-36. [10]

Bohus, D., and Rudnicky A. (2003) - *RavenClaw: Dialog Management Using Hierarchical Task Decomposition and an Expectation Agenda*, in Proceedings of Eurospeech-2003, Geneva, Switzerland. [9]

Aist, G., Dowding, J., Hockey, B.A., Rayner, M., Hieronymus, J., Bohus, D., Boven, B., Blaylock, N., Campana, E., Early, S., Gorrell, G., and Phan, S. (2003) - *Talking through procedures: An intelligent Space Station procedure assistant*, demonstration at EACL-2003, Budapest, Hungary. [8]

Bohus, D., and Rudnicky A. (2002) - *LARRI: A Language-Based Maintenance and Repair Assistant*, in Proceedings of IDS-2002, Kloster Irsee, Germany. [7]

Bohus, D., and Rudnicky A. (2002) - *Integrating Multiple Knowledge Sources for Utterance-Level Confidence Annotation in the CMU Communicator Spoken Dialog System*, Technical Report CS-190, Carnegie Mellon University, Pittsburgh, PA, USA. [6]

Bohus, D., and Rudnicky, A. (2001) - *Modeling the Cost of Misunderstandings in the CMU Communicator Dialog System*, in Proceedings of ASRU-2001, Madonna di Campiglio, Italy. [5]

Carpenter P., Jin C., Wilson D., Zhang R., Bohus, D., and Rudnicky A. (2001) - *Is This Conversation on Track?,* in Proceedings of Eurospeech-2001, Aalborg, Denmark. [4]

Bohus, D. (2000) - *Stochastic Speech Understanding for Human-Computer Dialogue*, in Romanian Journal of Information Science and Technology, Volume 4, No 3-4/2001. [3]

Bohus, D. (2000) - *Stochastically-Based Semantic Analysis in Human-Computer Dialog*, Graduate Thesis, Politechnica University of Timisoara, Romania. [2]

Bohus, D., and Boldea, M. (2000) - *A Web-based Text Corpora Development System*, in Proceedings of LREC-2000, Athens, Greece. [1]

PROFESSIONAL ACTIVITIES	**Steering Board Member** International Conference for Multimodal Interaction	2016 – 2019
	Reviewer and Program Committee Member Reviewer and program committee member duties for various conferences and journals, including ICMI, SIGdial, HRI, IJCAI, ACL, IUI, Transactions on Interactive Intelligent Systems, Transactions on Spoken Language Processing, Dialog and Discourse, etc.	2007 – present
	Co-organizer MSR-UW Summer Institute on Social Robotics, Union, WA, USA.	2018

	Co-organizer AAAI Spring Symposium on Turn-taking and Coordination in Human-Machine Interaction, Stanford, CA, USA.	2015
	Program Chair International Conference on Multimodal Interaction, Seattle, WA, USA.	2015
	Co-organizer Workshop on Understanding and Modeling Multiparty, Multimodal Interactions, Istanbul, Turkey.	2014
	General Chair International Conference on Multimodal Interaction, Los Angeles, CA, USA.	2012
	Co-organizer AAAI Fall Symposium on Dialog with Robots, Arlington, VA, USA.	2010
ADVISEES AND INTERNS	**Dimosthenis Kontogiorgos**, KTH MSR Intern	2018
	Zhou Yu, Carnegie Mellon University PhD Dissertation Committee	2017
	Leah Perlmutter, University of Washington MSR Intern	2016
	Shray Bansal, Georgia Tech MSR Intern	2015
	Sean Andrist, University of Wisconsin-Madison MSR Intern	2015
	Zhou Yu, Carnegie Mellon University MSR Intern	2014
	Tomislav Pejsa, University of Wisconsin Madison MSR Intern	2014
	William Wang, Carnegie Mellon University MSR Intern	2012
	Walter Lasecki, University of Rochester MSR Intern	2012
	Satanjeev Banerjee, Carnegie Mellon University PhD Dissertation Committee	2010
	Stephanie Rosenthal, Carnegie Mellon University MSR Intern	2011
	Oriol Vinyals, Berkeley University MSR Intern	2011
	Richard Roberts, Georgia Tech MSR Intern	2009
SELECTED TALKS	**Keynote Talk at SIGdial'2019**, Stockholm, Sweden. *Situated Interaction: Opportunities and Challenges*	2019
	Invited Talk at MSR Cambridge AI School, Cambridge, UK. *Timing and Coordination in Physically Situated Language Interaction*	2017

	Invited Talk at Latin American MSR Faculty Summit, Rio de Janeiro, Brazil. *Physically Situated Dialog: Opportunities and Challenges for Integrative AI*	2016
	Invited Talk at CHI'2016 Workshop on Designing Speech and Multimodal Interactions for Mobile, Wireless, and Pervasive Applications, San Jose, CA, USA. *Physically Situated Dialog: Challenges and Opportunities*	2016
	Invited Talk at ASRU'2015, Scottsdale, AZ, USA. *Situated Dialog: Opportunities and Challenges*	2015
	Invited Lecture at 2015 Young Researchers' Roundtable on Spoken Dialog Systems, Prague, Czech Republic. *Multimodal and Incremental Reasoning in Physically Situated Dialog*	2015
	Invited Talk at University of Washington, WA, USA. *Physically Situated Dialog: Challenges and Opportunities*	2015
	Invited Talk at University of Wisconsin-Madison, WI, USA. *Physically Situated Dialog: Challenges and Opportunities*	2015
	Invited Talk at 7th Workshop on Eye Gaze in Intelligent Human Machine Interaction: Eye-Gaze and Multimodality, Istanbul, Turkey. *Attention and Gaze in Situated Language Interaction*	2014
	Invited Talk at UW MSR Summer Institute: Understanding Situated Language in Everyday Life, Union, WA, USA. *Physically Situated Language Interaction*	2013
	Invited Talk at University of Southern California, Los Angeles, CA, USA. *Physically Situated Spoken Language Interaction*	2012
	Invited Talk at Carnegie Mellon University, Pittsburgh, PA, USA. *Engagement and Turn Taking in Open World Dialog Systems*	2011

OPEN SOURCE	**Platform for Situated Intelligence** an open, extensible framework that enables the development, fielding and study of situated, integrative-AI applications. github.com/Microsoft/psi	2018 – present

SELECTED MEDIA COVERAGE	**Microsoft teaches robots how to deal with groups and draw from memory** Jon Fingas, engadget.com | link	2014
	Can robots have social intelligence? Microsoft, phys.org | link	2014
	Microsoft's giving us a look at the future of robots in the office Tech Light, investorspot.com | link	
	Microsoft Research is building a smart virtual assistant with its Situated Interaction project Pradeep, mspoweruser.com | link	2014
	Could virtual assistants be made to understand us better? BBC | link	2014
	One day an elevator might ask — Are you getting on? Matt McFarland, The Washington Post | link	2014
	Microsoft's building smart elevators that know when you want to get on Bob Sorokanich, gizmodo.com | link	2014

Computers learn to listen, and some talk back   2010
Steve Lohr and John Markoff, The New York Times | link

Ability to 'see' advances artificial intelligence   2010
James Temple, San Francisco Chronicle | link

Microsoft aims to turn PCs into personal assistants, teachers   2009
Byron Acohido, USA Today | link

Microsoft demos robotic receptionist   2008
Ina Fried, cnet.com | link