

Research Interests

Robotics, Artificial Intelligence, Perception.

Education

- Dr. rer.-nat. (Ph.D.), University of Bonn, Germany December 1998
Computer Science – *summa cum laude* (Thesis).
- Diplom (M.Sc.), University of Bonn, Germany April 1993
Computer science (major) and physics (minor) – *summa cum laude*.
- Vordiplom (B.Sc.), University of Bonn, Germany March 1990
Computer science (major), economics and physics (minor).

Positions

- Senior Director of Robotics Research, NVIDIA 2017 – present
- Professor, University of Washington, Computer Science & Engineering 2013 – present
- Associate Professor, University of Washington, Computer Science & Engineering 2005 – 2013
- Director, Intel Labs Seattle 2009 – 2011
- Assistant Professor, University of Washington, Computer Science & Engineering 2000 – 2005
- Post-doc, Carnegie Mellon University, School of Computer Science 1998 – 2000

Awards and Honors

- **Pioneer in Robotics and Automation Award:** IEEE Robotics and Automation Society (RAS), 2020.
- **Fellow, IEEE:** Institute of Electrical and Electronics Engineers, 2015.
- **Fellow, AAAI:** Association for the Advancement of Artificial Intelligence, 2011.
- **IEEE ICRA 2020 Milestone Paper Award:** International Conference on Robotics & Automation, *Monte Carlo localization for mobile robots*, published in ICRA 1999 (most influential ICRA paper 1998-2002).
- **ICRA 2017 Best Robotic Vision Paper Award:** IEEE International Conference on Robotics & Automation, *Self-supervised visual descriptor learning for dense correspondence*.
- **AAAI 2017 Classic Paper Award:** AAAI Conference on Artificial Intelligence, *Monte Carlo localization: Efficient Position Estimation for Mobile Robots*, published in AAAI 1999.
- **AAAI 2016 Classic Paper Award:** AAAI Conference on Artificial Intelligence, *The Interactive Museum Tour-Guide Robot*, published in AAAI 1998.
- **CVPR 2015 Best Paper Award:** IEEE Computer Society Conference on Computer Vision and Pattern Recognition, *DynamicFusion: Reconstruction and tracking of non-rigid scenes in real-time*.
- **Honorable Mention: AAAI 2014 Classic Paper Award:** AAAI Conference on Artificial Intelligence, *Estimating the Absolute Position of a Mobile Robot Using Position Probability Grids*, published in 1996.
- **ICRA 2014 Cognitive Robotics Best Paper Award:** IEEE International Conference on Robotics & Automation, *Multi-task policy search for robotics*.
- **Ubicomp 2013 10-Year Impact Award:** International Conference on Ubiquitous Computing, *Inferring high-level behavior from low-level sensors*, published 2003.
- **Friedrich Wilhelm Bessel Research Award:** Alexander von Humboldt Foundation, Germany, 2013.

- **AIJ Prominent Paper Award:** Artificial Intelligence Journal, *Learning and inferring transportation routines*, 2012.
- **ICRA 2011 Best Vision Paper Award:** IEEE International Conference on Robotics & Automation, *Sparse distance learning for object recognition combining RGB and depth information*.
- **IROS 2007 Best Student Paper Award** (as advisor): IEEE/RSJ International Conference on Intelligent Robots and Systems, *GP-UKF: Unscented Kalman filters with Gaussian process prediction and observation models*.
- **ISWC 2005 Best Paper Award:** International Symposium on Wearable Computers, *Fine-grained activity recognition by aggregating abstract object usage*.
- **Honorable Mention: 2004 IJCAII-JAIR Best Paper Prize:** Journal of Artificial Intelligence Research (JAIR), *Markov Localization for Mobile Robots in Dynamic Environments*, published 1999.
- **AAAI 2004 Outstanding Paper Award:** National Conference on Artificial Intelligence, *Learning and Inferring Transportation Routines*.
- **RoboCup 2004 Scientific Challenge (Best Paper) Award:** International RoboCup Symposium, *Map-based Multiple Model Tracking of a Moving Object*.
- **NSF CAREER Award:** *Probabilistic Methods for Multi-Robot Collaboration*, March 2001.
- **ICRA 2000 Best Paper Award:** IEEE International Conference on Robotics & Automation, *A Real-Time Algorithm for Mobile Robot Mapping with Applications to Multi-Robot and 3D Mapping*.
- **ECCAI Artificial Intelligence Dissertation Award:** European Coordinating Committee for Artificial Intelligence, *Markov Localization: A Probabilistic Framework for Mobile Robot Localization and Navigation*, 2000.
- **AKI Dissertation Award:** “Arbeitsgemeinschaft der deutschen KI-Institute” (German AI institutes), *Markov Localization: A Probabilistic Framework for Mobile Robot Localization and Navigation*, 1999.
- **DAGM 1999 Outstanding Paper Award:** 21st Symposium on Pattern Recognition, *Collaborative Multi-Robot Localization*.
- **AAAI 1998 Outstanding Paper Award:** National Conference on Artificial Intelligence, *The Interactive Museum Tour-guide Robot*.
- **IROS 1998 Best Paper Award:** IEEE/RSJ International Conference on Intelligent Robots and Systems, *An Experimental Comparison of Localization Methods*.
- **Second Place Award:** *clean-up an office event* at the AAAI autonomous mobile robot competition, 1994.

Professional Activities

SELECTED EDITORIAL BOARD / CHAIRMANSHIP

- **Associate Editor** *The International Journal of Robotics Research* (IJRR), 2017 -.
- Member *AGE-WELL International Scientific Advisory Committee* (ISAC), since 2014.
- **Editor** *IEEE Transactions on Robotics* (T-RO), 2010 - 2015.
- **General Chair** *Robotics: Science and Systems* (RSS), 2014.
- **Program Chair** *Robotics: Science and Systems* (RSS), 2013.
- Conference Committee Chair *Association for the Advancement of Artificial Intelligence* (AAAI), 2009 – 2012.
- Advisory Board *Journal of Artificial Intelligence Research* (JAIR), since 2011.
- Associate Editor *Journal of Artificial Intelligence Research* (JAIR), 2008 – 2011.
- RSS Foundation Board, since 2009.
- Conference Board *Robotics: Science and Systems* (RSS), since 2005.
- Local arrangements co-chair *Robotics: Science and Systems* (RSS), 2009.
- **Program co-chair** *Twenty-Third Conference on Artificial Intelligence* (AAAI), 2008.
- Associate Editor *IEEE Transactions on Robotics* (T-RO), 2004 – 2007.
- Publication chair *Robotics: Science and Systems* (RSS), 2006.

- Workshops co-chair *National Conference on Artificial Intelligence (AAAI)*, 2004.
- NSF Reviewing Panels: 2012, 2004, 2001.

Selected Invited Talks

- **Distinguished Lecture:** Colorado School of Mines, Golden, CO, February 2018.
- University of California at Berkeley, EECS Colloquium Series, Berkeley, CA, February 2018.
- Harvard University, Computer Science Colloquium Series, Cambridge, MA, October 2017.
- **Plenary:** IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Vancouver, BC, Canada, September 2017.
- **Keynote:** Robotics: Science & Systems Conference (RSS), Boston, MA, July 2017.
- Toyota Technological Institute of Chicago, TTIC Colloquium, Chicago, IL, May 2017.
- **Distinguished Lecturer Series,** UMass Amherst, College of Information and Computer Sciences, Amherst, MA, October 2016.
- Stanford University, The Future of Artificial Intelligence Event, Stanford, CA, June 2016.
- **Keynote:** IEEE International Conference on Robotics & Automation (ICRA), Stockholm, Sweden, May 2016.
- Arizona State University, ASU Robotics Seminar, Tempe, AZ, April 2016.
- **Distinguished Lecture:** Simon Fraser University, Burnaby, BC, Canada, February 2016.
- University of Washington College of Engineering: 2015 Engineering Lecture Series, November 2015.
- Massachusetts Institute of Technology, MIT Robotics Seminar Series, Cambridge, MA, May 2015.
- **Keynote:** 12th Asian Conference on Computer Vision (ACCV), Singapore, November 2014.
- Brown University, Humanity Centered Robotics Multidisciplinary (HCRI) Speaker Series, Providence, RI, September 2014.
- **Distinguished CS Colloquium:** Department of Computer Science, ETH Zurich, April 2014.
- **Keynote:** 3D Vision Conference (3DV), Seattle, WA, June 2013.
- **Keynote:** Tenth Conference on Computer and Robot Vision (CRV), Regina, Canada, May 2013.
- University of Maryland, Center for Automation Research, Rosenfeld Lecture: Distinguished Seminar Series on Vision, College Park, MD, April 2013.
- University of Pennsylvania, Institute for Research in Cognitive Science and GRASP Laboratory, IRCS/GRASP Joint Colloquium, Philadelphia, PA, November 2012.
- Carnegie Mellon University, Robotics Institute, RI Seminar Series, Pittsburgh, PA, April 2012.
- **Keynote:** 15th annual RoboCup International Symposium, Istanbul, Turkey, July 2011.
- Cornell University, Department of Computer Science, CS Colloquium, Ithaca, NY, November 2010.
- University of Rochester, Department of Computer Science, Rochester, NY, November 2010.
- Georgia Institute of Technology, Center for Robotics and Intelligent Machines, RIM Seminar Series, Atlanta, GA, March 2010.
- **Keynote:** Robotics Industry Forum, Orlando, FL, January 2010.
- **Keynote:** 4th European Conference on Mobile Robots (ECMR), Dubrovnik, Croatia, September 2009.
- Dartmouth College, Computer Science Seminar Series, Dartmouth, NH, February 2009.
- **Keynote:** 11th International Conference on Information Fusion (FUSION), Cologne, Germany, July 2008.
- Carnegie Mellon University, School of Computer Science, Intelligence Seminar Series, Pittsburgh, PA, November 2007.
- Carnegie Mellon University, Robotics Institute, RI Seminar Series, Pittsburgh, PA, November 2007.

- **Plenary talk:** 30th German Conference on Artificial Intelligence (KI), Osnabrück, Germany, September 2007.
- Georgia Institute of Technology, Center for Robotics and Intelligent Machines, RIM Seminar Series, Atlanta, GA, August 2007.
- University of Sydney, Institute of Transport and Logistics Studies, ITLS-Sydney Seminar Series, Sydney, Australia, May 2007.
- **Plenary talk:** Australasian Conference on Robotics and Automation, Auckland, New Zealand, December 2006.
- University of Freiburg, Faculty Seminar, Freiburg, Germany, June 2005.
- Canadian Conference on Computer and Robot Vision, Victoria, Canada, May 2005.
- University of Michigan, Artificial Intelligence Seminar, Ann Arbor, MI, January 2005.
- University of Texas at Austin, Forum for Artificial Intelligence, Austin, TX, October 2004.
- Stanford University, Broad Area Colloquium For AI-Geometry-Graphics-Robotics-Vision, Stanford, CA, September 2004.
- University of Southern California, CRES Robotics Seminar Series, Los Angeles, CA, November 2003.
- University of Pennsylvania, GRASP Seminar Series, Philadelphia, PA, November 2003.
- Oregon Graduate Institute, Portland, OR, January 2003.

Publication List

Download papers at <http://homes.cs.washington.edu/~fox/publications> or via Google Scholar with citation counts at <http://scholar.google.com/citations?hl=en&user=DqXsbPAAAAAJ>

BOOKS AND EDITED VOLUMES

- [1] D. Fox, L. Kavraki, and K. Kurniawati, editors. *Robotics: Science and Systems X*, 2014. ISBN 978-0-9923747-0-9.
- [2] S. Williams and D. Fox. Special issue on Robotics: Science and Systems. *International Journal of Robotics Research (IJRR)*, 34, 2015. Guest editors.
- [3] G. Dudek and D. Fox. Special issue on Robotics: Science and Systems. *Autonomous Robots*, 37(4), 2014. Guest editors.
- [4] P. Newman, D. Fox, and D. Hsu, editors. *Robotics: Science and Systems IX*, 2013. ISBN 978-981-07-3937-9.
- [5] D. Fox and C. Gomes, editors. *Proceedings of the Twenty-Third AAAI Conference on Artificial Intelligence*, number ISBN 978-1-57735-368-3. AAAI Press, 2008.
- [6] G. Sukhatme, S. Schaal, W. Burgard, and D. Fox, editors. *Robotics: Science and Systems II*. MIT Press, 2007.
- [7] S. Thrun, W. Burgard, and D. Fox. *Probabilistic Robotics*. MIT Press, Cambridge, MA, September 2005. ISBN 0-262-20162-3.

REFEREED JOURNAL / MAGAZINE ARTICLES

- [1] D. Gordon, A. Farhadi, and D. Fox. Re^3 : Real-time recurrent regression networks for visual tracking of generic objects. In *IEEE Robotics and Automation Letters*, 2018.
- [2] T. Schimdt, R. Newcombe, and D. Fox. Self-supervised visual descriptor learning for dense correspondence. *IEEE Robotics and Automation Letters*, 2017. **[ICRA Best Vision Paper Award]**
- [3] M. Chung, A. Friesen, D. Fox, A. Meltzoff, and R. Rao. A Bayesian developmental approach to robotic goal-based imitation learning. *PLoS One*, 10(11), 2015.
- [4] T. Schmidt, R. Newcombe, and D. Fox. DART: dense articulated real-time tracking with consumer depth cameras. *Autonomous Robots*, 39(3), 2015.

- [5] M. Deisenroth, D. Fox, and C.E. Rasmussen. Gaussian processes for data-efficient learning in robotics and control. *IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI)*, 37(2), 2015.
- [6] L. Bo, X. Ren, and D. Fox. Learning hierarchical sparse features for RGB-(D) object recognition. *International Journal of Robotics Research (IJRR)*, 33, 2014.
- [7] X. Ren, D. Fox, and K. Konolige. Change their perception: RGB-D for 3d modeling and recognition. *Robotics & Automation Magazine*, 20(4), December 2013.
- [8] A. Deshpande, J. Ko, D. Fox, and Y. Matsuoka. Control strategies for the index finger of a tendon-driven hand. *International Journal of Robotics Research (IJRR)*, 32(1), 2013.
- [9] S. Bachrach, A. Prentice, R. He, P. Henry, A. Huang, M. Krainin, D. Maturana, D. Fox, and N. Roy. Estimation, planning, and mapping for autonomous flight using an RGB-D camera in GPS-denied environments. *International Journal of Robotics Research (IJRR)*, 31(11), 2012.
- [10] P. Henry, M. Krainin, E. Herbst, X. Ren, and D. Fox. RGB-D mapping: Using Kinect-style depth cameras for dense 3D modeling of indoor environments. *International Journal of Robotics Research (IJRR)*, 31(4), 2012.
- [11] M. Krainin, P. Henry, X. Ren, and D. Fox. Manipulator and object tracking for in hand 3d object modeling. *International Journal of Robotics Research (IJRR)*, 30(9), 2011.
- [12] A. Stupakov, E. Hanusa, D. Vijaywargi, D. Fox, and J. Bilmes. The design and collection of COSINE, a multi-microphone in-situ speech corpus recorded in noisy environments. *Computer Speech and Language*, 26:52–66, 2011.
- [13] B. Douillard, D. Fox, F. Ramos, and H. Durrant-Whyte. Classification and semantic mapping of urban environments. In *International Journal of Robotics Research (IJRR)*, 30(1), 2011.
- [14] J. Ko and D. Fox. Learning GP-BayesFilters via Gaussian process latent variable models. *Autonomous Robots*, 30(1), 2011.
- [15] K. Lai and D. Fox. Object recognition in 3D point clouds using web data and domain adaptation. *International Journal of Robotics Research (IJRR)*, 29(8), 2010.
- [16] J. Ko and D. Fox. GP-BayesFilters: Bayesian filtering using Gaussian process prediction and observation models. *Autonomous Robots*, 27(1), 2009.
- [17] R. Vincent, D. Fox, J. Ko, K. Konolige, B. Limketkai, B. Morisset, C. Ortiz, D. Schulz, and B. Stewart. Distributed multirobot exploration, mapping, and task allocation. *Annals of Mathematics and Artificial Intelligence*, 52(2–4), 2008.
- [18] L. Liao, D. J. Patterson, D. Fox, and H. Kautz. Learning and inferring transportation routines. *Artificial Intelligence (AIJ)*, 171(5-6):311–331, 2007.
[2012 AIJ Prominent Paper Award]
- [19] L. Liao, D. Fox, and H. Kautz. Extracting places and activities from GPS traces using hierarchical conditional random fields. *International Journal of Robotics Research (IJRR)*, 26(1), 2007.
- [20] D. Fox, J. Ko, K. Konolige, B. Limketkai, and B. Stewart. Distributed multi-robot exploration and mapping. *Proc. of the IEEE*, 94(7):1325–1339, 2006. Special Issue on Multirobot Systems.
- [21] M. Philipose, K.P. Fishkin, M. Perkowitz, D.J. Patterson, D. Hähnel, D. Fox, and H. Kautz. Inferring activities from interactions with objects. *IEEE Pervasive Computing Magazine*, 3(4):50–57, 2004.
- [22] C.T. Kwok, D. Fox, and M. Meilä. Real-time particle filters. *Proceedings of the IEEE*, 92(2):469–484, 2004. Special Issue on Sequential State Estimation.
- [23] D. Fox. Adapting the sample size in particle filters through KLD-sampling. *International Journal of Robotics Research (IJRR)*, 22(12):985–1003, 2003.
- [24] D. Fox, J. Hightower, L. Liao, D. Schulz, and G. Borriello. Bayesian filtering for location estimation. *IEEE Pervasive Computing Magazine*, 2(3):24–33, 2003. Special Issue on Dealing with Uncertainty.
- [25] D. Schulz, W. Burgard, and D. Fox. People tracking with a mobile robot using sample-based joint probabilistic data association filters. *International Journal of Robotics Research (IJRR)*, 22(2):99–116, 2003.

- [26] M. Beetz, T. Arbuckle, T. Belker, M. Bennewitz, W. Burgard, A.B. Cremers, D. Fox, H. Grosskreutz, D. Haehnel, and D. Schulz. Integrated plan-based control of autonomous service robots in human environments. *IEEE Intelligent Systems*, 16(5):56–65, 2001.
- [27] S. Thrun, D. Fox, W. Burgard, and F. Dellaert. Robust Monte Carlo localization for mobile robots. *Artificial Intelligence (AIJ)*, 128(1-2):99–141, 2001.
- [28] S. Thrun, M. Beetz, M. Bennewitz, W. Burgard, A. B. Cremers, F. Dellaert, D. Fox, D. Haehnel, C. Rosenberg, N. Roy, J. Schulte, and D. Schulz. Probabilistic algorithms and the interactive museum tour-guide robot minerva. *International Journal of Robotics Research (IJRR)*, 19(11):972–999, 2000.
- [29] D. Fox, W. Burgard, H. Kruppa, and S. Thrun. A probabilistic approach to collaborative multi-robot localization. *Autonomous Robots (ARJ)*, 8(3):325–344, 2000.
- [30] D. Schulz, W. Burgard, D. Fox, S. Thrun, and A.B. Cremers. Web interfaces for mobile robots in public places. *IEEE-Magazine on Robotics and Automation*, 7(1):48–56, 2000.
- [31] D. Fox, W. Burgard, and S. Thrun. Markov localization for mobile robots in dynamic environments. *Journal of Artificial Intelligence Research (JAIR)*, 11:391–427, 1999.
[honorable mention: 2004 IJCAI-JAIR best paper prize]
- [32] W. Burgard, A.B. Cremers, D. Fox, D. Hähnel, G. Lakemeyer, D. Schulz, W. Steiner, and S. Thrun. Experiences with an interactive museum tour-guide robot. *Artificial Intelligence (AIJ)*, 114(1-2):3–55, 1999.
- [33] D. Fox, W. Burgard, and S. Thrun. Active markov localization for mobile robots. *Robotics and Autonomous Systems (RAS)*, 25:195–207, 1998.
- [34] M. Beetz, W. Burgard, D. Fox, and A.B. Cremers. Integrating active localization into high-level robot control systems. *Robotics and Autonomous Systems (RAS)*, 23:205–220, 1998.
- [35] S. Thrun, D. Fox, and W. Burgard. A probabilistic approach to concurrent mapping and localization for mobile robots. *Machine Learning*, 31:29–53, 1998. Also appeared in *Autonomous Robots* 5:253–271, joint issue.
- [36] D. Fox, W. Burgard, and S. Thrun. The dynamic window approach to collision avoidance. *IEEE Robotics & Automation Magazine*, 4(1):23–33, March 1997.
- [37] W. Burgard, A.B. Cremers, D. Fox, D. Hähnel, A.M. Kappel, and S. Lüttringhaus-Kappel. Verbesserte Brandfrüherkennung im Steinkohlenbergbau durch Vorhersage von CO-Konzentrationen. In *KI Themenheft Data Mining*, volume 1:46–53. ScienTec Publishing GmbH, 1998. In German.

REFEREED CONFERENCE / SYMPOSIUM ARTICLES

Acceptance rate given if below 40%

- [1] C. Schenck and D. Fox. SPNets: Differentiable fluid dynamics for deep neural networks. In *Proc. of the Conference on Robot Learning (CoRL)*, 2018.
- [2] J. Liang, V. Makoviyuchuk, A. Handa, N. Chentanez, M. Macklin, and D. Fox. Gpu-accelerated robotic simulation for distributed reinforcement learning. In *Proc. of the Conference on Robot Learning (CoRL)*, 2018.
- [3] J. Tremblay, T. To, B. Sundaralingam, Y. Xiang, D. Fox, and S. Birchfield. Deep object pose estimation for semantic robotic grasping of household objects. In *Proc. of the Conference on Robot Learning (CoRL)*, 2018.
- [4] C.-A. Cheng, M. Mukadam, J. Issac, S. Birchfield, D. Fox, B. Boots, and N. Ratliff. RMP-flow: A computational graph for automatic motion policy generation. In *Workshop on the Algorithmic Foundations of Robotics (WAFR)*, 2018.
- [5] Y. Li, G. Wang, X. Ji, Y. Xiang, and D. Fox. DeepIM: Deep iterative matching for 6d pose estimation. In *Proc. of European Conference on Computer Vision (ECCV)*, 2018. [Oral presentation, 2% of submissions were selected for oral]
- [6] D. Gordon, A. Kembhavi, M. Rastegari, J. Redmond, D. Fox, and A. Farhadi. IQA: Visual question answering in interactive environments. In *Proc. of the IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR)*, 2018. [30% acceptance rate]

- [7] Y. Xiang, T. Schmidt, V. Narayanan, and D. Fox. PoseCNN: A convolutional neural network for 6D object pose estimation in cluttered scenes. In *Proc. of Robotics: Science and Systems (RSS)*, 2018.
- [8] A. Byravan, F. Leeb, F. Meier, and D. Fox. SE3-Pose-Nets: Structured deep dynamics models for visuo-motor planning and control. In *Proc. of the IEEE International Conference on Robotics & Automation (ICRA)*, 2018.
- [9] A. Bosselut, O. Levy, A. Holtzman, C. Ennis, D. Fox, and Y. Choi. Simulating action dynamics with neural process networks. In *Proc. of the International Conference on Learning Representations (ICLR)*, 2018. [34% acceptance rate]
- [10] R. Mottaghi, C. Schenck, D. Fox, and A. Farhadi. See the glass half full: Reasoning about liquid containers, their volume and content. In *Proc. of the International Conference on Computer Vision (ICCV)*, 2017. [29% acceptance rate]
- [11] Y. Zhu, D. Gordon, E. Kolve, D. Fox, L. Fei-Fei, A. Gupta, R. Mottaghi, and A. Farhadi. Visual semantic planning using deep successor representations. In *Proc. of the International Conference on Computer Vision (ICCV)*, 2017. [29% acceptance rate]
- [12] C. Schenck and D. Fox. Reasoning about liquids via closed-loop simulation. In *Proc. of Robotics: Science and Systems (RSS)*, 2017.
- [13] Y. Xiang and D. Fox. DA-RNN: Semantic mapping with data associated recurrent neural networks. In *Proc. of Robotics: Science and Systems (RSS)*, 2017.
- [14] C. Schenck and D. Fox. Visual closed-loop control for pouring liquids. In *Proc. of the IEEE International Conference on Robotics & Automation (ICRA)*, 2017.
- [15] A. Byravan and D. Fox. SE3-nets: Learning rigid body motion using deep neural networks. In *Proc. of the IEEE International Conference on Robotics & Automation (ICRA)*, 2017. [**Finalist: ICRA Best Vision Paper Award**]
- [16] Y. Sun, A. Singla, D. Fox, and A. Krause. Evaluating task-dependent taxonomies for navigation. In *Proc. of the AAAI Conference on Human Computation and Crowdsourcing (HCOMP)*, 2016.
- [17] Y. Sun and D. Fox. Toward never-ending object learning for robots. In *Proc. of the IEEE International Conference on Robotics & Automation (ICRA)*, 2016.
- [18] A. Byravan, M. Monfort, B. Ziebart, B. Boots, and D. Fox. Graph-based inverse optimal control for robot manipulation. In *Proc. of the International Joint Conference on Artificial Intelligence (IJCAI)*, 2015. [29% acceptance rate]
- [19] Y. Sun, A. Singla, D. Fox, and A. Krause. Building hierarchies of concepts via crowdsourcing. In *Proc. of the International Joint Conference on Artificial Intelligence (IJCAI)*, 2015. [29% acceptance rate]
- [20] R. Newcombe, D. Fox, and S. Seitz. DynamicFusion: Reconstruction and tracking of non-rigid scenes in real-time. In *Proc. of the IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR)*, 2015. [25% acceptance rate; **Best Paper Award**]
- [21] T. Schmidt, R. Newcombe, and D. Fox. Self-supervised visual descriptor learning for dense correspondence. *IEEE Robotics and Automation Letters*, 2017. [**ICRA Best Vision Paper Award**]
- [22] T. Schmidt, R. Newcombe, and D. Fox. DART: dense articulated real-time tracking with consumer depth cameras. *Autonomous Robots*, 39(3), 2015.
- [23] T. Schmidt, K. Hertkorn, R. Newcombe, Z. Marton, S. Suppa, and D. Fox. Depth-based tracking with physical constraints for robot manipulation. In *Proc. of the IEEE International Conference on Robotics & Automation (ICRA)*, 2015. [**Finalist: ICRA Best Vision Paper Award**]
- [24] T. Schmidt, R. Newcombe, and D. Fox. DART: Dense articulated real-time tracking. In *Proc. of Robotics: Science and Systems (RSS)*, 2014. [31% acceptance rate]
- [25] C. Matuszek, L. Bo, L. Zettlemoyer, and D. Fox. Learning from unscripted deictic gesture and language for human-robot interactions. In *Proc. of the AAAI Conference on Artificial Intelligence (AAAI)*, 2014. [28% acceptance rate]
- [26] Y. Sun, L. Bo, and D. Fox. Learning to identify new objects. In *Proc. of the IEEE International Conference on Robotics & Automation (ICRA)*, 2014.

- [27] K. Lai, L. Bo, and D. Fox. Unsupervised feature learning for 3d scene labeling. In *Proc. of the IEEE International Conference on Robotics & Automation (ICRA)*, 2014. [Finalist: ICRA Best Vision Paper Award]
- [28] M. Madry, L. Bo, D. Kragic, and D. Fox. ST-HMP: Unsupervised spatio-temporal feature learning for tactile data. In *Proc. of the IEEE International Conference on Robotics & Automation (ICRA)*, 2014.
- [29] E. Herbst, P. Henry, and D. Fox. Toward online 3-D object segmentation and mapping. In *Proc. of the IEEE International Conference on Robotics & Automation (ICRA)*, 2014.
- [30] B. Boots, A. Byravan, and D. Fox. Learning predictive models of a depth camera & manipulator from raw execution traces. In *Proc. of the IEEE International Conference on Robotics & Automation (ICRA)*, 2014.
- [31] A. Byravan, B. Boots, S. Srinivasa, and D. Fox. Space-time functional gradient optimization for motion planning. In *Proc. of the IEEE International Conference on Robotics & Automation (ICRA)*, 2014.
- [32] M. Ruhnke, L. Bo, D. Fox, and W. Burgard. Hierarchical sparse coded surface models. In *Proc. of the IEEE International Conference on Robotics & Automation (ICRA)*, 2014.
- [33] M. Deisenroth, P. Englert, J. Peters, and D. Fox. Multi-task policy search for robotics. In *Proc. of the IEEE International Conference on Robotics & Automation (ICRA)*, 2014. [ICRA Cognitive Robotics Best Paper Award]
- [34] P. Henry, D. Fox, A. Bhowmik, and R. Mongia. Patch volumes: Segmentation-based consistent mapping with RGB-D cameras. In *Proc. of the International Conference on 3D Vision (3DV)*, 2013.
- [35] M. Ruhnke, L. Bo, D. Fox, and W. Burgard. Compact RGBD surface models based on sparse coding. In *Proc. of the National Conference on Artificial Intelligence (AAAI)*, 2013. [29% acceptance rate]
- [36] L. Bo, X. Ren, and D. Fox. Multi-path hierarchical sparse coding for object recognition. In *Proc. of the IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR)*, 2013. [25.2% acceptance rate]
- [37] Y. Sun, L. Bo, and D. Fox. Attribute based object identification. In *Proc. of the IEEE International Conference on Robotics & Automation (ICRA)*, 2013. [39% acceptance rate]
- [38] E. Herbst, X. Ren, and D. Fox. RGB-D Flow: Dense 3-d motion estimation combining color and depth. In *Proc. of the IEEE International Conference on Robotics & Automation (ICRA)*, 2013. [39% acceptance rate]
- [39] A. Gupta, D. Fox, B. Curless, and M. Cohen. DuploTrack: A real-time system for authoring and guiding Duplo block assembly. In *Proc. of the ACM Symposium on User Interface Software and Technology (UIST)*, 2012. [\approx 20% acceptance rate]
- [40] J. Lei, X. Ren, and D. Fox. Fine-grained kitchen activity recognition using RGB-D data. In *International Conference on Ubiquitous Computing (UbiComp)*, 2012. [19% acceptance rate]
- [41] C. Matuszek, N. Fitzgerald, L. Zettlemoyer, and D. Fox. A joint model of language and perception for grounded attribute learning. In *Proc. of the International Conference on Machine Learning (ICML)*, 2012. [27% acceptance rate]
- [42] L. Bo, X. Ren, and D. Fox. Unsupervised feature learning for RGB-D based object recognition. In *Proc. of the International Symposium on Experimental Robotics (ISER)*, 2012.
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