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Professor of Computer Science and Electrical Engineering
Director, Stanford Artificial Intelligence Lab (SAIL)

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EDUCATION

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| 1995 | Dr. rer.-nat. (Ph.D.) in computer science and statistics, University of Bonn, Germany, summa cum laude. |
| 1993 | Diplom (M.Sc.) in computer science and statistics, University of Bonn, Germany. |
| 1988 | Vordiplom (B.Sc.) in computer science, economics, and medicine, University of Hildesheim, Germany. |

ACADEMIC POSITIONS

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| 2011– | Google Fellow. |
| 2011– | Research professor of computer science, Stanford University. |
| 2007–2011 | Professor of computer science and electrical engineering, Stanford University. |
| 2003–2007 | Associate professor of computer science and (since 2006) electrical engineering, Stanford University. Since 2004 director of the Stanford Artificial Intelligence Laboratory (SAIL). |
| 1998–2003 | Assistant professor and (since 2001) associate professor of computer science, robotics, and automated learning and discovery, Carnegie Mellon University. |
| 1995–1998 | Research Computer Scientist, Carnegie Mellon University. |

INDUSTRIAL, AFFILIATE, AND CONSULTING POSITIONS

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| 2009– | Senior Advisor, Charles River Ventures. |
| 2007– | Principal Engineer, Google, Inc. |

HONORS AND AWARDS

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| 2011 | Fast Company: Fifth most creative person.
Inaugural AAAI Ed Feigenbaum Prize.
Max Planck Research Award, 2011. |
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Crunchy, Best Technology Achievement, 2010.

2010 Time Magazine, The 50 Best Inventions of 2010.
IEEE ITSS Distinguished Researcher Award.
Fortune Magazine: 50 Smartest People in Tech, Academic Runner-Up.

2008 PC World list *Best 100 Products of 2008* (for Google Street View)

2007 Braunschweig Research Prize.
Member, National Academy of Engineering.
Member, Deutsche Akademie der Naturforscher Leopoldina (German Academy of Sciences).

2006 Scientific American 50.
World Technology Network Award (category: Information Technology) and WTN Fellow.
AAAI Fellow (American Association of Artificial Intelligence).
ECCAI Fellow (European Coordinating Committee for Artificial Intelligence).
Vance D. and Arlene C. Coffman Scholar II, Stanford School of Engineering.
Wired Magazine *best robot of all times*.
Forbes Magazine E-Gang.

2005 Leader of the Stanford Racing Team that won the DARPA Grand Challenge.
Popular Science Brilliant Ten.

2004 Honorable mention, 2004 IJCAI-JAIR best paper prize.

2003–2006 Reid and Polly Anderson Scholar and (until 2004) David Filo and Jerry Yang Faculty Scholar, Stanford School of Engineering.

2003 Best conference paper, International Conference of Field and Service Robotics (FSR).
Best conference paper, IEEE International Conference on Robotics and Automation (ICRA).
Best student conference paper, International Joint Conference on Autonomous Agents and Multiagent Systems (AAMAS).

2002 Finmeccanica endowed faculty chair, School of Computer Science, Carnegie Mellon University.

2001 Olympus award, German society for pattern recognition (DAGM).

2000 Best conference paper, IEEE International Conference on Robotics and Automation (ICRA).

1999 Best conference paper, German Conference of the German society for pattern recognition (DAGM).

1999–2003 NSF CAREER.

1998 Best conference paper, National Conference on Artificial Intelligence (AAAI).

1996 First place, AAAI autonomous mobile robot competition.

1994 Second place, AAAI autonomous mobile robot competition.

FIELD SERVICE

2013 General Chair, IJCAI Conference.
2009– President, Robotics Science and Systems Foundation.
2005–2008 AAAI Councilor.
2005 Founding conference chair, Robotics Science and Systems conference (RSS), Boston.
Co-chair, International Symposium on Robotics Research (ISRR), San Francisco.
2003–2009 Vice President for Development, NIPS Foundation.
2003 Program co-chair, International Conference on Field and Service Robotics (FSR), Japan.
2002–2003 Program chair (2002) and general chair (2003), Neural Information Processing Systems conference (NIPS), Vancouver.
1998 Conference chair, Conference on Automated Learning and Discovery (CONALD).
1990– Member of numerous editorial boards and organizing committees.

MAJOR PLENARY KEYNOTES

2010 nVidia GPU Conference, San Jose.
SIGSPATIAL, San Jose.
International Conference on Robotics and Automation (ICRA), Anchorage.
2009 International Conference on Automated Planning and Scheduling, Thessaloniki, Greece.
International Conference on Engineering Design, Stanford.
Electric Aircraft Symposium, San Bruno.
Annual Conference, Society of Automotive Engineers (SAE), Detroit.
2008 Linux World, Opening Keynote, San Francisco.
International Conference on Multimedia and Entertainment (ICME), Germany.
2007 Institute of Navigation (ION) GNSS, Fort Worth.
Florida Artificial Intelligence Conference, Key West.
2006 IEEE Sensors, Korea.
MIT Emerging Technologies Conference, Cambridge.
Automated Software Engineering Conference (ASE), Tokyo.
European Conference on Machine Learning (ECML), Berlin.
IFAC Mechatronics, Heidelberg.
IEEE World Congress on Computational Intelligence (WCCI), Vancouver.
Innovative Applications of Artificial Intelligence (IAAI), Boston.

- Workshop on Algorithmic Foundations of Robotics (WAFR), New York City.
- International Multisensory Research Forum (IMRF), Dublin.
- German National Conference on AI (KI), Bremen.
- International Symposium on 3D Data Processing, Visualization and Transmission (3DPVT), Chapel Hill.
- Sensors Expo and Conference, Chicago.
- 2005 Neural information processing systems (NIPS), Vancouver.
- German National Conference on AI (KI), Koblenz.
- International Conference on Advanced Robotics (ICAR), Seattle.
- DARPA Cognitive Systems Conference, Arlington.
- 2004 IEEE International Conference on Intelligent Robots and Systems (IROS), Sendai.
- National Conference on Artificial Intelligence (AAAI), San Jose.
- 2002 International Conference on Uncertainty in Artificial Intelligence (UAI), Edmonton.
- European Conference on Artificial Intelligence (ECAI), Lyon.
- International Conference on Machine Learning (ICML), Sydney.
- 2001 Belgium Netherlands Artificial Intelligence Conference (BNAIC), Amsterdam.
- International Conference on Field and Service Robotics (FSR), Helsinki.
- 2000 Joint Brazilian and Ibero-American AI conference (SBIA/IBERAMIA), Atibaia, Brazil.
- Australian Conference on Robotics and Automation (ACRA), Melbourne.
- 1999 German National Conference on AI (KI), Bonn.
- Neuro-Fuzzy Conference, Leipzig.

BOOKS (MONOGRAPHS)

- [1] M. Montemerlo and S. Thrun. *The FastSLAM Algorithm for Simultaneous Localization and Mapping*. Springer Tracts in Advanced Robotics, forthcoming.
- [2] S. Thrun, W. Burgard, and D. Fox. *Probabilistic Robotics*. MIT Press, Cambridge, MA, 2005.
- [3] H. Choset, K. Lynch, S. Hutchinson, G. Kantor, W. Burgard, L. Kavraki, and S. Thrun. *Principles of Robotic Motion: Theory, Algorithms, and Implementation*. MIT Press, Cambridge, MA, 2004.
- [4] S. Thrun. *Explanation-Based Neural Network Learning: A Lifelong Learning Approach*. Kluwer Academic Publishers, Boston, MA, 1996.

BOOKS (EDITED VOLUMES)

- [5] S. Thrun, R.A. Brooks, and H. Durrant-Whyte, editors. *Robotics Research: Results of the 12th International Symposium ISRR*. Springer Tracts in Advanced Robotics, Berlin, Germany, 2007.
- [6] S. Yuta, H. Asama, S. Thrun, E. Prassler, and T. Tsubouchi, editors. *Field and Service Robotics: Recent Advances in Research and Applications*. Springer Tracts in Advanced Robotics, Berlin, 2006.
- [7] S. Thrun, G. Sukhatme, S. Schaal, and O. Brock, editors. *Robotics Science and Systems I*. MIT Press, Cambridge, CA, 2005.
- [8] S. Thrun, L. Saul, and K. Obermayer, editors. *Advances in Neural Information Processing Systems 16*. MIT Press, Cambridge, MA, 2004.
- [9] S. Becker, S. Thrun, and K. Obermayer, editors. *Advances in Neural Information Processing Systems 15*. MIT Press, Cambridge, MA, 2003.
- [10] S. Thrun and L.Y. Pratt, editors. *Learning To Learn*. Kluwer Academic Publishers, Boston, MA, 1998.
- [11] J. Franklin, T. Mitchell, and S. Thrun, editors. *Recent Advances in Robot Learning*. Kluwer Academic Publishers, Boston, MA, 1996.

CHAPTERS IN BOOK

- [12] C. Theobalt, E. de Aguiar, C. Stoll, H.-P. Seidel, and S. Thrun. Performance capture from multi-view video. In R. Ronfard and

- G. Taubin, editors, *Image and Geometry Processing for 3-D Cinematography*. Springer, Berlin, Germany, 2010.
- [13] S. Thrun. Simultaneous localization and mapping. In M.E. Jefferies and W.-K. Yeap, editors, *Spatial Mapping Approaches in Robotic and Natural Mapping Systems*. Springer Tracts in Advanced Robotics, Berlin, 2006.
 - [14] A. Lookingbill, D. Lieb, and S. Thrun. Optical flow approaches for self-supervised learning in autonomous mobile robot navigation. In C. Laugier and R. Chatila, editors, *Navigation in Open and Dynamic Environments*. Springer, Berlin, Germany, 2006.
 - [15] D. Margaritis, S. Thrun, and C. Faloutsos. Netcube: Fast approximate database queries using bayesian networks. In A. Mittal, A. Kassim, and T. Tan, editors, *Bayesian Network Technologies: Applications and Graphical Models*. IIT India, 2006.
 - [16] S. Thrun. Robotics. In *Chapter 25 of "Artificial Intelligence: A Modern Approach (second edition)" by S. Russell and P. Norvig*. Prentice Hall, Englewood Cliffs, NJ, 2002.
 - [17] S. Thrun. Robotic mapping: A survey. In G. Lakemeyer and B. Nebel, editors, *Exploring Artificial Intelligence in the New Millennium*. Morgan Kaufmann, 2002.
 - [18] D. Fox, S. Thrun, W. Burgard, and F. Dellaert. Particle filters for mobile robot localization. In A. Doucet, N. de Freitas, and N. Gordon, editors, *Sequential Monte Carlo Methods in Practice*, pages 499–516. Springer Verlag, 2001.
 - [19] D. Fox, W. Burgard, and S. Thrun. Markov localization for reliable robot navigation and people detection. In *Modeling and Planning for Sensor-Based Intelligent Robot Systems*. Springer Verlag, Berlin, 1999.
 - [20] S. Thrun, A. Bücken, W. Burgard, D. Fox, T. Fröhlinghaus, D. Henning, T. Hofmann, M. Krell, and T. Schmidt. Map learning and high-speed navigation in RHINO. In D. Kortenkamp, R.P. Bonasso, and R. Murphy, editors, *AI-based Mobile Robots: Case Studies of Successful Robot Systems*, pages 21–52. MIT Press, Cambridge, MA, 1998.
 - [21] S. Thrun and J. O’Sullivan. Clustering learning tasks and the selective cross-task transfer of knowledge. In S. Thrun and L.Y. Pratt, editors, *Learning To Learn*. Kluwer Academic Publishers, 1998.
 - [22] S. Thrun. Lifelong learning algorithms. In S. Thrun and L.Y. Pratt, editors, *Learning To Learn*. Kluwer Academic Publishers, 1998.
 - [23] S. Thrun and L.Y. Pratt. Learning to learn: Introduction and overview. In S. Thrun and L.Y. Pratt, editors, *Learning To Learn*. Kluwer Academic Publishers, 1998.
 - [24] J. O’Sullivan, T. Mitchell, and S. Thrun. Explanation-based neural network learning for mobile robot perception. In K. Ikeuchi and M. Veloso, editors, *Symbolic Visual Learning*. Oxford University Press, 1997.

- [25] T. Mitchell and S. Thrun. Learning analytically and inductively. In D. Steier and T. Mitchell, editors, *Mind Matters: A Tribute to Allen Newell*. Lawrence Erlbaum Associates Publishers, 1996.
- [26] S. Thrun. Exploration in active learning. In M. Arbib, editor, *Handbook of Brain and Cognitive Science*. MIT Press, 1995.
- [27] S. Thrun. A lifelong learning perspective for mobile robot control. In V. Graefe, editor, *Intelligent Robots and Systems*. Elsevier, 1995.
- [28] S. Thrun. The role of exploration in learning control. In D.A. White and D.A. Sofge, editors, *Handbook for Intelligent Control: Neural, Fuzzy and Adaptive Approaches*. Van Nostrand Reinhold, Florence, Kentucky 41022, 1992.

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- [29] C. Yan, S. Schuon, D. Chan, C. Theobalt, and S. Thrun. Algorithms for 3d shape scanning with a depth camera. *Pattern Analysis and Machine Intelligence*, 2012.
- [30] A. Teichman and S. Thrun. Tracking-based semi-supervised learning. *International Journal of Robotics Research*, 2011. Accepted for publication.
- [31] K. Loewke, D. Camarillo, W. Piyawattanametha, M. Mandella, C. Contag, S. Thrun, and K. Salisbury. In vivo micro-image mosaicing. *Transaction on Biomedical Engineering*, 2010. In Press.
- [32] S. Levine, P. Krähenbühl, S. Thrun, and V. Koltun. Gesture controllers. *ACM SIGGRAPH*, 2010.
- [33] D. Dolgov, S. Thrun, M. Montemerlo, and J. Diebel. Path planning for autonomous vehicles in unknown semi-structured environments. *The International Journal of Robotics Research*, 2009. In Press.
- [34] A. Petrovskaya and S. Thrun. Model based vehicle tracking for autonomous driving in urban environments. *Autonomous Robots*, 2009.
- [35] M. Montemerlo, J. Becker, S. Bhat, H. Dahlkamp, D. Dolgov, S. Ettinger, D. Haehnel, T. Hilden, G. Hoffmann, B. Huhnke, D. Johnston, S. Klumpp, D. Langer, A. Levandowski, J. Levinson, J. Marcil, D. Orenstein, J. Paefgen, I. Penny, A. Petrovskaya, M. Pflueger, G. Stanek, D. Stavens, A. Vogt, and S. Thrun. Junior: The stanford entry in the urban challenge. *Journal of Field Robotics*, 2008.
- [36] S. Park, F. Pfenning, and S. Thrun. A probabilistic language based upon sampling functions. *ACM Transactions on Programming Languages and Systems (TOPLAS)*, 2008. in press.

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- [38] M. Matsuoka, A. Chen, S. Singh, A.Y. Ng, and S. Thrun. Autonomous helicopter tracking and localization using a self-surveying camera array. *International Journal of Robotics Research*, Forthcoming.
- [39] S. Thrun, M. Montemerlo, H. Dahlkamp, D. Stavens, A. Aron, J. Diebel, P. Fong, J. Gale, M. Halpenny, G. Hoffmann, K. Lau, C. Oakley, M. Palatucci, V. Pratt, P. Stang, S. Strohband, C. Dupont, L.-E. Jendrossek, C. Koelen, C. Markey, C. Rummel, J. van Niekerk, E. Jensen, P. Alessandrini, G. Bradski, B. Davies, S. Ettinger, A. Kaehler, A. Nefian, and P. Mahoney. Stanley, the robot that won the DARPA Grand Challenge. *Journal of Field Robotics*, 23(9):661–692, 2006.
- [40] J. Pineau, G. Gordon, and S. Thrun. Anytime point-based approximations for large POMDPs. *Journal of Artificial Intelligence Research*, 27:335–380, 2006.
- [41] D. Lookingbill, J. Rogers, J. Curry, D. Lieb, and S. Thrun. Reverse optical flow for self-supervised adaptive autonomous robot navigation. *International Journal on Computer Vision (IJCV)*, 2006. Forthcoming.
- [42] J. Diebel, S. Thrun, and M. Brüning. A bayesian method for probable surface reconstruction and decimation. *ACM Transactions on Graphics*, 25(1), 2006.
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- [45] S. Thrun, S. Thayer, W. Whittaker, C. Baker, W. Burgard, D. Ferguson, D. Hähnel, M. Montemerlo, A. Morris, Z. Omohundro, C. Reverte, and W. Whittaker. Autonomous exploration and mapping of abandoned mines. *IEEE Robotics and Automation*, 11(4), 2005.
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- [47] M. Bennewitz, W. Burgard, G. Cielniak, and S. Thrun. Learning motion patterns of people for compliant motion. *International Journal of Robotics Research*, 24(1), 2005.
- [48] S. Thrun, C. Martin, Y. Liu, D. Hähnel, R. Emery-Montemerlo, D. Chakrabarti, and W. Burgard. A real-time expectation maximization algorithm for acquiring multi-planar maps of indoor environments with mobile robots. *IEEE Transactions on Robotics*, 20(3):433–443, 2004.

- [49] S. Thrun, Y. Liu, D. Koller, A.Y. Ng, Z. Ghahramani, and H. Durrant-Whyte. Simultaneous localization and mapping with sparse extended information filters. *International Journal of Robotics Research*, 23(7–8), 2004.
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- [51] J. Pineau, M. Montemerlo, N. Roy, S. Thrun, and M. Pollack. Towards robotic assistants in nursing homes: challenges and results. *Robotics and Autonomous Systems*, 42(3–4):271–281, 2003.
- [52] S. Thrun. Learning occupancy grids with forward sensor models. *Autonomous Robots*, 15:111–127, 2003.
- [53] D. Hähnel, W. Burgard, and S. Thrun. Learning compact 3D models of indoor and outdoor environments with a mobile robot. *Robotics and Autonomous Systems*, 44:15–17, 2003.
- [54] M. Bennewitz, W. Burgard, and S. Thrun. Finding and optimizing solvable priority schemes for decoupled path planning techniques for teams of mobile robots. *Robotics and Autonomous Systems*, 41(2):89–99, 2002.
- [55] F. Dellaert, S.M. Seitz, C. Thorpe, and S. Thrun. EM, MCMC, and chain flipping for structure from motion with unknown correspondence. *Machine Learning*, 50(1-2):45–71, 2003.
- [56] S. Thrun. A probabilistic online mapping algorithm for teams of mobile robots. *International Journal of Robotics Research*, 20(5):335–363, 2001.
- [57] S. Thrun, D. Fox, W. Burgard, and F. Dellaert. Robust Monte Carlo localization for mobile robots. *Artificial Intelligence*, 128(1-2):99–141, 2000.
- [58] S. Thrun, M. Beetz, M. Bennewitz, W. Burgard, A.B. Cremers, F. Dellaert, D. Fox, D. Hähnel, C. Rosenberg, N. Roy, J. Schulte, and D. Schulz. Probabilistic algorithms and the interactive museum tour-guide robot Minerva. *International Journal of Robotics Research*, 19(11):972–999, 2000.
- [59] S. Waldherr, S. Thrun, and R. Romero. A gesture-based interface for human-robot interaction. *Autonomous Robots*, 9(2):151–173, 2000.
- [60] D. Fox, W. Burgard, H. Kruppa, and S. Thrun. A probabilistic approach to collaborative multi-robot localization. *Autonomous Robots*, 8(3), 2000.
- [61] D. Fox, W. Burgard, and S. Thrun. Markov localization for mobile robots in dynamic environments. *Journal of Artificial Intelligence Research*, 11:391–427, 1999.
- [62] 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*, 114(1-2):3–55, 1999.

- [63] K. Nigam, A. McCallum, S. Thrun, and T. Mitchell. Learning to classify text from labeled and unlabeled documents. *Machine Learning*, 39(2/3):1–32, 1998.
- [64] 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).
- [65] S. Thrun. Learning metric-topological maps for indoor mobile robot navigation. *Artificial Intelligence*, 99(1):21–71, 1998.
- [66] S. Thrun. Bayesian landmark learning for mobile robot localization. *Machine Learning*, 33(1):41–76, 1998.
- [67] D. Fox, W. Burgard, and S. Thrun. Active Markov localization for mobile robots. *Robotics and Autonomous Systems*, 25(3-4):195–207, 1998.
- [68] D. Fox, W. Burgard, and S. Thrun. The dynamic window approach to collision avoidance. *IEEE Robotics and Automation*, 4(1), 1997.
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- [70] S. Thrun and T. Mitchell. Lifelong robot learning. *Robotics and Autonomous Systems*, 15:25–46, 1995.
- [71] K. Möller and S. Thrun. ARC: Adaptive Roboterkontrolle mit Künstlichen Neuronalen Netzen. *Wirtschaftsinformatik*, 33(5):408–419, 1991. In German.

MAGAZINE AND UNREFEREED JOURNAL ARTICLES

- [72] S. Thrun. Towards robotic cars. *Communications of the ACM*, April 2010.
- [73] S. Thrun. Why we compete in DARPA’s urban challenge autonomous robot race. *Communications of the ACM*, 50(10):29–31, 2007.
- [74] S. Thrun. A personal account on the development of stanley, the robot that won the darpa grand challenge. *AI Magazine*, 27(4):69–82, 2006.
- [75] S. Thrun. Teaching challenge. *IEEE Robotics and Automation Magazine*, 13:4, 2006.
- [76] V. Verma, R. Simmons, G. Gordon, and S. Thrun. Real-time fault diagnosis. *IEEE Robotics and Automation Magazine*, 11(2):56–66, 2004.
- [77] S. Thrun. Probabilistic robotics. *Communications of the ACM*, 45(3):52–57, 2002.
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- [80] S. Thrun and M. Littman. Book review: Reinforcement Learning by R. Sutton and A. Barto. *AI Magazine*, 21(1):103–105, 2000.
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- [84] S. Thrun. To know or not to know: On the utility of models in mobile robotics. *AI Magazine*, 18(1):47–54, 1997.
- [85] A.B. Cremers, J. Buhmann, and S. Thrun. Komplexe lernende Systeme: Der mobile Roboter RHINO. *Künstliche Intelligenz*, 2, 1995. In German.
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- [88] E. Le Grand and S. Thrun. 3-axis magnetic field mapping and fusion for indoor localization. In *Proceedings IEEE International Conference on Multisensor Fusion and Information Integration (MFI 2012)*, Hamburg, Germany, September 2012.
- [89] V. Ganapathi, C. Plagemann, D. Koller, and S. Thrun. Real-time human pose tracking using range cameras. In *Proceedings of the European Conference on Computer Vision (ECCV)*, Firenze, Italy, 2012.
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- [91] Y.M. Kim, J. Dolson, M. Sokolsky, V. Koltun, and S. Thrun. Interactive acquisition of residential floor plans. In *Proceedings of the IEEE Conference on Robotics and Automation*, St. Paul, Minnesota, May 2012. IEEE.

- [92] A. Teichman, J. Levinson, and S. Thrun. Tracking-based semi-supervised learning. In *Proceedings of Robotics Science and Systems Conference (RSS)*, Los Angeles, CA, 2011.
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- [95] A. Teichman, J. Levinson, and S. Thrun. Towards 3d object recognition via classification of arbitrary object tracks. In *Proceedings of the IEEE Conference on Robotics and Automation (ICRA)*, Shanghai, China, 2011. IEEE.
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- [98] M. Quigley, D. Stavens, A. Coates, and S. Thrun. Sub-meter indoor localization in unmodified environments with inexpensive sensors. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Taipei, Taiwan, 2010.
- [99] S. Schuon, D. Chan, C. Yan, C. Theobalt, and S. Thrun. 3d shape scanning with a time-of-flight camera. In *Proceedings of Twenty-Third IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, San Francisco, California, 2010. IEEE.
- [100] J. Dolson, J. Baek, C. Plagemann, and S. Thrun. Super-resolution of range data in dynamic environments using a gaussian framework. In *Proceedings of Twenty-Third IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, San Francisco, California, 2010. IEEE.
- [101] D. Stavens and Sebastian Thrun. Unsupervised learning of invariant features using video. In *Proceedings of Twenty-Third IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, San Francisco, California, 2010. IEEE.
- [102] V. Ganapathi, C. Plagemann, D. Koller, and S. Thrun. Real time motion capture using a single time-of-flight camera. In *Proceedings of Twenty-Third IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, San Francisco, California, 2010. IEEE.
- [103] J. Levinson and S. Thrun. Robust vehicle localization in urban environments using probabilistic maps. In *Proceedings of the*

- IEEE Conference on Robotics and Automation (ICRA)*, Anchorage, Alaska, 2010. IEEE.
- [104] M. Werling, J. Ziegler, S. Kammel, and S. Thrun. Optimal trajectory generation for dynamic street scenarios in a frenét frame. In *Proceedings of the IEEE Conference on Robotics and Automation (ICRA)*, Anchorage, Alaska, 2010. IEEE.
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