

Edwin Olson, Ph.D

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EDUCATION

- **PhD in Computer Science and Engineering** *2008*
Massachusetts Institute of Technology.
Thesis: *Robust and Efficient Robotic Mapping*.
Advised by John Leonard and Seth Teller.
- **Masters of Engineering in Electrical Engineering and Computer Science** *2001*
Massachusetts Institute of Technology.
Thesis: *Otto: A Low-Cost Robotics Platform for Research and Education*.
Advised by Lynn Andrea Stein.
- **Bachelor of Science in Electrical Engineering and Computer Science** *2000*
Massachusetts Institute of Technology.

PROFESSIONAL EXPERIENCE

- **May Mobility, Inc.** *2017-present*
Founder, CEO.
- **Toyota Research Institute** *2016*
Co-Director of Autonomous Driving.
- **University of Michigan** *2014-present*
Associate Professor, Computer Science and Engineering.
- **University of Michigan** *2014*
Morris Wellman Assistant Professor, Computer Science and Engineering.
- **University of Michigan** *2008-2014*
Assistant Professor, Computer Science and Engineering.
- **MIT DARPA Urban Challenge Team** *2006-2007*
Student technical lead.
- **Massachusetts Institute of Technology** *2001-2008*
Research Assistant and Teaching Assistant
- **Permabit Inc.** *2001-2002*
Senior software engineer. Co-designer of distributed journaling file system.

HONORS AND AWARDS

- **SAE World Congress Outstanding Oral Presentation Award** 2018
For my keynote, “How to build a safe autonomous vehicle”
- **CoE Education Excellence Award** 2015
“For his work in contributing to the curriculum in robotics, in developing educational robots, and for his activities in outreach.”
- **Joel and Ruth Spira Award for Excellence in Teaching** 2014
- **Morris Wellman Faculty Development Assistant Professor** 2014
Awarded to a junior faculty member in Computer Science and Engineering to recognize outstanding contributions to teaching and research.
- **DARPA Young Faculty Award** 2013
Identifies and engages rising research stars in junior faculty positions at US academic institutions.
- **TRW Automotive Endowed Research Award** 2013
The TRW Automotive Research Award supports innovative research in automotive technology.
- **Featured Speaker, World Science Festival “Cool Jobs”** 2013
- **Popular Science, “Brilliant 10”** 2012
Awarded to a selection of “the brightest young researchers in the country.”
- **Runner up, Dick Volz Best US PhD Award for the Most Impactful Thesis** 2012
Awarded four years after publication of PhD to recognize impactful theses
- **Keynote Speaker, RoboCup Competition** 2012
- **IROS CoTeSys Cognitive Robotics Best Paper Finalist** 2012
- **1st Place, Multi-Autonomous Ground Robot International Competition (MAGIC)** 2010
Principle Investigator, Team Michigan. \$750,000 Prize
- **Finalist, Old Ram Shed’s Challenge** 2010
Principle Investigator, Team Michigan.
- **4th Place, DARPA Urban Challenge** 2007
Student Technical Lead as part of MIT’s Team Talos
- **Best Paper, MIT CSAIL student workshop** 2006
Recognizing Places with Weak Evidence
- **Best Paper, MIT CSAIL student workshop** 2005
Incremental Optimization of Large Robot-Acquired Maps
- **Frederick C. Hennie III Teaching Award for Teaching Excellence** 2004
MIT Department of Electrical Engineering and Computer Science.

FUNDED RESEARCH GRANTS

Dollar amounts represent my share (where applicable), sorted by start date.

- DARPA, “Squad Multi-entity Autonomous TEam SquadMATE” \$499k. 2015-2017.
- Mobility Transformation Center, “SmartCarts” \$200k. 2015.

- NSF, “CyberSEES: TYPE 2: Sustainably Unlocking Energy from Municipal Solid Waste Using a Sensor-Driven Cyber-Infrastructure Framework”, \$399k. 2014-present.
- DARPA Young Faculty Award, “Mutual Modeling for Human/Robot Teaming with Minimal Communications”, \$230k. 2013-present.
- ONR, “Integrating Cognitive Architecture and Probabilistic Perceptual Processing”, \$1,040k. 2013-present. \$464k. 2011-2012.
- Ford Motor Company, “Next-Generation Vehicle Platform for Active Safety and Driver Assistance Research”, \$1,176k. 2012-present
- ENSCO Corporation, “Automated Extraction of Grade Crossing Parameters, Associated Traffic Control Devices, and Sightlines from LIDAR data, Phase III”, \$149k. 2012-2013.
- Asian Office of Aerospace Research and Development (AOARD), “Joint Operations for Multiple Autonomous Robots”, \$750k. 2011-present
- HStar Technologies. “A Near-Autonomous Combat Casualty Extraction System” \$70k. 2011-2012.
- DARPA, “I2O Broad Operational Language Translation (BOLT)”, \$216k. 2011.
- Intel, “Multi-camera, omni-directional vision for robotics”, \$23k. 2011.
- Federal Railway Administration, “Automated Extraction of Grade Crossing Parameters, Associated Traffic Control Devices, and Sightlines from LIDAR data, Phase II”, \$110k. 2011-2012.
- NSF BPC-AE: Collaborative Research, “The ARTSI Alliance: Advancing Robotics Technology for Societal Impact”, \$46k. 2010-2013.
- Federal Railway Administration, “Automated Extraction of Grade Crossing Parameters, Phase I”, \$99k. 2009.
- Department of Defense, “Team Michigan-MAGIC 2010”, \$50k. 2009-2011.
- Intel, “Infrastructure for large teams of autonomous robots”, \$45k. 2009.
- Ground Robot Research Center, “Autonomous robotic exploration of novel, human-filled environments”, \$295k. 2008-2011.

INVITED TALKS

Keynotes/featured talks in bold.

1. CVPR Workshop on Autonomous Driving. *Driving like a human*, June 2018.
2. Society of Active Retirees (SOAR), *Safety and Autonomous Vehicles*, April 2018.
3. **SAE WCX 2018. *How to build a safe autonomous vehicle***, April 2018. (Keynote)
4. Autonomous Car Detroit, March 2018. *Connecting Communities through Self-Driving Micro-Transit*
5. IEEE RAS Michigan, March 2018. *Challenges and Opportunities with Self-Driving Vehicles*
6. UM China Forum. *May Mobility: Early Markets for Self-Driving Vehicles*, March 2018.
7. North American International Auto Show (NAIAS). *Autonomous Driving Panel*, January 2018. (Moderator).

8. UM HKN. *Connecting Communities with Self-Driving Micro-Transit*, January 2018.
9. **IROS 2017. *Reliability and Robustness of Robotics Systems***, October 2017. (Keynote)
10. TU Automotive - *Deploying Fleets of Autonomous Vehicles*, October 2017.
11. Multi-Robot Control and Planning Workshop at ICRA 2017, May 2017. *Coupled Intent Estimation and Behavioral Planning* (Invited Speaker)
12. Osher Lifelong Learning Institute, January 2017. *Safety of Autonomous Vehicles: Technology and Policy* (Seminar)
13. Wharton Business School, LaunchPad on SiriusXM. January 2017. *Autonomous Vehicles Live Show* (Interview)
14. AutoMobiID at NAIAS. January 2017. *Role of Innovation and Automobiles* (Panelist)
15. New England Robotics Conference. October 2016. Planning with Multi-Policy Decision Making (Invited Speaker)
16. Automotive TechAD. December, 2016. *The Road (Behind and) Ahead for Autonomous Vehicles* (Invited Speaker)
17. Development, Testing, and Verification of ADAS and ADF. Linz, Austria. September 2016. *Planning with Multi-Policy Decision Making* (Invited Speaker)
18. Geometry and Beyond: Representations, Physics, and Scene Understanding for Robotics (RSS Conference). June 2016. (Moderator)
19. Mitsubishi Electronic Research Labs: Celebrating 25 years, June 2016. *Smart Mobility* (Panelist)
20. MIT Robotics Seminar Series, May 2016. *Reliable Robots: Failing without failing*
21. Consumer Electronics Show, January 2016. *What drives the self-driving car business?* (Panelist)
22. **The International Conference on Robot and Intelligent Equipment (RIE), November 2015. *The Promise of Robot Autonomy***
23. Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek (TNO), March 2015. *Autonomous cars and my gray hair*
24. Eindhoven University of Technology (TU/e), March 2015. *Where am I? Mapping and localization for autonomy*
25. Brown University, October 2014. *Autonomous cars and my gray hair*
26. Mitsubishi Electronics Research Laboratory (MERL), September 2014. *Autonomous cars and my gray hair*
27. Self-Driving Vehicles: Technology and Policy Workshop (RSS), July 2014. *Autonomous cars: Safety and Human Factors*
28. Nokia, June 2014. *APRIL Laboratory Overview*
29. Crossing the Reality Gap (Workshop, ICRA), May 2014. *Multi-Robot Systems and Communication Limits*
30. Workshop on what sucks in robotics, and how to fix it (ICRA), May 2014. *The robots are fine, it's the humans that suck*

31. Naval Research Lab (NRL), November 2013. *Learning to recognize objects in-situ*
32. **World Science Festival, June 2013. *Cool Jobs: Robotacist***
33. Workshop on Robust and Multimodal Inference in Factor Graphs (ICRA), May 2013. *Learning Max Mixtures.*
34. Dow Corning Technical Exchange Society, May 2013. *Robot and Human Teams for Exploration.*
35. Workshop on Many-Robot Systems: Crossing the Reality Gap (ICRA), May 2013. *Humans and Multi-Robot Systems.*
36. TRW Automotive, August 2013. *From MAGIC to Self-Driving Cars*
37. Army Research Lab, May 2013. *Learning Max Mixtures.*
38. AAAI Symposium, November 2012. *Putting Humans In The Loop.*
39. Spelman College, *The APRIL Robotics Lab*, November 2012.
40. UM Transportation Research Institute, November 2012. *From MAGIC to Self-Driving Cars.*
41. Willow Garage, December 2012. *Max Mixtures.*
42. Google, December 2012. *Max Mixtures.*
43. **RoboCup Competition Keynote, June 2012. *Multi-Robot Autonomy and the MAGIC Competition.***
44. Advancing Robotics Technology for Societal Impact (ARTSI) Faculty Summit, June 2012. *Modeling Robot Sensors.*
45. **AUVSI Driverless Car Summit, June 2012. *From MAGIC to Self-Driving Cars.***
46. ICRA Workshop on Long-Term Autonomy, May 2012. *Long term autonomy for multi-agent systems.*
47. Multi-Vehicle Dynamics Seminar Series, April 2012. *“Where the heck am I?”*
48. ARTSI Robotics Competition (Norfolk State University / HBCU) Invited Speaker, March 2012. *Where the heck am I? Why the simplest problems are often the hardest.*
49. Drexel Robotics Seminar Series, February 2012. *Winning the MAGIC 2010 Competition.*
50. ONR Program Review Invited Talk, February 2012. *Inference on Networks of Mixtures.*
51. Georgia Tech RIM Seminar, August 2011. *Winning the MAGIC 2010 Competition.*
52. Automated SLAM Evaluation Workshop (RSS), June 2011. *A brief introduction to graph-based SLAM.*
53. Automated SLAM Evaluation Workshop (RSS), June 2011. *Evaluating Back-Ends.*
54. Rice University Seminar, March 2011. *Winning the MAGIC 2010 Competition.*
55. Long-term autonomy workshop (ICRA), May 2011. *Lessons from 50 robot-hours of semi-autonomous robot operation.*
56. FIRST Robotics Competition Regional Championships, March 2011. *The robots are coming.*
57. UPenn GRASP Seminar, February 2011. *Winning the MAGIC 2010 Competition.*

58. Carnegie Mellon University Robotics Institute Seminar, January 2011. *Winning the MAGIC 2010 Competition.*
59. University of Texas (Austin) Seminar, January 2011. *Winning the MAGIC 2010 Competition.*
60. ONR Unmanned Systems Technology Review. January 2011. *The MAGIC 2010 Competition.*
61. AUVSI Invited Panelist, January 2011. *Dual-Use Robotics.*
62. Probabilistic Graphical Models in Robotics Workshop (IROS), October 2010. *Graphical Models for Machine Perception.*
63. AAI Robotics Workshop, July 2010. *Building large robot systems with LCM.*
64. TARDEC Seminar Series, April 2010. *Autonomous exploration and understanding of indoor and outdoor spaces.*
65. Advancing Robotics Technology for Societal Impact (ARTSI) Faculty Workshop, June 2009. *Data: communications, logging, and visualization*
66. Robotics Faculty Seminar, April 2009. *Error Bounded Depth Limited Planning.*
67. UMich Controls Seminar Series, November 2008. *Algorithms for an autonomous car.*
68. Future Directions in Visual Navigation workshop (ICRA), May 2008. *Learning Probabilistic Environmental Models with Vision: Successes and Challenges.*
69. Stanford, January 2008. *Algorithms for an autonomous car.*
70. UC Berkeley, January 2008. *Algorithms for an autonomous car.*

DISCUSSION PANELS

- “Robotics in Graduate School”, Morgan State University. March 2013.
- “Opportunities for Autonomous Technology Development”, National Center for Manufacturing Sciences, October 2012.
- AUVSI in Washington, DC, “Dual Use Robotics”. February 2011.

OTHER APPEARANCES

- World Science Festival: Presenter of Robotics Apprentice Program, June 2013.

PROFESSIONAL ACTIVITIES

Organizing Committees

- Local Accommodations Co-Chair, Robotics Science and Systems, 2016.
- Short Talks Chair, Robotics Science and Systems, 2014.
- Publicity Chair, Robotics Science and Systems, 2013.
- Co-Organizer, Workshop on Robust and Multimodal Inference on Factor Graphs at ICRA, 2013.
- Co-Organizer, Advances in Robot Learning and Human-Robot Interaction Workshop at IROS, 2012.
- Steering Committee, Automated SLAM Evaluation Workshop at RSS, 2011.

Editorial

- Associate Editor, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS): 2010, 2011, 2012, 2013, 2014
- Associate Editor, IEEE International Conference on Robotics and Automation (ICRA): 2012, 2013, 2014, 2015
- Associate Editor, Association for the Advancement of AI (AAAI): 2012, 2015

Peer Review: Conferences

- Robotics Science and Systems: 2005 - 2012
- IEEE International Conference on Robotics and Automation (ICRA): 2007 - 2012, 2015
- International Joint Conferences on Artificial Intelligence (IJCAI): 2009
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS): 2007-2012
- AAAI: 2014, 2012, 2011, 2008
- IFAC World Congress: 2011
- Workshop on Algorithmic Foundations of Robotics (WAFR): 2011
- FLAIRS-24

Peer Review: Journals

- IEEE Transactions on Robotics (T-RO): 2014, 2013, 2012, 2011, 2010, 2009, 2008
- Journal of Field Robotics (JFR): 2014, 2013, 2012, 2011, 2009, 2008, 2006
- IEEE Transactions on Signal Processing, 2014
- International Journal of Robotics Research: 2013, 2012, 2011, 2010, 2009
- Autonomous Robots: 2012, 2011, 2010
- Robotics and Autonomous Systems: 2010, 2009
- Cryptologia, 2012
- The International Journal of Intelligent Control and Systems (IJICS): 2011
- Journal of Robotics and Computer Integrated Manufacturing: 2010
- Journal of Intelligent and Robotic Systems: 2009, 2004
- Computer Vision and Image Understanding (CVIU): 2009

Co-chair, IEEE RAS Technical Advisory Committee on Robot Learning *2012-Present*

Panelist, NSF Proposal Review Panels *2012*

Member, Michigan Robotics Day Organizing Committee *2012*

Member, SAE On-Road Autonomous Vehicle Standards Committee *2011-Present*

Advisory Board, Autonomous Auto X PRIZE *2011*

PUBLICATIONS

Journals

- [1] Edwin Olson and Pratik Agarwal. Inference on networks of mixtures for robust robot mapping. *International Journal of Robotics Research* 2013.
- [2] Edwin Olson, Johannes Strom, Robert Goeddel, Ryan Morton, Pradeep Ranganathan and Andrew Richardson. Exploration and Mapping with Autonomous Robot Teams. *Communications of the ACM* 2013.
- [3] Edwin Olson, Johannes Strom, Ryan Morton, Andrew Richardson, Pradeep Ranganathan, Robert Goeddel, Mihai Bulic, Jacob Crossman and Bob Marinier. Progress towards multi-robot reconnaissance and the MAGIC 2010 Competition. *Journal of Field Robotics* 2012.
- [4] Yangming Li and Edwin Olson. A General Purpose Feature Extractor for Light Detection and Ranging Data. *Sensors* 2010.
- [5] Albert S. Huang, Matthew Antone, Edwin Olson, Luke Fletcher, David Moore, Seth Teller and John Leonard. A High-rate, Heterogeneous Data Set from the DARPA Urban Challenge. *International Journal of Robotics Research* 2010.
- [6] Edwin Olson. Recognizing Places using Spectrally Clustered Local Matches. *Robotics and Autonomous Systems* 2009.
- [7] Albert Huang, David Moore, Matthew Antone, Edwin Olson and Seth Teller. Finding multiple lanes in urban road networks with vision and lidar. *Autonomous Robots* 2009.
- [8] J. Leonard, J. How, S. Teller, M. Berger, S. Campbell, G. Fiore, L. Fletcher, E. Frazzoli, A. Huang, S. Karaman, O. Koch, Y. Kuwata, D. Moore, E. Olson, S. Peters, J. Teo, R. Truax, M. Walter, D. Barrett, A. Epstein, K. Maheloni, K. Moyer, T. Jones, R. Buckley, M. Antone, R. Galejs, S. Krishnamurthy and J. Williams. A Perception Driven Autonomous Urban Vehicle. *Journal of Field Robotics* 2008.
- [9] Luke Fletcher, Seth Teller, Edwin Olson, David Moore, Yoshiaki Kuwata, Jonathan How, John Leonard, Isaac Miller, Mark Campbell, Dan Huttenlocher, Aaron Nathan and Frank-Robert Kline. The MIT – Cornell Collision and Why it Happened. *Journal of Field Robotics Special Issue on the DARPA Urban Challenge* 2008.
- [10] Edwin Olson. Robust Dictionary Attack of Short Simple Substitution Ciphers. *Cryptologia* 2007.
- [11] Edwin Olson, John Leonard and Seth Teller. Robust Range-Only Beacon Localization. *IEEE Journal of Oceanic Engineering* 2006.

Refereed Conferences

- [12] Dhanvin Mehta, Gonzalo Ferrer and Edwin Olson. Fast discovery of influential outcomes for risk-aware MPDM. *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)* 2017.

- [13] Xipeng Wang, Steve Vozar and Edwin Olson. FLAG: Feature-based Localization between Air and Ground. *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)* 2017.
- [14] Robert Goeddel, Carl Kershaw, Jacopo Serafin and Edwin Olson. FLAT2D: Fast Localization from Approximate Transformation into 2D. *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* 2016.
- [15] Dhanvin Mehta, Gonzalo Ferrer and Edwin Olson. Autonomous Navigation in Dynamic Social Environments using Multi-Policy Decision Making. *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* 2016.
- [16] Robert Goeddel and Edwin Olson. Learning Semantic Place Labels from Occupancy Grids using CNNs. *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* 2016.
- [17] John Wang and Edwin Olson. AprilTag 2: Efficient and robust fiducial detection. *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* 2016.
- [18] Ryan Marcotte and Edwin Olson. Adaptive forward error correction with adjustable-latency QoS for robotic networks. *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)* 2016.
- [19] Surat Kwanmuang and Edwin Olson. Maximum Likelihood Tracking of a Personal Dead-Reckoning System. *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* 2015.
- [20] Andrew Richardson and Edwin Olson. TailoredBRIEF: Online Per-Feature Descriptor Customization. *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* 2015.
- [21] Enric Galceran, Edwin Olson and Ryan M. Eustice. Augmented vehicle tracking under occlusions for decision-making in autonomous driving . *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)* 2015 .
- [22] John Wang and Edwin Olson. High-Performance Inertial Measurements Using a Redundant Array of Inexpensive Gyroscopes (RAIG). *Proceedings of the IEEE Conference on Multisensor Fusion and Integration for Intelligent Systems (MFI)* 2015.
- [23] Enric Galceran, Alexander G. Cunningham, Ryan M. Eustice and Edwin Olson. Multipolicy Decision-Making for Autonomous Driving via Change-point-based Behavior Prediction. *Proceedings of Robotics: Science and Systems (RSS)* 2015.
- [24] Edwin Olson. M3RSM: Many-to-Many Multi-Resolution Scan Matching. *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)* 2015.
- [25] Alexander G. Cunningham, Enric Galceran, Ryan M. Eustice and Edwin Olson. MPDM: Multi-policy Decision-Making in Dynamic, Uncertain Environments for Autonomous Driving. *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)* 2015.
- [26] Enric Galceran, Ryan M. Eustice and Edwin Olson. Toward integrated motion planning and control using potential fields and torque-based steering actuation for autonomous driving . *Proceedings of the IEEE Intelligent Vehicle Symposium* 2015 .
- [27] Pradeep Ranganathan and Edwin Olson. Locally-weighted Homographies for Calibration of Imaging Systems. *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* 2014.

- [28] [Andrew Richardson](#) and Edwin Olson. PAS: Visual Odometry with Perspective Alignment Search. *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* 2014.
- [29] [John Wang](#) and Edwin Olson. Robust Pose Graph Optimization Using Stochastic Gradient Descent. *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)* 2014.
- [30] [Andrew Richardson](#), [Johannes Strom](#) and Edwin Olson. AprilCal: Assisted and repeatable camera calibration. *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* 2013.
- [31] [Lauren Hinkle](#) and Edwin Olson. Predicting Object Functionality Using Physical Simulations. *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* 2013.
- [32] [Ryan Morton](#) and Edwin Olson. Robust Sensor Characterization via Max-Mixture Models: GPS Sensors. *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* 2013.
- [33] [Robert Goeddel](#) and Edwin Olson. Inferring Categories to Accelerate the Learning of New Classes. *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* 2013.
- [34] [Andrew Richardson](#) and Edwin Olson. Learning Convolutional Filters for Interest Point Detection. *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)* 2013.
- [35] [Johannes Strom](#) and Edwin Olson. Multi-sensor ATTenuation Estimation (MATTE): Signal-strength prediction for teams of robots. *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* 2012.
- [36] [Pratik Agarwal](#) and Edwin Olson. Variable reordering strategies for SLAM. *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* 2012.
- [37] [Robert Goeddel](#) and Edwin Olson. DART: A Particle-based Method for Generating Easy-to-Follow Directions. *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* 2012. CoTeSys Best Paper Finalist
- [38] Edwin Olson and [Yangming Li](#). IPJC: The Incremental Posterior Joint Compatibility Test for Fast Feature Cloud Matching. *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* 2012.
- [39] [Pradeep Ranganathan](#) and Edwin Olson. Gaussian Process for Lens Distortion Modeling. *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* 2012.
- [40] Edwin Olson and [Pratik Agarwal](#). Inference on networks of mixtures for robust robot mapping. *Proceedings of Robotics: Science and Systems (RSS)* 2012.
- [41] [Jacob Crossman](#), [Robert Marinier](#) and Edwin Olson. A Hands-Off, Multi-Robot Display for Communicating Situation Awareness to Operators. *Proceedings of the International Conference on Collaboration Technologies and Systems* 2012.
- [42] [Andrew Richardson](#) and Edwin Olson. Iterative Path Optimization for Practical Robot Planning. *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* 2011.
- [43] [Johannes Strom](#) and Edwin Olson. Occupancy Grid Rasterization in Large Environments for Teams of Robots. *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* 2011.

- [44] Ryan D. Morton and Edwin Olson. Positive and Negative Obstacle Detection using the HLD Classifier. *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* 2011.
- [45] Edwin Olson. AprilTag: A robust and flexible visual fiducial system. *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)* 2011.
- [46] Edwin Olson. On computing the average orientation of vectors and lines. *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)* 2011.
- [47] Yangming Li and Edwin Olson. Structure Tensors for General Purpose LIDAR Feature Extraction. *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)* 2011.
- [48] Pradeep Ranganathan, Ryan Morton, Andrew Richardson, Johannes Strom, Robert Goeddel, Mihai Bulic and Edwin Olson. Coordinating a Team of Robots for Urban Reconnaissance. *Proceedings of the Land Warfare Conference (LWC)* 2010.
- [49] Johannes Strom, Andrew Richardson and Edwin Olson. Graph-based Segmentation for Colored 3D Laser Point Clouds. *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* 2010.
- [50] Pradeep Ranganathan and Edwin Olson. Automated Safety Inspection of Grade Crossings. *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* 2010.
- [51] Edwin Olson. A Passive Solution to the Sensor Synchronization Problem. *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* 2010.
- [52] Albert Huang, Edwin Olson and David Moore. LCM: Lightweight Communications and Marshalling. *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* 2010.
- [53] Yangming Li and Edwin Olson. Extracting general-purpose features from LIDAR data. *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)* 2010.
- [54] Edwin Olson. Real-Time Correlative Scan Matching. *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)* 2009.
- [55] David C. Moore, Albert S. Huang, Matthew Walter, Edwin Olson, Luke Fletcher, John Leonard and Seth Teller. Simultaneous Local and Global State Estimation for Robotic Navigation. *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)* 2009.
- [56] Albert Huang, David Moore, Matthew Antone, Edwin Olson and Seth Teller. Multi-Sensor Lane Finding in Urban Road Networks. *Proceedings of Robotics: Science and Systems (RSS)* 2008.
- [57] Giorgio Grisetti, Dario Lodi Rizzini, Cyrill Stachniss, Edwin Olson and Wolfram Burgard. Online Constraint Network Optimization for Efficient Maximum Likelihood Map Learning. *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)* 2008.
- [58] Edwin Olson, John Leonard and Seth Teller. Spatially-Adaptive Learning Rates for Online Incremental SLAM. *Proceedings of Robotics: Science and Systems* 2007.
- [59] Edwin Olson, John Leonard and Seth Teller. Fast Iterative Optimization of Pose Graphs with Poor Initial Estimates. *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)* 2006.
- [60] Edwin Olson, Matthew Walter, John Leonard and Seth Teller. Single Cluster Graph Partitioning for Robotics Applications. *Proceedings of Robotics Science and Systems* 2005.
- [61] Edwin Olson, John Leonard and Seth Teller. Robust Range-Only Beacon Localization. *IEEE Autonomous Underwater Vehicles (AUV '04)* 2004.

Theses

- [62] Surat Kwanmuang. FILTERING AND TRACKING FOR A PEDESTRIAN DEAD-RECKONING SYSTEM. *University of Michigan* 2015.
- [63] Johannes Strom. Online mapping and perception algorithms for multi-robot teams operating in urban environments. *University of Michigan* 2015.
- [64] Andrew Richardson. Learning and Searching Methods for Robust, Real-Time Visual Odometry. *University of Michigan* 2015.
- [65] Edwin Olson. Robust and Efficient Robotic Mapping. *Massachusetts Institute of Technology* 2008.
- [66] Edwin Olson. Otto: A Low-Cost Robotics Platform for Research and Education. *Massachusetts Institute of Technology* 2001.

Workshops (Reviewed)

- [67] Soheil Saadat, Tarek Omar, Edwin Olson and Pradeep Ranganathan. The Federal Railroad Administration's Automated Grade Crossing Survey System. *Proceedings of the American Railway Engineering and Maintenance-of-Way Association (AREMA)* 2015.
- [68] Emmanuel Johnson, Edwin Olson and Chutima Boonthum-Denecke. Robot Localization Using Overhead Camera and LEDs. *FLAIRS Conference* 2012.
- [69] Edwin Olson and Michael Kaess. Evaluating the Performance of Map Optimization Algorithms. *RSS Workshop on Good Experimental Methodology in Robotics* 2009.
- [70] Edwin Olson. Implicit Data Association from Spectrally Clustered Local Matches. *Inside Data Association Workshop: Robotics Science and Systems* 2008.
- [71] Edwin Olson. Recognizing Places with Weak Evidence. *CSAIL Student Workshop Proceedings* 2006. Best Paper
- [72] Edwin Olson. Incremental Optimization of Large Robot-Acquired Maps. *CSAIL Student Workshop Proceedings* 2005. Best Paper
- [73] Max Bajracharya and Edwin Olson. A Low-Cost, High-Performance Robotics Platform for Education and Research. *AAAI Symposium on Robotics and Education 2001: Working Notes* 2001.

Technical Reports

- [74] Edwin Olson. AprilTag: A robust and flexible multi-purpose fiducial system. *University of Michigan APRIL Laboratory* 2010.

Book Chapters

- [75] John Leonard, Jonathan How, Seth Teller, Mitch Berger, Stefan Campbell, Gaston Fiore, Luke Fletcher, Emilio Frazzoli, Albert Huang, Sertac Karaman, Olivier Koch, Yoshiaki Kuwata, David Moore, Edwin Olson, Steve Peters, Justin Teo, Robert Truax, Matthew Walter, David Barrett, Alexander Epstein, Keoni Maheloni, Katy Moyer, Troy Jones, Ryan Buckley, Matthew Antone, Robert Galejs, Siddhartha Krishnamurthy and Jonathan Williams. A Perception-Driven Autonomous Urban Vehicle. *The DARPA Urban Challenge* 2009.

DEPARTMENTAL SERVICE

- UM Robotics Institute, Faculty Steering Committee, 2013-Present.
- Michigan Transportation Center, Faculty Advisory Committee, 2013-Present.
- Michigan Mobility Transportation Center, Steering Committee, 2012-Present.
- UM/UMTRI Faculty Search Committee, 2012-2013.
- UM Robotics Institute, Education sub-committee, 2012-Present.
- Graduate Admissions Committee, 2012-2013.
- Michigan Robotics Day Organizing Committee, 2011-2012.
- Graduate Admissions and Affairs Committee: 2008, 2009, 2010, 2011.

PATENTS

- US Patent 9282326B2. *Interactive Camera Calibration Tool*. 2016.
- US Patent 7457800. *Storage system for randomly named blocks of data*. 2008.

TEACHING

- EECS280x, Introductory Programming and Data Structures (Experimental Section). Winter 2015
- EECS598-015, Autonomous Transportation Systems. Fall 2015.
- EECS598-014, Interactive Game Systems. Fall 2015.
- EECS280, Introductory Programming and Data Structures. Fall 2015
- EECS467, Autonomous Robotics Laboratory. Winter 2014.
- EECS598, Autonomous Automobiles. Fall 2013.
- EECS498, Autonomous Robotics Laboratory. Winter 2013.
- EECS498, Robotics: Algorithms and Methods. Fall 2012.
- EECS498, Autonomous Robotics Laboratory. Winter 2012.
- EECS568, Robotics: Algorithms and Methods. Fall 2011.
- EECS492, Introduction to Artificial Intelligence. Winter 2010.
- EECS598, Multi-robot systems. Fall 2010.
- EECS492, Introduction to Artificial Intelligence. Winter 2011.
- EECS498, Autonomous Robotics Laboratory. *new class*. Fall 2009.
- EECS598-2, Algorithms for Robotics. *new class*. Winter 2009.
- EECS492, Introduction to Artificial Intelligence. Fall 2008.
- 6.141/6.142 (MIT) Robotics Science and Systems (Teaching Assistant). 2006.
- 6.186 (MIT), Mobile Autonomous Systems Laboratory (Founder/Instructor). IAP 1999-2004.
- 6.004 (MIT) Computation Structures (Teaching Assistant). 1999-2002.

STUDENTS ADVISED

PhD Students

Johannes Strom, 2015.
Andrew Richardson, 2015.
Surat Kwanmuong, 2015.
Pradeep Ranganathan, Estimated 2016.
Rob Goeddel, Estimated 2016.
Lauren Hinkle, Estimated 2017.
John Wang, Estimated 2017.
Yangming Li (Visiting student), 2010.

Postdoctoral Students

Enric Galceran, 2014-2015.
Alex Cunningham, 2014-present.
Steve Vozar, 2015-present.

Masters Students

Pratik Agarwal, 2012.
Ryan Morton, 2014. (Now CTO at SkySpecs)
Matt Vaughan, 2015.

Additional PhD Committees

Ryan Oliver (ME Department), 2013.
Steve Vozar (ME Department), 2013.
Rachael Bis (ME Department), 2012.

Masters Committee Member

Ryan Tokola (ECE), 2013.
Yoichi Okubo (ME), 2009.

Team Mentoring

2012-Present. Advisor of University of Michigan Mars Rover Team.
2010-Present. Mentor of University of Michigan Autonomous Boat (UM:Autonomy) Team.
2009-Present. Advisor of University of Michigan Autonomous Aerial Vehicle (MAAV) Team.
2008-Present. Advisor of University of Michigan/MSAIL Robo-Cup Team.