# Geoffrey A. Hollinger

School of Mechanical, Industrial & Manufacturing Engineering
204 Rogers Hall
Oregon State University
Corvallis, OR 97331

Tel: (541) 737-5906
Fax: (541) 737-2600
geoff.hollinger@oregonstate.edu
http://research.engr.oregonstate.edu/rdml/

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## Research Interests

algorithmic robotics, distributed control, human-robot interaction, machine learning, marine robotics, multiagent systems, planning under uncertainty, position estimation, probabilistic robotics, pursuit/evasion, mobile robotics, networked robots, optimization, robotic search, sensor networks, unmanned aerial vehicles

## Education

**Carnegie Mellon University** — Pittsburgh, PA
Ph.D. in Robotics, 2010 — Thesis: *Search in the Physical World*
M.S. in Robotics, 2007 — Thesis advisor: Prof. Sanjiv Singh

**Swarthmore College** — Swarthmore, PA
B.S. in General Engineering, 2005 — Graduated with High Honors
B.A. in Philosophy, 2005

## Professional Experience

**Associate Professor**, Mechanical, Industrial & Manufacturing Engineering — Fall 2019–present
**Director**, Robotics Interdisciplinary Graduate Program — Fall 2019–present
**Courtesy Faculty**, Electrical Engineering & Computer Science — Fall 2013–present
**Assistant Professor**, Mechanical, Industrial & Manufacturing Engineering — Fall 2013–Summer 2019
Oregon State University — Corvallis, OR

**Postdoctoral Research Associate**, Computer Science Department — Fall 2010–Fall 2013
University of Southern California — Los Angeles, CA

**Doctoral Research Assistant**, Robotics Institute — Fall 2005–Spring 2010
Carnegie Mellon University — Pittsburgh, PA

**Summer Fellow**, Personal Robotics Group — Summer 2008
Intel Research — Pittsburgh, PA

**Visiting Researcher**, GRASP Laboratory — Summer 2006
University of Pennsylvania — Philadelphia, PA

**Research Intern**, Embedded Control Design Team — Summer 2004, Summer 2005
NASA Marshall Space Flight Center — Huntsville, AL

**Undergraduate Research Assistant**, Engineering Department — Summer 2003–Spring 2005
Swarthmore College — Swarthmore, PA

## Awards

### National and International Awards

- National Science Foundation CAREER Award, 2019
- Office of Naval Research Young Investigator Program (YIP) Award, 2017
- Honorable Mention for NSF Graduate Research Fellowship Program (GRFP), 2006

**Conference and Society Awards**

- Winner: Outstanding Associate Editor Award: *IEEE Robotics and Automation Letters*, 2019
- Finalist: Best Automation Paper Award, IEEE Int. Conf. on Robotics and Automation (ICRA), 2017
- Winner: Best Poster Award at Workshop on Self-organizing Maps (WSOM), 2014
- Winner: Outstanding Reviewer Award: *IEEE Transactions on Robotics*, 2014
- Finalist: KUKA Service Robotics Best Paper Award, IEEE Int. Conf. on Robotics and Automation (ICRA), 2011
- Finalist: Best Student Paper Award at Robotics: Science and Systems Conf. (RSS), 2008

**University and Regional Awards**

- Engelbrecht Young Faculty Award, College of Engineering, Oregon State University, 2017
- Northwest Energy XP Award (advisor to students Andrew Smith and Robert Debortoli), 2015 and 2016
- Carnegie Mellon Robotics Graduate Fellowship, 2005–2010
- Perdue Award for Engineering Excellence, 2004
- District Champion IEEE Micromouse Robotics Team, 2002

## Publications

*Summary: 30 refereed journal articles (published or accepted for publication), 2 edited journal volumes, 47 refereed conference papers, and 20 refereed workshop papers. These papers have received 2936 total citations with h-Index 27 and i10-index 49 (according to Google Scholar).*

*All publications are available online at:*
http://research.engr.oregonstate.edu/rdml/

**Journal Articles**

30. G. Olson, S. Chow, A. Nicolai, C. Branyan, **G. Hollinger** and Y. Menguc, "A generalizable equilibrium model for bending soft arms with longitudinal actuators," *International Journal of Robotics Research*, DOI: 10.1177/0278364919880259, Oct. 2019.

29. J. Caley, N. Lawrance, and **G. Hollinger**, "Deep learning of structured environments for robot search," *Autonomous Robots*, vol. 43, no. 7, pp. 1695–1714, Oct. 2019.

28. N. Lawrance, R. DeBortoli, D. Jones, S. McCammon, L. Milliken, A. Nicolai, T. Somers and **G. Hollinger**, "Shared autonomy for low-cost underwater vehicles," *Journal of Field Robotics*, vol. 36, no. 3, pp. 495–516, May 2019.

27. J. J. Chung, A. Smith, R. Skeele and **G. Hollinger**, "Risk-aware graph search with dynamic edge cost discovery," *International Journal of Robotics Research*, vol. 38, no. 2–3, pp. 182–196, Mar. 2019.

26. A. Smith, G. Best, J. Yu, and **G. Hollinger**, "Real-time distributed non-myopic task selection for heterogeneous robotic teams," *Autonomous Robots*, vol. 43, no. 3, pp. 789–811, Mar. 2019.

25. A. Smith and **G. Hollinger**, "Distributed inference-based multi-robot exploration," *Autonomous Robots*, vol. 42, no. 8, pp. 1651–1668, Dec. 2018.

24. K. J. Benoit-Bird, T. P. Welch, C. M. Waluk, J. A. Barth, I. Wangen, P. McGill, C. Okuda, **G. Hollinger**, M. Sato, and S. McCammon, "Equipping an underwater glider with a new echosounder to explore ocean ecosystems," *Limnology and Oceanography: Methods*, vol. 16, no. 11, pp.734-749, Nov. 2018.

23. A. Nicolai and **G. Hollinger**, "Denoising autoencoders for laser-based scan registration," *IEEE Robotics and Automation Letters*, vol. 3, no. 4, pp. 4391-4398, Oct. 2018.

22. J. J. Chung, C. Rebhuhn, C. Yates, **G. Hollinger** and K. Tumer, "A multiagent framework for learning dynamic traffic management strategies," *Autonomous Robots*, vol. 43, no. 6, pp. 1375-1391, Aug. 2018.

21. Y. Ye, L. He, Z. Wang, D. Jones, **G. Hollinger**, M. Taylor, and Q. Zhang, "Orchard manoeuvring strategy for a robotic bin-handling machine," *Biosystems Engineering*, vol. 169, pp. 85-103, May 2018.

20. J. Faigl and **G. Hollinger**, "Autonomous data collection using a self-organizing map," in *IEEE Transactions on Neural Networks and Learning Systems*, vol. 29, no. 5, pp. 1703-1715, May 2018.

19. D. Jones and **G. Hollinger**, "Planning energy-efficient trajectories in strong disturbances," in *IEEE Robotics and Automation Letters*, vol. 2, no. 4, pp. 2080–2087, Oct. 2017.

18. Y. Ye, Z. Wang, D. Jones, L. He, M. Taylor, **G. Hollinger** and Q. Zhang, "Bin-dog: A robotic platform for bin management in orchards," *Robotics*, vol. 6, no. 2, article 12, May 2017.

17. N. Lawrance, J. J. Chung and **G. Hollinger**, "Fast marching adaptive sampling," *IEEE Robotics and Automation Letters*, vol. 2, no. 2, pp. 696–703, Apr. 2017.

16. T. Somers and **G. Hollinger**, "Human-robot planning and learning for marine data collection," *Autonomous Robots* (AURO16), vol. 40, no. 7, pp. 1123–1137, Oct. 2016.

15. D. Fernandez and **G. Hollinger**, "Model predictive control for underwater robots in ocean waves," in *IEEE Robotics and Automation Letters*, vol. 2, no. 1, pp. 88-95, Jan. 2016 (also presented at ICRA 2016).

14. **G. Hollinger**, A. Pereira, J. Binney, T. Somers, G. Sukhatme, "Learning uncertainty in predictive ocean models for safe and reliable navigation of underwater vehicles," *Journal of Field Robotics* (JFR15), vol. 33, no. 1, pp. 47–66, Jan. 2016.

13. **G. Hollinger**, S. Yerramalli, S. Singh, U. Mitra, and G. Sukhatme, "Distributed data fusion for multi-robot search," *IEEE Transactions on Robotics* (TRO15), vol. 31, no. 1, pp. 55–66, Feb. 2015.

12. **G. Hollinger** and G. Sukhatme, "Sampling-based robotic information gathering algorithms," *International Journal of Robotics Research* (IJRR), vol. 33, no. 9, pp. 1271–1287, Aug. 2014.

11. A. Pereira, J. Binney, **G. Hollinger**, and G. Sukhatme, "Risk-aware path planning for autonomous underwater vehicles using predictive ocean models," *Journal of Field Robotics* (JFR13), vol. 30, no. 5, pp. 741–762, Oct. 2013.

10. **G. Hollinger**, B. Englot, F. Hover, U. Mitra, G. Sukhatme, "Active planning for underwater inspection and the benefit of adaptivity," *International Journal of Robotics Research* (IJRR12), vol. 32, no. 1, pp. 3–18, Jan. 2013.

9. **G. Hollinger** and S. Singh, "Multirobot coordination with periodic connectivity: Theory and experiments," *IEEE Transactions on Robotics* (TRO12a), vol. 28, no. 4, pp. 967–973, Aug. 2012.

8. **G. Hollinger**, S. Choudhary, P. Qarabaqi, C. Murphy, U. Mitra, G. Sukhatme, M. Stojanovic, H. Singh, and F. Hover, "Underwater data collection using robotic sensor networks," *IEEE Journal on Selected Areas in Communications* (JSAC12), vol. 30, no. 5, pp. 899–911, June 2012.

7. **G. Hollinger**, J. Djugash, and S. Singh, "Target tracking without line of sight using range from radio," *Autonomous Robots* (AURO12), vol. 32, no. 1, pp. 1–14, Jan. 2012.

6. T. Chung*, **G. Hollinger***, and V. Isler*, "Search and pursuit-evasion in mobile robotics: A survey," *Autonomous Robots* (AURO11), vol. 31, no. 4, pp. 299–316, Nov. 2011. *Authors contributed equally to article.

5. **G. Hollinger**, A. Kehagias, and S. Singh, "Improving the efficiency of clearing with multi-agent teams," *International Journal of Robotics Research* (IJRR10), vol. 29, no. 8, pp. 1088–1105, July 2010.

4. **G. Hollinger**, A. Kehagias, and S. Singh, "GSST: Anytime guaranteed search," *Autonomous Robots* (AURO10b), vol. 29, no. 1, pp. 99–118, July 2010.

3. S. Srinivasa, D. Ferguson, C. Helfrich, D. Berenson, A. Collet, R. Diankov, G. Gallagher, **G. Hollinger**, and J. M. Vande Wenghe, "Herb: A home exploring robotic butler," *Autonomous Robots* (AURO10a), vol. 28, no. 1, pp. 5–20, Jan. 2010.

2. A. Kehagias, **G. Hollinger**, and S. Singh, "A graph search algorithm for indoor pursuit/evasion," *Mathematical and Computer Modelling* (MCM09), vol. 50, no. 9-10, pp. 1305–1317, Nov. 2009.

1. **G. Hollinger**, S. Singh, J. Djugash, and A. Kehagias, "Efficient multi-robot search for a moving target," *International Journal of Robotics Research* (IJRR09), vol. 28, no. 2, pp. 201–219, Feb. 2009.

**Edited Journal Volumes**

2. J. J. Chung, J. Faigl, and **G. Hollinger**, Eds., *Autonomous Robots: Special Issue on Online Decision Making in Multi-Robot Coordination*, vol. 42, no. 4, Apr. 2018.

1. **G. Hollinger**, T. Chung, and V. Isler, Eds., *Autonomous Robots: Special Issue on Search and Pursuit-evasion with Mobile Robots*, vol. 31, no. 4, Nov. 2011.

**Refereed Conference Papers**

47. J. Caley and **G. Hollinger**, "Environment prediction from sparse samples for robotic information gathering," in *Proc. IEEE Int. Conf. on Robotics and Automation*, Paris, France, May 2020.

46. A. Nicolai, G. Olson, Y. Menguc, and **G. Hollinger**, "Learning to control reconfigurable staged soft arms," in *Proc. IEEE Int. Conf. on Robotics and Automation*, Paris, France, May 2020.

45. R. DeBortoli, L. Fuxin, and **G. Hollinger**, "ElevateNet: A convolutional neural network for estimating the missing dimension in 2D underwater sonar images," in *Proc. IEEE/RSJ International Conference on Intelligent Robots and Systems*, Macau, China, Nov. 2019.

44. S. McCammon, T. P. Welch, C. M. Waluk, K. Benoit-Bird, J. A. Barth, and **G. Hollinger**, "Onboard autonomy system for the Slocum glider," in *Proc. IEEE/MTS OCEANS Conference*, Seattle, WA, Oct. 2019.

43. G. Best and **G. Hollinger**, "Decentralised self-organising maps for the online orienteering problem with neighbourhoods," [Extended Abstract], *Proc. IEEE International Symposium on Multi-Robot and Multi-Agent Systems*, Rutgers, NJ, Aug 2019

42. D. Jones, M. Kuhlman, D. Sofge, S. Gupta, and **G. Hollinger**, "Stochastic optimization for autonomous vehicles with limited control authority," in *Proc. IEEE/RSJ Int. Conf. on Intelligent Robots and Systems*, Madrid, Spain, Oct. 2018, pp. 2395–2401.

41. S. McCammon and **G. Hollinger**, "Topological hotspot identification for informative path planning with a marine robot," in *Proc. IEEE Int. Conf. on Robotics and Automation*, Brisbane, Australia, May 2018, pp. 4865-4872.

40. R. DeBortoli*, A. Nicolai*, F. Li, and **G. Hollinger**, "Realtime underwater 3D reconstruction using global context and active labeling," in *Proc. IEEE Int. Conf. on Robotics and Automation*, Brisbane, Australia, May 2018, pp. 6204–6211. *Authors contributed equally to article.

39. T. Oshiro, C. Palmer, **G. Hollinger**, Y. Menguc, T. Palmer, T. Courier, O. D. Yirmibesoglu, S. Morrell and A. Rynes, "Soft robotics in radiation environments for safeguards applications," *Proc. Institute of Nuclear Materials Management Annual Meeting*, Indian Wells, CA, July 2017, pp.1513-1522.

38. C. Fleming, S. Walker, C. Branyan. A. Nicolai, **G. Hollinger** and Y. Menguc, "Toolpath planning for continuous extrusion additive manufacturing," in *Proc. Int. Conf. on Shape, Solid, Structure and Physical Convention* (S3PM), Berkeley, CA, June 2017.

37. S. McCammon and **G. Hollinger**, "Planning and executing optimal non-entangling paths for tethered underwater vehicles," in *Proc. IEEE Int. Conf. on Robotics and Automation* (ICRA), Singapore, May 2017, pp. 3040–3046.

36. L. Milliken and **G. Hollinger**, "Modeling user expertise for choosing levels of shared autonomy," in *Proc. IEEE Int. Conf. on Robotics and Automation* (ICRA), Singapore, May 2017, pp. 2285–2291.

35. **G. Hollinger**, C. Palmer, T. Palmer and B. Smart, "Advanced teleoperation and shared autonomy for nuclearized robotic systems," in *Proc. Waste Management Symposium* (WM), Phoenix, AZ, Mar. 2017.

34. R. Skeele, J. J. Chung and **G. Hollinger**, "Risk-aware graph search with dynamic edge cost discovery," in *Proc. Workshop on the Algorithmic Foundations of Robotics* (WAFR), San Francisco, CA, Dec. 2016. [WAFR16 acceptance rate 25%]

33. J. Caley and **G. Hollinger**, "Deep learning of structured environments for robot search," in *Proc. IEEE/RSJ Int. Conf. on Intelligent Robots and Systems* (IROS), Daejeon, Korea, Oct. 2016, pp. 3987–3992.

32. N. Lawrance, T. Somers, D. Jones, S. McCammon, **G. Hollinger**, "Ocean deployment and testing of a semi-autonomous underwater vehicle," in *Proc. IEEE/MTS OCEANS Conf.*, Monterey, CA, Sept. 2016.

31. J. Caley and **G. Hollinger**, "Data-driven comparison of spatio-temporal monitoring techniques," in *Proc. IEEE/MTS OCEANS Conf.* (OCEANS15), Washington, DC, Oct. 2015.

30. C. Rebhuhn, R. Skeele, J. J. Chung, **G. Hollinger** and K. Tumer, "Learning to trick cost-based planners into cooperative behavior," in *Proc. IEEE/RSJ Int. Conf. on Intelligent Robots and Systems* (IROS15), Hamburg, Germany, Sept. 2015, pp. 4627–4633.

29. **G. Hollinger**, "Long-horizon robotic search and classification using sampling-based motion planning," in *Robotics: Science and Systems Conf.* (RSS15), Rome, Italy, July 2015.

28. R. Skeele and **G. Hollinger**, "Aerial vehicle path planning for monitoring wildfire frontiers," in *Proc. Int. Conf. on Field and Service Robotics* (FSR15), Toronto, Canada, June 2015.

27. S.-H. Yoo, A. Stuntz, Y. Zhang, R. Rothschild, **G. Hollinger** and R. Smith, "Experimental analysis of receding horizon planning algorithms for marine monitoring," in *Proc. Int. Conf. on Field and Service Robotics* (FSR15), Toronto, Canada, June, 2015.

26. T. Somers and **G. Hollinger**, "Coactive learning with a human expert for robotic information gathering," in *Proc. IEEE Int. Conf. on Robotics and Automation* (ICRA15), Seattle, WA, May 2015, pp. 559–564.

25. K. Cesare, R. Skeele, S.-H. Yoo, Y. Zhang and **G. Hollinger**, "Multi-UAV exploration with limited communication and battery," in *Proc. IEEE Int. Conf. on Robotics and Automation* (ICRA15), Seattle, WA, May 2015, pp. 2230–2235.

24. J. Faigl and **G. Hollinger**, "Unifying multi-goal path planning for autonomous data collection," in *Proc. IEEE/RSJ Int. Conf. on Intelligent Robots and Systems* (IROS14), Chicago, IL, Sept. 2014, pp. 2937–2942.

23. J. Faigl and **G. Hollinger**, "Self-organizing maps for the prize-collecting traveling salesman problem," in *Proc. Workshop on Self-organizing Maps* (WSOM14), Mittweida, Germany, July 2014. **Winner of Best Poster Award**

22. **G. Hollinger** and G. Sukhatme, "Trajectory learning for human-robot scientific data collection," in *Proc. IEEE Int. Conf. on Robotics and Automation* (ICRA14), Hong Kong, China, May 2014, pp. 6600–6605.

21. **G. Hollinger**, C. Choudhuri, U. Mitra, and G. Sukhatme, "Squared error distortion metrics for motion planning in robotic sensor networks," in *Proc. Int. Workshop on Wireless Networking for Unmanned Autonomous Vehicles* (Wi-UAV13), Atlanta, GA, Dec. 2013.

20. **G. Hollinger** and G. Sukhatme, "Sampling-based motion planning for robotic information gathering," in *Proc. Robotics: Science and Systems Conf.* (RSS13), Berlin, Germany, June 2013. **[RSS 2013 acceptance rate: 30%]**

19. **G. Hollinger**, A. Pereira, and G. Sukhatme, "Learning uncertainty models for reliable operation of autonomous underwater vehicles," in *Proc. IEEE Int. Conf. on Robotics and Automation* (ICRA13), Karlsruhe, Germany, May 2013, pp. 5573–5579 .

18. **G. Hollinger**, U. Mitra, and G. Sukhatme, "Active and adaptive dive planning for dense bathymetric mapping," in *Proc. Int. Symp. on Experimental Robotics* (ISER12), Quebec City, Canada, June 2012, pp. 803–817.

17. **G. Hollinger**, B. Englot, F. Hover, U. Mitra, and G. Sukhatme, "Uncertainty-driven view planning for underwater inspection," in *Proc. IEEE Int. Conf. on Robotics and Automation* (ICRA12), St. Paul, MN, May 2012, pp. 4884-4891.

16. **G. Hollinger**, S. Choudhary, P. Qarabaqi, C. Murphy, U. Mitra, G. Sukhatme, M. Stojanovic, H. Singh, and F. Hover, "Communication protocols for underwater data collection using a robotic sensor network," in *Proc. Int. Workshop on Wireless Networking for Unmanned Autonomous Vehicles* (Wi-UAV11), Houston, TX, Dec. 2011.

15. **G. Hollinger**, U. Mitra, and G. Sukhatme, "Autonomous data collection from underwater sensor networks using acoustic communication," in *Proc. IEEE/RSJ Int. Conf. on Intelligent Robots and Systems* (IROS11), San Francisco, CA, Sept. 2011, pp. 3564–3570.

14. **G. Hollinger**, U. Mitra, and G. Sukhatme, "Active classification: Theory and application to underwater inspection," in *Proc. Int. Symp. on Robotics Research* (ISRR11), Flagstaff, AZ, Aug. 2011.

13. **G. Hollinger**, S. Yerramalli, S. Singh, U. Mitra, and G. Sukhatme, "Distributed coordination and data fusion for underwater search," in *Proc. IEEE Int. Conf. on Robotics and Automation* (ICRA11), Shanghai, China, May 2011, pp. 349–355. **Finalist for KUKA Service Robotics Best Paper Award**

12. **G. Hollinger** and S. Singh, "Towards experimental analysis of challenge scenarios in robotics," in *Proc. Int. Symp. on Experimental Robotics* (ISER10), Delhi, India, Dec. 2010, pp. 909–921.

11. **G. Hollinger** and S. Singh, "Multi-robot coordination with periodic connectivity," in *Proc. IEEE Int. Conf. on Robotics and Automation* (ICRA10), Anchorage, AK, May 2010, pp. 4457–4462.

10. **G. Hollinger**, A. Kehagias, and S. Singh, "Efficient, guaranteed search with multi-agent teams," in *Proc. Robotics: Science and Systems Conf.* (RSS09), Seattle, WA, June 2009, pp. 265–272. **[RSS 2009 acceptance rate: 25%]**

9. **G. Hollinger**, D. Ferguson, S. Srinivasa, and S. Singh, "Combining search and action for mobile robots," in *Proc. IEEE Int. Conf. on Robotics and Automation* (ICRA09), Kobe, Japan, May 2009, pp. 952–957.

8. **G. Hollinger** and S. Singh, "Proofs and experiments in scalable, near-optimal search by multiple robots," in *Proc. Robotics: Science and Systems Conf.* (RSS08), Zurich, Switzerland, June 2008, pp. 206–213. **[RSS 2008 acceptance rate: 24%], Finalist for Best Student Paper Award**

7. **G. Hollinger**, J. Djugash, and S. Singh, "Tracking a moving target in cluttered environments with ranging radios," in *Proc. IEEE Int. Conf. on Robotics and Automation* (ICRA08), Pasadena, CA, May 2008, pp. 1430–1435.

6. **G. Hollinger**, J. Djugash, and S. Singh, "Coordinated search in cluttered environments using range from multiple robots," in *Proc. Int. Conf. on Field and Service Robotics* (FSR07), Chamonix, France, July 2007, pp. 433–442.

5. **G. Hollinger**, A. Kehagias, and S. Singh, "Probabilistic strategies for pursuit in cluttered environments with multiple robots," in *Proc. IEEE Int. Conf. on Robotics and Automation* (ICRA07), Rome, Italy, Apr. 2007, pp. 3870–3876.

4. **G. Hollinger**, Y. Georgiev, A. Manfredi, B. Maxwell, Z. Pezzementi, and B. Mitchell, "Design of a social mobile robot using emotion-based decision mechanisms," in *Proc. IEEE/RSJ Int. Conf. on Intelligent Robots and Systems* (IROS06), Beijing, China, Oct. 2006, pp. 3093–3098.

3. **G. Hollinger** and D. Gwaltney, "Evolutionary design of fault-tolerant analog control for a piezoelectric pipe-crawling robot," in *Proc. Genetic and Evolutionary Computation Conf.* (GECCO06), Seattle, WA, July 2006, pp. 761–768.

2. E. Liao, **G. Hollinger**, J. Djugash, and S. Singh, "Preliminary results in tracking mobile targets using range sensors from multiple robots," in *Proc. Int. Symp. on Distributed Autonomous Robotics Systems* (DARS06), Minneapolis, MN, June 2006, pp. 125–134.

1. **G. Hollinger** and J. Briscoe, "Genetic optimization and simulation of a piezoelectric pipe-crawling robot," in *Proc. IEEE Int. Conf. on Robotics and Automation* (ICRA05), Barcelona, Spain, Apr. 2005, pp. 484–489.

**Refereed Workshop Papers**

20. E. Scheide, G. Best, and **G. Hollinger**, "Learning behavior trees for robotic task planning by Monte Carlo search over a formal grammar," in *Proc. Robotics: Science and Systems Conference Workshop on Learning in Task and Motion Planning* (RSS), virtual, July 2020.

19. S. Chow and **G. Hollinger**, "Merging segments in configuration space for soft manipulator planning," in *Proc. IEEE International Conference on Robotics and Automation Workshop on Opportunities and Challenges of Soft Robotics across Different Length Scales* (ICRA), Montreal, Canada, May 2019.

18. R. DeBortoli*, A. Nicolai*, F. Li, **G. Hollinger**, "Assessing perception quality in sonar images using global context," in *Proc. IEEE International Conference on Intelligent Robots and Systems Workshop on Introspective Methods for Reliable Autonomy* (IROS), Vancouver, Canada, Sept. 2017. *Authors contributed equally to article.

17. A. Smith and **G. Hollinger**, "Distributed inference-based multi-robot exploration," in *Proc. Robotics: Science and Systems Conference Workshop on Robot Communication in the Wild* (RSS17), Boston, MA, July 2017.

16. A. Smith and **G. Hollinger**, "Task selection for human-robot teams in dynamic environments," in *Proc. Robotics: Science and Systems Conference Workshop on Heterogeneity and Diversity for Resilience in Multi-Robot Systems* (RSS17), Boston, MA, July 2017.

15. J. Caley, N. Lawrance and **G. Hollinger**, "Deep networks with confidence bounds for robotic information gathering," in *Proc. Robotics: Science and Systems Conference Workshop on New Frontiers for Deep Learning in Robotics* (RSS17), Boston, MA, July 2017.

14. T. Somers, N. Lawrance and **G. Hollinger**, "Efficient learning of trajectory preferences using combined ratings and rankings," in *Proc. Robotics: Science and Systems Conference Workshop on Mathematical Models, Algorithms, and Human-Robot Interaction* (RSS), Boston, MA, July 2017.

13. J. J. Chung, L. Milliken, **G. Hollinger** and K. Tumer, "When to ask for help: introspection in multi-robot teams," in *Proc. IEEE Int. Conf. on Robotics and Automation Workshop on Human Multi-Robot System Interaction* (ICRA17), Singapore, May 2017.

12. D. Jones and **G. Hollinger**, "Real-time stochastic optimization for energy-efficient trajectories," in *Proc. Robotics: Science and Systems Conf. Workshop on Robot-Environment Interaction for Perception and Manipulation* (RSS16), Ann Arbor, MI, June, 2016.

11. S. McCammon and **G. Hollinger**, "Planning non-entangling paths for tethered underwater robots using simulated annealing," in *Proc. Robotics: Science and Systems Conf. Workshop on Robot Learning and Planning* (RSS16), Ann Arbor, MI, June, 2016.

10. L. Milliken and **G. Hollinger**, "Modeling user expertise for choosing levels of shared autonomy," in *Proc. Robotics: Science and Systems Conf. Workshop on Planning for Human-Robot Interaction* (RSS16), Ann Arbor, MI, June, 2016.

9. A. Nicolai, R. Skeele, C. Eriksen, and **G. Hollinger**, "Deep learning for laser based odometry estimation," in *Proc. Robotics: Science and Systems Conf. Workshop on Limits and Potentials of Deep Learning in Robotics* (RSS16), Ann Arbor, MI, June, 2016.

8. N. Lawrance, T. Somers, D. Jones, S. McCammon and **G. Hollinger**, "Ocean deployment and testing of a semi-autonomous underwater vehicle," in *Proc. IEEE Int. Conf. on Robotics and Automation Workshop on Marine Robot Localization and Navigation* (ICRA16), Stockholm, Sweden, May 2016.

7. Y. Zhang, Y. Ye, Z. Wang, M. Taylor, **G. Hollinger**, and Q. Zhang, "Intelligent in-orchard bin-managing system for tree fruit production," in *Proc. IEEE Int. Conf. on Robotics and Automation Workshop on Robotics in Agriculture* (ICRA15), Seattle, WA, May 2015.

6. R. Skeele, J. Chung, **G. Hollinger**, and K. Tumer, "Risk aware graph search with uncertain edge costs," in *Proc. IEEE Int. Conf. on Robotics and Automation Workshop on Planning for Solving Complex Tasks, Reducing Uncertainty, and Generating Informative Paths & Policies* (ICRA15), Seattle, WA, May 2015.

5. C. Rebhuhn, R. Skeele, J. Chung, **G. Hollinger**, and K. Tumer, "Promoting cooperative behavior between cost-based planners," in *Proc. IEEE Int. Conf. on Robotics and Automation Workshop on Taxonomies of Interconnected Systems: Asymmetric Interactions in Distributed Robotics* (ICRA15), Seattle, WA, May 2015.

4. N. Lawrance, J. Chung, and **G. Hollinger**, "Shortest path exploration with fast marching," in *Proc. IEEE Int. Conf. on Robotics and Automation Workshop on Planning for Solving Complex Tasks, Reducing Uncertainty, and Generating Informative Paths & Policies* (ICRA15), Seattle, WA, May 2015.

3. T. Somers and **G. Hollinger**, "Coactive learning with a human expert for robotic monitoring," in *Proc. Robotics: Science and Systems Workshop on Robotic Monitoring* (RSS14), Berkeley, CA, July 2014.

2. **G. Hollinger**, A. Pereira, V. Ortenzi, and G. Sukhatme, "Towards improved prediction of ocean processes using statistical machine learning," in *Proc. Robotics: Science and Systems Workshop on Robotics for Environmental Monitoring* (RSS12), Sydney, Australia, July 2012.

1. **G. Hollinger**, B. Englot, U. Mitra, G. Sukhatme, and F. Hover, "Path and view planning for underwater surface inspection," in *Proc. Robotics: Science and Systems Marine Robotics Workshop* (RSS11), Los Angeles, CA, June 2011.

**Theses (including theses of advised students)**

- A. Nicolai, "Augmented deep learning techniques for robotic state estimation, " Ph.D. thesis, Robotics, Oregon State University, Corvallis, OR, August 2019.
- J. Caley, "Deep learning for robotic exploration," Ph.D. thesis, Robotics, Oregon State University, Corvallis, OR, June 2019.
- A. Smith, "Non-myopic distributed planning and coordination for multi-robot teams," Ph.D. thesis, Robotics and Mechanical Engineering, Oregon State University, Corvallis, OR, June 2018.
- L. Milliken, "Modeling human expertise for providing adaptive levels of robot shared autonomy," M.S. thesis, Robotics Program, Oregon State University, Corvallis, OR, September 2017.
- C. Rebhuhn, "Adaptive multiagent traffic management for autonomous robotic systems," Ph.D. thesis, Robotics and Mechanical Engineering, Oregon State University, Corvallis, OR, June 2017.
- R. Skeele, "Planning under uncertainty for unmanned aerial vehicles," M.S. thesis, Robotics Program, Oregon State University, Corvallis, OR, June 2016.

- Y. Zhang, "Multi-robot coordination: applications in orchard bin management and informative path planning," M.S. thesis, Robotics Program, Oregon State University, Corvallis, OR, September 2015.
- D. Fernandez, "Model predictive control for underwater robots in ocean waves," M.S. thesis, Robotics Program, Oregon State University, Corvallis, OR, September 2015.
- A. Iscen, "Multiagent learning for locomotion and coordination in tensegrity robotics," Ph.D. dissertation, Mechanical Engineering and Computer Science, Oregon State University, Corvallis, OR, May 2014.
- G. Hollinger, "Search in the physical world," Ph.D. dissertation, Robotics Institute, Carnegie Mellon University, Pittsburgh, PA, July 2010.
- G. Hollinger, Z. Pezzementi, A. Flurie, and B. Maxwell, "Design and construction of an indoor robotic blimp for urban search and rescue tasks," Senior design thesis, Engineering Department, Swarthmore College, Swarthmore, PA, May 2005.

## Invited Talks

- "Marine robotics: planning, decision making, and human-robot learning,"

  MicroWorkshop on Robotics, Harvey Mudd College (presented virtually), May, 2020.

  RSS Workshop on Robots in the Wild: Challenges in Deploying Robust Autonomy for Robotic Exploration, June, 2019.

  ICRA Workshop on Approaching Residency of Marine Robots for Deep-Sea Research, Montreal, Canada, May, 2019.

  University of Nebraska, Lincoln, NE, April, 2019.

  University of Michigan, Ann Arbor, MI, February, 2019.

  NSF-Sponsored Workshop on Integrating Science Needs with Advanced Seafloor Sensor Engineering to Provide Early Warning of Geohazards, Gleneden Beach, Oregon, July, 2018.

  ICRA Workshop on Informative Path Planning and Adaptive Sampling, Brisbane, Australia, May, 2018.

  MIT, Boston, MA, April, 2018.

  Carnegie Mellon University, Pittsburgh, PA, February, 2018.

  University of Texas Austin, Austin, TX, January, 2018.

  University of Washington, Seattle, WA, October, 2017.

  Naval Research Laboratory, Washington, DC, March, 2017.
- "Taskable and adaptable autonomy for heterogeneous marine vehicles," Marine Technology Summit, Newport, OR, October, 2018.
- "Marine robotic inspection: perception, navigation, and shared autonomy," IROS Workshop on Perception and Planning for Robotic Inspection, Vancouver, Canada, September, 2017.
- "Active information gathering for teams of aerial and marine vehicles," ICRA Workshop on Multi-robot Perception-Driven Control and Planning, Singapore, June 2017.
- "Information gathering with multi-robot teams: towards resilient shared autonomy with humans," Workshop on Heterogeneity in Multi-Robot Systems, Arlington, VA, August 2016.
- "Learning uncertainty in ocean currents for reliable navigation of autonomous underwater vehicles," Workshop on Material Transport in Geophysical Flows, Montclair, NJ, July 2016.
- "Sensing, perception, and estimation in multi-robot systems," IEEE RAS Multi-robot Summer School, Singapore, June 2016.
- "Long-horizon robotic search and classification using sampling-based motion planning," AAAI Robotics Early Career Spotlight Talk, Phoenix, AZ, Feb. 2016.

- "Risk-aware graph search," Unmanned Maritime Systems Technology (UMST) Review, Destin, FL, Feb. 2016.
- "Autonomous monitoring and intervention," Northwest National Marine Renewable Energy Center (NNMREC) Annual Meeting, Portland, OR, Sept. 2015–2017.
- "Multi-view aquatic information gathering," Robotics: Science and Systems Workshop on Multi-view Geometry in Robotics, Rome, Italy, July 2015.
- "Cooperative decision making for multi-robot systems," Robotics: Science and Systems Workshop on Principles of Multi-robot Systems, Rome, Italy, July 2015.
- "Aquatic exploration: human-robot teaming and efficient planning," ICRA Workshop on Persistent Autonomy for Aquatic Robotics, Seattle, WA, May 2015.
- "Algorithmic field robotics," Robotics: Science and Systems Area Chair Symposium: Frontiers in Robotics, New Brunswick, NJ, Mar. 2015.
- "Human-robot autonomous exploration and exploitation," Unmanned Maritime Systems Technology (UMST) Review, Destin, FL, Jan. 2015.
- "Marine robotics: planning, decision making & learning," Northwest Marine Technology Summit, Newport, OR, Oct. 2014.
- "Safe and reliable human-robot underwater data collection," Robotics: Science and Systems Workshop on Autonomous Control, Adaptation and Learning for Underwater Vehicles, Berkeley, CA, July 2014.
- "Planning, decision making & learning for robotic information gathering,"

  NSF-Sponsored Workshop on Robot Planning in the Real World, Arlington, VA, Oct. 2013.

  Dept. of Electrical Engineering, Czech Technical University, Prague, Czech Republic, July 2013.

  Dept. of Computer Science, University of Colorado at Boulder, Boulder, CO, Mar. 2013.

  Dept. of Electrical, Computer & Systems Eng., Rensselaer Polytechnic Institute, Troy, NY, Mar. 2013.

  Dept. of Electrical & Computer Engineering, Stevens Institute of Technology, Hoboken, NJ, Mar. 2013.

  Robotics Institute, Carnegie Mellon Univ., Pittsburgh, PA, Feb. 2013.

  Dept. of Electrical Eng. & Comp. Sciences, Univ. of California Berkeley, Berkeley, CA, Nov. 2012.

  Willow Garage, Menlo Park, CA, Nov. 2012.

  Anki Inc., San Francisco, CA, Nov. 2012.

  Google, Mountain View, CA, Nov. 2012.

  Dept. of Engineering Science, Univ. of Oxford, Oxford, United Kingdom, May 2012.

  Dept. of Computer Science, Univ. of Massachusetts Amherst, Amherst, MA, Mar. 2012.

  Computer Science Dept., Univ. of California Los Angeles, Los Angeles, CA, Mar. 2012.

  Dept. of Computer Science, Rutgers University, Piscataway, NJ, Feb. 2012.

  Mechanical, Industrial & Manufacturing Eng. Dept., Oregon State Univ., Corvallis, OR, Feb. 2012.

  Dept. of Mechanical Engineering, Univ. of California Riverside, Riverside, CA, Jan. 2012.
- "Autonomous data collection in underwater sensor networks," Mini-Symposium on TSP and its Applications, SIAM Conference on Control and its Applications, San Diego, CA, July 2013.
- "Robotic decision making for sensing in the natural world,"

  Mechanical, Industrial & Manufacturing Eng. Dept., Oregon State Univ., Corvallis, OR, Feb. 2013.

  CyPhy Lab Colloquium, Queensland University of Technology, Brisbane, Australia, July 2012.

  Robotics and Intelligent Machines Seminar, Georgia Tech, Atlanta, GA, Feb. 2012.

Dept. of Computer Science, Univ. of California Santa Barbara, Santa Barbara, CA, Nov. 2011.

Dept. of Computer Science and Eng., Univ. of Washington, Seattle, WA, Nov. 2011.

Computer Science Dept., Univ. of Texas at Austin, Austin, TX, Nov. 2011.

CSAIL, Massachusetts Institute of Technology, Boston, MA, Oct. 2011.

Dept. of Computer Science and Eng., Univ. of California San Diego, La Jolla, CA, Oct. 2011.

- "Complexity and performance guarantees in robotic information gathering," Robotics: Science and Systems Workshop on Stochastic Motion Planning and Information-based Control, Sydney, Australia, July 2012.
- "Autonomous robotic inspection and the benefit of adaptivity," Field Robotics Center Seminar, Carnegie Mellon Univ., Pittsburgh, PA, Jan. 2012.
- "Underwater data collection using robotic sensor networks," IEEE Underwater Acoustic Signal Processing Workshop, West Greenwich, RI, Oct. 2011.
- "Active classification: Theory and application to underwater inspection," National Control Engineering Student Workshop, College Park, MD, Apr. 2011.
- "Multi-robot search in the physical world,"

  Monterey Bay Aquarium Research Institute, Moss Landing, CA, Oct. 2010.

  Operations Research Dept., Naval Postgraduate School, Monterey, CA, Oct. 2010.

  Computer Science Dept., Worcester Polytechnic Institute, Worcester, MA, Mar. 2010.

  Engineering Dept., Swarthmore College, Swarthmore, PA, Mar. 2010.

  Computer Science Dept., George Washington Univ., Washington, DC, Feb. 2010.

  Robotic Embedded Systems Lab, Univ. of Southern California, Los Angeles, CA, Dec. 2009.

  Mobility and Robotic Systems Section, Jet Propulsion Laboratory, Pasadena, CA, Dec. 2009.
- "Careers in robotics," Allen D. Nease High School Robotics Club, St. Augustine, FL, Dec. 2007.
- "Probabilistic techniques for solving the multi-robot coordinated search problem,"

  Field Robotics Center Seminar, Carnegie Mellon Univ., Pittsburgh, PA, June 2007.

  GRASP Laboratory SWARMS Group, Univ. of Pennsylvania, Philadelphia, PA, June 2006.

## Funding

23. Resident seabed autonomy, Office of Naval Research, PI: Dana Manalang (UW-APL), CoPIs: G. Hollinger (OSU), A. Marburg (UW-APL), K. Tumer (OSU), J. Adams (OSU), F. Li (OSU). J. Davidson (OSU), H. Knight (OSU), Amount: $7,000,000 (OSU portion $3,300,000). Funded for 2020-2023.

22. Autonomous monitoring of geologic repositories, Pacific Northwest National Lab, PI: C. Palmer (OSU), Co-PI: G. Hollinger (OSU), Amount: $120,000 (my portion $69,342). Funded for 2020.

21. Topological planning in information space for intelligent robotic systems, NSF CAREER Award, PI: G. Hollinger (OSU), Amount: $497,523. Funded for 2019–2024.

20. Precise, discriminating and robust mapping, DARPA, PI: S. Scherer (CMU), Co-PIs: M. Travers (CMU) and G. Hollinger (OSU), Amount: $4,500,000 (my portion $600,000). Funded for 2018–2021.

19. Optimization of marine hydrokinetic energy systems for naval applications at multiple scales, U.S. Navy, PI: B. Polagye (UW), Co-PIs: G. Hollinger (OSU) and A. Stewart (UW), Amount: $7,300,000 (my portion $300,000). Funded for 2018–2021.

18. Integrating science needs with advanced seafloor sensor engineering to provide early warning of geohazards: visioning workshop and roadmap for the future, National Science Foundation (NSF), PI: C. Parrish (OSU), Co-PIs: G. Hollinger (OSU), A. Trehu (OSU), B. Mason (OSU), J. Selker (OSU), Amount $50,000. Funded for 2018.

17. Bioinspired design and shared autonomy for underwater robots with soft limbs, National Science Foundation (NSF) National Robotics Initiative (NRI) Program, PI: Y. Menguc (OSU), Co-PI: G. Hollinger (OSU), Amount: $686,583 (my portion $343,291). Funded for 2017–2020.

16. Taskable and adaptable autonomy for heterogenous marine vehicles, National Science Foundation (NSF) Smart & Autonomous Systems, PI: G. Hollinger (OSU), Co-PIs: J. A. Adams (OSU), J. Barth (OSU), J. Nash (OSU), K. Shearman (OSU), Amount: $1,000,000 (my portion $264,000). Funded for 2017–2020.

15. Autonomous ocean navigation, Naval Research Laboratory, PI: G. Hollinger (OSU), Amount: $112,104. Funded for 2017–2018.

14. Information-aware decision making in teams of autonomous vehicles and humans, Office of Naval Research (ONR) Young Investigator Program (YIP), PI: G. Hollinger (OSU), Amount: $510,000. Funded for 2017–2020.

13. Robotic emplacement of harsh environment tag on spent fuel assemblies, Idaho National Lab, PI: G. Hollinger (OSU), Co-PIs: Yigit Menguc (OSU), Amount: $116,635 (my portion $58,317). Funded for 2016–2018.

12. Joint mission planning (JMPS) autonomy algorithm integration, US Navy, PI: B. Smart (OSU), Co-PIs: G. Hollinger (OSU), K. Tumer (OSU), C. Grimm (OSU), Amount: $400,000 (my portion $100,000). Funded for 2016–2017.

11. Cooperative autonomous tunnel mapping, U.S. Air Force, PI: S. Singh (Near Earth Autonomy, Inc.), Co-PIs: G. Hollinger (OSU), N. Michael (CMU), S. Scherer (CMU), Amount: $998,843 (my portion $165,000). Funded for 2015-2017.

10. Advanced laboratory and field arrays (ALFA) for marine energy, U.S. Department of Energy, PIs: B. Batten (OSU), B. Polagye (UW), and Jeremy Kasper (Univ. Alaska Fairbanks), Co-PIs: G. Hollinger and others, Amount: $4,000,000 (my portion $233,427). Funded for 2015–2017.

9. Revolutionizing our understanding of ocean ecosystems, W. M. Keck Foundation, PI: J. Barth (OSU), Co-PIs: K. Benoit-Bird (OSU) and G. Hollinger (OSU), Amount: $1,000,000 (my portion $128,786). Funded for 2015-2017.

8. Intelligent in-orchard bin managing system for tree fruit production, USDA National Robotics Initiative (NRI) Program, PI: Q. Zhang (WSU), Co-PIs: M. Taylor (WSU) and G. Hollinger (OSU), Amount: $1,010,168 (my portion $283,487). Funded for 2014–2017.

7. Typecasting agents for managing human-system interactions in the National Airspace System, NASA SSAT Program, PI: K. Tumer (OSU), Co-PI: G. Hollinger (OSU), Amount: $917,843 (my portion $458,921). Funded for 2014–2017.

6. Defect detection and characterization in cast metal parts, PCC Structurals, Inc. with Oregon Metals Initiative cost matching, PI: R. Hatton (OSU), Co-PI: G. Hollinger (OSU), Amount: $100,000 (my portion $50,000). Funded for 2014–2015.

5. Complex system planning to improve global product flow, PCC Structurals, Inc. with Oregon Metals Initiative cost matching, PI: G. Hollinger (OSU), Co-PIs: B. Smart (OSU) and K. Tumer (OSU), Amount: $200,000 (my portion $83,333). Funded for 2014–2017.

4. Automatic detection of visual defects in metal parts, DWFritz Automation, Inc. with Oregon Metals Initiative cost matching, PI: B. Smart (OSU), Co-PI: G. Hollinger (OSU), Amount: $100,000 (my portion $50,000). Funded for 2014–2015.

3. Autonomous exploration and exploitation: the role of adaptive decision making, Office of Naval Research (ONR) Science of Autonomy Program, PI: G. Hollinger (OSU), Amount: $510,000. Funded for 2014–2017.

2. Collaborative planning for human-robot science teams, National Science Foundation (NSF) National Robotics Initiative (NRI) Program, PI: G. Sukhatme (USC), Subcontracted Co-PI: G. Hollinger (OSU), Amount: $482,252 (my portion $228,000). Funded for 2013–2016.

1. Multi-UAV cooperative tunnel mapping, U.S. Air Force Phase 1 SBIR, G. Hollinger consulting with Near Earth Autonomy, Inc., Status: Funded for 2013. Amount: $100,000 (my portion $24,000).

## Teaching and Mentoring Experience

**Instructor, Graduate Course** — Winter 2018
Philosophy and Ethics of Robotics (new course) — Oregon State University

**Instructor, Graduate Course** — Winter 2015–2019 (taught every other year)
Sequential Decision Making in Robotics (new course) — Oregon State University

**Instructor, Undergraduate Course** — Fall 2013–2019 (taught every year)
Dynamics, Systems and Control (Regular and Honors sections) — Oregon State University

**Instructor, Graduate Course** — Spring 2011
Sequential Decision Making in Robotics (new course) — University of Southern California

**Teaching Assistant, Undergraduate Course** — Fall 2009
Introduction to Mobile Robot Programming — Carnegie Mellon University

**Teaching Assistant, Graduate Course** — Fall 2007
Graduate Artificial Intelligence — Carnegie Mellon University

**Reading Group Founder** — Spring 2006–Spring 2010
Philosophy of Robotics Reading Group — Carnegie Mellon University

**Student Tutor** — Fall 2001–Spring 2005
Upward Bound Program — Swarthmore College

**Mentoring**

- Postdoctoral advisees (OSU), current: Graeme Best (Ph.D., University of Sydney).
- Graduate advisees (OSU), current: Tim Player (Ph.D., Oregon Lottery Scholarship), Robert Debortoli (Ph.D.), Thane Somers (Ph.D.), Seth McCammon (Ph.D.), Scott Chow (Ph.D.), Dylan Jones (Ph.D., NSF GRFP Honorable Mention), Ian Rankin (Ph.D.), Jacob Anderson (M.S.), Manish Saroya (M.S.), Chris Lee (M.S.), Emily Scheide (M.S.)
- Postdoctoral advisees (OSU), past: Jen Jen Chung (Ph.D., University of Sydney), Nicholas Lawrance (Ph.D., University of Sydney)
- Graduate advisees (OSU), alumni:
  - Matthew Frantz (M.S., Robotics, graduated 2019), Topic: Incorporating Preferences through Linear Programming Constraints for Autonomous Ocean Planning
  - Austin Nicolai (Ph.D., Robotics, graduated 2019), Topic: Augmented Deep Learning Techniques for Robotic State Estimation
  - Jeff Caley (Ph.D., Robotics, graduated 2019), Topic: Deep Learning for Robotic Exploration
  - Andrew Smith (Ph.D., Robotics and Mechanical Engineering, graduated 2018), Topic: Non-Myopic Distributed Planning and Coordination for Multi-Robot Teams
  - Carrie Rebhuhn (Ph.D., Robotics and Mechanical Engineering, co-advised with Kagan Tumer, graduated 2017), Topic: Adaptive Multiagent Traffic Management for Autonomous Robotic Systems

  - Lauren Milliken (M.S., Robotics, graduated 2017), Topic: Modeling User Expertise for Choosing Levels of Shared Autonomy
  - Ryan Skeele (M.S., Robotics, graduated 2016), Topic: Planning Under Uncertainty for Unmanned Aerial Vehicles
  - Yawei Zhang (M.S., Robotics, graduated 2015), Topic: Multi-robot Coordination: Applications in Orchard Bin Management and Informative Path Planning
  - Daniel Fernandez (M.S., Robotics, graduated 2015), Topic: Model Predictive Control for Underwater Robots in Ocean Waves
  - Atil Iscen (Ph.D., Mechanical Engineering and Computer Science, co-advised with Kagan Tumer, graduated 2014), Topic: Multiagent Learning for Locomotion and Coordination in Tensegrity Robotics

- Undergraduate research assistants (OSU): Evan Gonnerman, Ryan Skeele, Brandon Lee, Kyle Cesare, Soo-hyun Yoo, Heather Vermilyea, Alex Mikes

- Summer undergraduate REU students (OSU): Andrew Stuntz (2014), Nikki Gantos (2015), Veronica Gruning (2016), Juan Diaz (2016), Javier Yu (2017), Trevor Greenside (2017), Gretchen Rice (2018), Sevval Sare Gulduren (2019), Abigail Rafter (2019)

- Thesis review committees (Ph.D.):

  - Neale Ratzlaff (Computer Science, Oregon State University), expected 2021
    Topic: TBD
  - Gina Olson (Robotics, Oregon State University), expected 2020
    Topic: Structure and Actuation of Cephalopod-Inspired Soft Robots
  - Gilberto Marcon dos Santos (Robotics, Oregon State University, expected 2020
    Topic: Coalition Formation for Scalable Multiple Robot Planning Under Uncertainty
  - Shauharda Khadka (Robotics, Oregon State University), 2019
    Topic: Tackling Credit Assignment Using Memory and Multilevel Optimization for Multiagent Reinforcement Learning
  - Akash Arora (Engineering and Information Technologies, University of Sydney), 2018
    Topic: Multi-Modal Active Perception for Robotic Information Gathering in Science Missions
  - Troy Wilson (Engineering and Information Technologies, University of Sydney), 2017
    Topic: Adaptive Sampling for Efficient Online Modelling
  - William Curran (Robotics, Oregon State University), 2017
    Topic: High-Dimensional Reinforcement Learning with Human Feedback
  - Gonzalo Saldias (Oceanography, Oregon State University), 2017
    Topic: Optics, Structure, and Variability of the Offshore Columbia River Plume
  - Maani Ghaffari Jadidi (Engineering and Information Technology, University of Technology Sydney), 2016
    Topic: Gaussian Processes for Information-Theoretic Robotics Mapping and Exploration
  - Timothy Patten (Engineering and Information Technologies, University of Sydney), 2016
    Topic: Active Object Classification from 3D Range Data with Mobile Robot
  - Lim Zhan Wei (Computer Science, National University of Singapore), 2015
    Topic: Planning Under Uncertainty: From Informative Path Planning to Partially Observable Semi-MDPs
  - Roman Marchant Matus (Machine Learning, University of Sydney), 2015
    Topic: Bayesian Optimisation for Planning in Dynamic Environments
  - Daniel Lazewatsky (Robotics, Oregon State University), 2015
    Topic: Making the Unconscious Unconscious: Reclaiming Microinteractions for People with Motor Disabilities
  - Arash Abbasi (Electrical and Computer Engineering, Oregon State University), 2015
    Topic: Ultra-wideband Relay Communication Systems

- Logan Yliniemi (Robotics, Oregon State University), 2015
  Topic: Multi-objective Optimization in Adaptive Multiagent Systems
- Christian Hubicki (Robotics, Oregon State University), 2015
  Topic: From Running Birds to Running Robots: Optimization as a Unifying Framework for Dynamic Bipedal Locomotion
- Chen Jie (Computer Science, National University of Singapore), 2013
  Topic: Towards Large-scale Modeling and Prediction of Spatiotemporal Environmental Phenomena

- Thesis review committees (M.S.):
  - Connor Yates (Robotics, Oregon State University, 2019)
    Topic: Multi-Reward Learning for Behavior-Driven Exploration
  - Patrick Clary (Robotics, Oregon State University, 2019)
    Topic: Sim-to-Real Policy Transfer for the Bipedal Robot Cassie
  - Austin Whitesell (Robotics, Oregon State University, 2019)
    Topic: Predicting Autonomous Navigation Behaviors and Failures from Features in the Environment
  - Michael Hector (Robotics, Oregon State University, 2019)
    Topic: Why Use Ankles? An Optimization Approach to Discover Energetic Benefits of Ankles in Steady Locomotion
  - Wylie Ferron (Civil and Construction Engineering, Oregon State University, 2018)
    Topic: Roadmap for BIM Adoption and Implementation by Small-Sized Construction Companies
  - Neale Ratzlaff (Computer Science, Oregon State University, 2018
    Topic: Methods for Detection and Recovery of Out-of-Distribution Examples
  - Taylor Courier (Robotics, Oregon State University, 2018
    Topic: Perception System for a Formula SAE Driverless Car
  - Erik Klinkhammer (Robotics, Oregon State University), 2018
    Topic: Learning in Complex Domains: Leveraging Multiple Rewards through Alignment
  - Chloe Fleming (Robotics, Oregon State University), 2018
    Topic: Recruitment-Based Robotic Colony Allocation
  - Ovunc Tuzel (Robotics, Oregon State University), 2018
    Topic: Artificial Swarm Control Through Learning Based Leadership
  - Matthew Gillins (Civil Engineering, Oregon State University), 2016
    Topic: Unmanned Aircraft Systems for Bridge Inspection: Testing and Developing End-to End Operational Workflow.
  - Alexandra Simpson (Civil Engineering, Oregon State University), 2016
    Topic: Wave-by-Wave Forecasting via Assimilation of Marine Radar Data
  - Aida Rahmattalabi (Robotics, Oregon State University), 2016
    Topic: D++: Structural Credit Assignment in Tightly Coupled Multiagent Domains
  - Andrew Gabler (Robotics, Oregon State University), 2015
    Topic: Learning-based Control of Experimental Hybrid Fuel Cell Power Plant
  - Sepideh Kharaghani (Robotics, Oregon State University), 2015
    Topic: History-based Local Reward Shaping in Multiagent Systems
  - Richard Meier (Electrical and Computer Engineering, Oregon State University), 2015
    Topic: Toward Automated Decision-making in Power Systems Wide-area Protection
  - Bradley Ling (Mechanical Engineering, Oregon State University), 2015
    Topic: Real-time Estimation and Prediction of Wave Excitation Forces for Wave Energy Control Applications
  - Teresa Tjahja (Computer Science, Oregon State University), 2015
    Topic: Supervised Hierarchical Segmentation for Bird Bioacoustics

  - Michael Dille (Robotics, Carnegie Mellon University), 2010
    Topic: Target Tracking, Geolocation, and Search with Small Unmanned Aerial Vehicles

- Thesis review committees (Honors B.S.):
  - Joshua Cook (Mechanical Engineering, Oregon State University), 2019
    Topic: Q-Network Selection in Multiagent Settings
  - Jacob Shryer (Mechanical Engineering, Oregon State University), 2019
    Topic: Design and Testing of a Tethered, Coaxial Rotor Micro Air Vehicle
  - Mitchell Bernards (Mechanical Engineering, Oregon State University), 2018
    Topic: Utilizing Robot Ankle Torques to Account for Foot Placement Error
  - John Diebold (Mechanical Engineering, Oregon State University), 2016
    Topic: Unmanned Aerial Vehicle Black Box
  - Cameron Bowie (Computer Science, Oregon State University), 2016
    Topic: Robotic Path-Planning Through Dynamic Maps
  - Ryan Skeele (Mechanical Engineering, Oregon State University), 2014
    Topic: Autonomous Quadcopter Research, Systems, and Global Impacts to Come

## Service and Affiliations

**Editorships, Program Committees, and Review Service**

- Local Arrangements Co-Chair: ACM/IEEE Int. Conf. on Human-Robot Interaction (HRI) 2015
- Area Chair: Robotics: Science and Systems Conf. (RSS) 2015
- Associate Editor (journals): *IEEE Robotics and Automation Letters* (RA-L) 2017–present, *Autonomous Robots* (AURO) 2018–present
- Associate Editor (conferences): IEEE Int. Conf. on Robotics and Automation (ICRA) 2012–2017; IEEE/RSJ Int. Conf. on Intelligent Robots and Systems (IROS) 2014–2016
- Senior Program Committee: Int. Joint Conf. on Artificial Intelligence (IJCAI) 2013; AAAI 2014
- Guest Editor: *Autonomous Robots: Special Issue on Search and Pursuit-evasion with Mobile Robots*, vol. 31, no. 4, Nov. 2011; *Autonomous Robots: Special Issue on Special Issue on Online Decision Making in Multi-Robot Coordination*, vol. 42, no. 4, Apr. 2018.,
- Program Committees: AAAI 2012–2015; Robotics: Science and Systems Conf. (RSS) 2010–2020; Int. Workshop on Cooperative Robots and Sensor Networks (RoboSense) 2012–2013; Autonomous Agents and Multiagent Systems (AAMAS) 2013–2014; Int. Conf. on Intelligent Autonomous Systems (IAS) 2014; Int. Symp. on Distributed Autonomous Robotic Systems (DARS) 2014–2016; Int. Symp. on Experimental Robotics (ISER) 2014; Int. Workshop on Wireless Networking for Unmanned Autonomous Vehicles (Wi-UAV) 2014; Workshop on Algorithmic Foundations of Robotics (WAFR) 2016–2019; International Symposium on Multi-Robot and Multi-Agent Systems (MRS) 2019
- Awards Committee: Int. Workshop on Wireless Networking for Unmanned Autonomous Vehicles (Wi-UAV) 2014
- Session Chair: Robotics: Science and Systems Conf. 2015 and 2018; IEEE Int. Conf. on Robotics and Automation 2013, 2015; IEEE/RSJ Int. Conf. on Intelligent Robots and Systems 2011
- Reviewer (Journals): *ACM Trans. on Sensor Networks*; *Computational Intelligence*; *IEEE Trans. on Robotics*; *IEEE Trans. on Mobile Computing*; *Journal of Field Robotics*; *Journal of Social Robotics*; *Robotics and Autonomous Systems*; *Artificial Intelligence Journal*; *Robotics and Automation Mag.*; *Autonomous Robots*; *Autonomous Agents and Multi-Agent Systems*; *Philosophy and Technology*; *Robotica*; *Int. Journal on Artificial Intelligence Tools*; *Applied Mathematics and Computation*; *Journal of Robotics*; *Int. Journal on Advanced*

*Robotic Systems*; *IEEE Access*; *IET Control Theory & Applications*; *IEEE Trans. on Vehicular Technology*; *IEEE Trans. Aerospace and Electronic Systems*; *Computers & Operations Research*; *Journal of Atmospheric and Oceanic Technology*; *IEEE Journal of Oceanic Engineering*; *Machine Learning*; *Ocean Engineering*; *IEEE Trans. Human-Machine Systems*

- Reviewer (Conferences and Workshops): Int. Symp. on Robotics Research; IEEE Int. Conf. on Robotics and Automation; Int. Conf. on Intelligent Autonomous Systems; Int. Symp. on Experimental Robotics; IEEE/RSJ Int. Conf. on Intelligent Robots and Systems; Int. Conf. on Field and Service Robotics; Int. Symp. on Distributed Autonomous Robotic Systems; IEEE Int. Workshop on Safety, Security, and Rescue Robots; Mediterranean Conf. on Control and Automation; Conf. Towards Autonomous Robotic Systems; Workshop on the Algorithmic Foundations of Robotics; IEEE Conf. on Decision and Control, American Control Conf.; Int. Symp. on Multi-robot and Multi-Agent Systems; IEEE Int. Conf. on Multisensor Fusion and Integration for Intelligent Systems

- Proposal Review Panels: Maryland Industrial Partnerships Program, 2014; Strategic Environmental Research and Development Program (SERDP), 2016; Interdisciplinary Research Initiation Award Program, 2016; Research Council of Norway, 2018; National Science Foundation panels, 2016–2017, 2019; NASA Early Stage Innovation, 2018

**Workshop Organization**

- "NSF-sponsored workshop on integrating science needs with advanced seafloor sensor engineering to provide early warning of geohazards," co-organized with C. Parrish, A. Trehu, J. Selker, and B. Mason, Gleneden Beach, OR, 2018

- "Robot communication in the wild: meeting the challenges of real-world systems," co-organized with M. Otte, D. Sofge, R. Fitch, and K. Dantu, Robotics: Science and Systems Conf. (RSS) Workshop, Boston, MA, 2017

- "Second workshop on on-line decision-making in multi-robot coordination," co-organized with J. Faigl, O. Simonin, J. J. Chung, and F. Charpillet, Robotics: Science and Systems Conf. (RSS) Workshop, Ann Arbor, MI, 2016

- "Panel discussion on the future of long-duration autonomy," panelist, MTS/IEEE OCEANS Conf., Washington, DC, 2015

- "Workshop on on-line decision-making in multi-robot coordination," co-organized with J. Faigl, O. Simonin, and F. Charpillet, IEEE Int. Conf. on Intelligent Robots and Systems (IROS) Workshop, Hamburg, Germany, 2015

- "Persistent autonomy for aquatic robotics: the role of control and learning in single and multi-robot systems," co-organized with F. Maurelli, D. Lane, R. N. Smith, M. A. Hsieh, L. Marques, K. Kyriakopoulos, M. Carreras, P. Kormushev, and M. Fox, IEEE Int. Conf. on Robotics and Automation (ICRA) Workshop, Seattle, WA, 2015

- "Workshop on human-robot teaming," panelist, ACM/IEEE Int. Conf. on Human-robot Interaction (HRI), Portland, OR, 2015

- "Autonomous control, adaptation and learning for underwater vehicles," co-organized with R. Smith, A. Hsieh, and F. Hover, Robotics: Science and Systems Conf. (RSS) Workshop, Berkeley, CA, 2014

- "Multi-agent coordination in robotic exploration," program committee member, European Conf. on Artificial Intelligence (ECAI) Workshop, Prague, Czech Republic, 2014

- "NSF-sponsored workshop on robot planning in the real world: research challenges and opportunities," session chair, Washington, DC, 2013

- "Robotic exploration, monitoring, and information collection: nonparametric modeling, information-based control, and planning under uncertainty," co-organized with S. Karaman, M. Vitus, M. Schwager, C. Tomlin, F. Ramos, S. Williams, and C. Stachniss, Robotics: Science and Systems Conf. (RSS) Workshop, Berlin, Germany, 2013

- "Combining task and motion planning for real-world applications," program committee member, Int. Conf. on Automated Planning and Scheduling (ICAPS) Workshop, Sao Paulo, Brazil, 2012
- Search in the physical world: efficiency, scalability, and guarantees," co-organized with T. Chung and V. Isler, IEEE Int. Conf. on Robotics and Automation (ICRA) Workshop, Anchorage, Alaska, 2010

**Society Memberships**

- IEEE (Robotics and Automation Society) Member 2002–2018, Senior Member 2018–present
- Member of Phi Beta Kappa Honors Society, inducted 2005
- Tau Beta Pi Engineering Honors Society, inducted 2004 (Swarthmore Chapter Vice-President 2004–05)

**University Committees**

- Faculty Advisor, Robotics Graduate Student Association, Oregon State University, 2019-present
- Graduate Program Committee, Robotics and Mechanical Engineering, Oregon State University, 2014–present
- Chair, Graduate Admissions Committee, Robotics, Oregon State University, 2013–present
- Faculty Hiring Committee, Robotics, Oregon State University, 2016 and 2018
- Autonomous Systems Research Group Steering Committee, Oregon State University, 2015–2016
- Search Committee, Grants & Contracts Coordinator, College of Engineering, Oregon State University, 2013
- Robotics Institute Graduate Admissions Committee, Carnegie Mellon University, 2009–2010
- Robotics Institute Summer Scholars Selection Committee, Carnegie Mellon University, 2007–2010

**Outreach**

- Research presentation at Oregon Regional MATE Remotely Operated Vehicle Competition, Lincoln City, OR, 2018 and 2019.
- ASE High School Intern Faculty Mentor: Remy Noble (2015), Apoorva Prakash (2016), Aarashvir Sidhu (2019)
- Underwater robot demo at OSU Hatfield's Marine Science Day, Newport, OR, 2015
- Oregon Robotics Kit software and hardware release for freshman and sophomore students, 2014
- Oregon State University MECOP co-op program faculty ambassador, 2014
- Consultant for elementary school robotics program at Teach Academy in South Los Angeles, 2011
- Judge for FIRST Lego League Robotics Competition, 2010
- Mentor for "100 Robots for 100 Kids" outreach program in Pittsburgh, 2007–2010
- Student representative for Robotics Institute Student Organization, 2005–2010

## Personal

- Citizenship: United States
- Languages: English (native), Spanish (basic)
- NCAA Athlete at Swarthmore (golf team)
- Swarthmore College Parliamentary Debate Society (Vice-President 2004–2005)