

## Curriculum Vitae

Notarization. I have read the following and certify that this *curriculum vitae* is a current and accurate statement of my professional record.

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

### Summary vitae

#### I. Personal Information

##### I.A. UID, Last Name, First Name, Middle Name, Contact Information

Otte, Michael Wilson  
3150 Glenn L. Martin Hall  
Department of Aerospace Engineering  
University of Maryland, College Park, 20742  
Phone: 301-405-2723  
Email: [otte@umd.edu](mailto:otte@umd.edu)  
Web: <http://www.ottelab.com>

##### I.B. Academic Appointments at UMD

11/18–present, Affiliate Assistant Professor, Computer Science  
05/18–present, Member, Maryland Robotics Center  
02/18–present, Assistant Professor, Aerospace Engineering  
07/17–02/18, Visiting Assistant Professor, Aerospace Engineering  
02/17–05/17, Lecturer, Maryland Applied Graduate Engineering (Robotics)

##### I.D. Other Employment

02/16–02/18, National Research Council RAP Postdoctoral Associate, U.S. Naval Research Laboratory  
10/14–08/15, Research Associate in residence at U.S. Air Force Research Laboratory, University of Colorado at Boulder  
09/11–09/14, Postdoctoral Associate, Massachusetts Institute of Technology

##### I.E. Educational Background

2011, Ph.D. in Computer Science, University of Colorado Boulder  
2007, M.S. in Computer Science, University of Colorado Boulder  
2005, B.S. in Aeronautical Engineering, Clarkson University, with distinction  
2005, B.S. in Computer Science, Clarkson University, with distinction

##### I.G. Professional Certifications, Licenses, and Memberships

2005, Certified as Intern Engineer, New York State

## II. Research, Scholarly, Creative and/or Professional Activities\*

### II.A. Books

#### II.A.2 Books Edited

2. Steven M. LaValle, Jason M. O’Kane, Michael Otte, Dorsa Sadigh, and Pratap Tokekar, editors. *Algorithmic Foundations of Robotics XV, Proceedings of the Fifteenth Workshop on the Algorithmic Foundations of Robotics*, Springer Proceedings in Advanced Robotics. Springer Cham, 2023.
1. Nikolaus Correll, Mac Schwager, and Michael W. Otte, editors. *Distributed Autonomous Robotic Systems, The 14th International Symposium, DARS 2018, Boulder, CO, USA, October 15-17, 2018*, volume 9 of *Springer Proceedings in Advanced Robotics*. Springer, 2019.

### II.B Chapters

#### II.B.1. Books

12. **Jaffar, Mohamed Khalid M.** and Michael Otte. PiP-X: Funnel-based online feedback motion planning/replanning in dynamic environments. In Steven M. LaValle, Jason M. O’Kane, Michael Otte, Dorsa Sadigh, and Pratap Tokekar, editors, *Algorithmic Foundations of Robotics XV*, pages 132–148, Cham, 2023. Springer International Publishing.
11. **Gandhe, Mitali** and Michael Otte. Decentralized robot swarm clustering: Adding resilience to malicious masquerade attacks. In Steven M. LaValle, Jason M. O’Kane, Michael Otte, Dorsa Sadigh, and Pratap Tokekar, editors, *Algorithmic Foundations of Robotics XV*, pages 98–114, Cham, 2023. Springer International Publishing.
10. **Motter, Paul, Hoover, Zachary**, and Michael Otte. Sailing a boat through a macroscopic smart-fluid composed of a robot swarm. In Bruno Siciliano, Cecilia Laschi, and Oussama Khatib, editors, *Experimental Robotics*, pages 424–435, Cham, 2021. Springer International Publishing.
9. **Nayak, Sharan** and Michael W. Otte. Rapid: An algorithm for quick replanning under changed dynamical constraints. In Bruno Siciliano, Cecilia Laschi, and Oussama Khatib, editors, *Experimental Robotics*, pages 576–588, Cham, 2021. Springer International Publishing.
8. Michael Otte and Donald Sofge. Path planning for information gathering with lethal hazards and no communication. In Marco Morales, Lydia Tapia, Gildardo Sánchez-Ante, and Seth Hutchinson, editors, *Algorithmic Foundations of Robotics XIII*, pages 389–405, Cham, 2020. Springer International Publishing.
7. Michael Otte, Michael Kuhlman, and Donald Sofge. *Competitive Two Team Target Search Game with Communication Symmetry and Asymmetry*, pages 208–223. Springer International Publishing, Cham, 2020.

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\*Names in boldface indicate graduate students under Michael Otte’s direct supervision at the time of submission. Names of supervised undergraduates are boldface and italic; postdocs are italicized.

6. Michael Otte. Collective cognition and sensing in robotic swarms via an emergent group-mind. In Dana Kulić, Yoshihiko Nakamura, Oussama Khatib, and Gentiane Venture, editors, *2016 International Symposium on Experimental Robotics*, pages 829–840, Cham, 2017. Springer International Publishing.
5. Michael Otte and Emilio Frazzoli. *RRTX: Real-Time Motion Planning/Replanning for Environments with Unpredictable Obstacles*, pages 461–478. Springer International Publishing, Cham, 2015.
4. Michael Otte and Nikolaus Correll. *Any-Com Multi-robot Path-Planning with Dynamic Teams: Multi-robot Coordination under Communication Constraints*, pages 743–757. Springer Berlin Heidelberg, Berlin, Heidelberg, 2014.
3. Joshua Bialkowski, Sertac Karaman, Michael Otte, and Emilio Frazzoli. *Efficient Collision Checking in Sampling-Based Motion Planning*, pages 365–380. Springer Berlin Heidelberg, Berlin, Heidelberg, 2013.
2. Michael Otte and Nikolaus Correll. *Any-Com Multi-robot Path-Planning: Maximizing Collaboration for Variable Bandwidth*, pages 161–173. Springer Berlin Heidelberg, Berlin, Heidelberg, 2013.
1. Greg Grudic, Jane Mulligan, Michael Otte, and Adam Bates. Online learning of multiple perceptual models for navigation in unknown terrain. In Christian Laugier and Roland Siegwart, editors, *Field and Service Robotics: Results of the 6th International Conference*, pages 411–420, Berlin, Heidelberg, 2008. Springer Berlin Heidelberg.

## II.C. Refereed Journals

### II.C.1 Refereed Journal Articles

19. **Aditya Savio Paul** and Michael Otte. Simultaneous motion replanning and gravity model refinement near small solar system bodies. *AIAA Journal of Aerospace Information Systems*, 20(11), 2023.
18. **Sharan Nayak**, Michael Paton, and Michael Otte. A heuristic-guided dynamical multi-rover motion planning framework for planetary surface missions. *IEEE Robotics and Automation Letters*, 8(5), 2023.
17. **Akshay Bapat**, **Bharath Reddy Bora**, Jeffrey W. Herrmann, Shapour Azarm, Huan Xu, and Michael W. Otte. Distributed task allocation algorithms for multi-agent systems with very low communication. *IEEE Access*, 10:124083–124102, 2022.
16. **Nayak, Sharan** and Michael W. Otte. Bidirectional sampling-based motion planning without two-point boundary value solution. *IEEE Transactions on Robotics*, 38(6):3636–3654, 2022.
15. **McGuire, Loy**, Michael W. Otte, Tristan Schuler, and Donald Sofge. Viscoelastic fluid-inspired swarm behavior to reduce susceptibility to local minima: The chain siphon algorithm. *IEEE Robotics and Automation Letters*, 7(2):1000–1007, 2022.
14. Estefany Carrillo, Suyash Yeotikar, **Sharan Nayak**, **Khalid M. Jaffar**, Shapour Azarm, Jeffrey W. Herrmann, Michael Otte, and Huan Xu.

Communication-aware multi-agent metareasoning for decentralized task allocation. *IEEE Access*, 9:98712–98730, 2021.

13. Michael Otte and Don Sofge. Path-based sensors: Paths as sensors, bayesian updates, and shannon information gathering. *IEEE Transactions on Automation Science and Engineering*, 18(3):946–967, 2021.
12. Samuel T Langlois, Oghenetekevwe Akoroda, Estefany Carrillo, Jeffrey Herrmann, Shapour Azarm, Huan Xu, and Michael W Otte. Metareasoning structures, problems, and modes for multiagent systems: A survey. *IEEE Access*, 8:183080–183089, 2020.
11. **Sharan Nayak**, Suyash Yeotikar, Estefany Carrillo, Eliot Rudnick-Cohen, **Mohamed Khalid M Jaffar**, Ruchir Patel, Shapour Azarm, Jeffrey Herrmann, Huan Xu, and Michael W Otte. Experimental comparison of decentralized task allocation algorithms under imperfect communication. *IEEE Robotics and Automation Letters*, 5(2):572–579, 2020.
10. Senthil Hariharan Arul, Adarsh Jagan Sathyamoorthy, **Shivang Patel**, Michael Otte, Huan Xu, Ming C Lin, and Dinesh Manocha. Lswarm: Efficient collision avoidance for large swarms with coverage constraints in complex urban scenes. *IEEE Robotics and Automation Letters (RA-L)*, 2019.
9. Michael Otte, Michael J. Kuhlman, and Donald Sofge. Auctions for multi-robot task allocation in communication limited environments. *Autonomous Robots*, Jan 2019.
8. Michael Otte. An emergent group mind across a swarm of robots: Collective cognition and distributed sensing via a shared wireless neural network. *The International Journal of Robotics Research*, 37(9):1017–1061, 2018.
7. Michael Otte and Nikolaus Correll. Dynamic teams of robots as ad hoc distributed computers: reducing the complexity of multi-robot motion planning via subspace selection. *Autonomous Robots*, 42(8):1691–1713, Dec 2018.
6. Michael Otte, Michael Kuhlman, and Donald Sofge. Competitive target search with multi-agent teams: symmetric and asymmetric communication constraints. *Autonomous Robots*, 42(6):1207–1230, Aug 2018.
5. Michael Kuhlman, Michael Otte, Donald Sofge, and Satyandra K. Gupta. Multipass target search in natural environments. *Sensors*, 17(11), 2017.
4. Joshua Bialkowski, Michael Otte, Sertac Karaman, and Emilio Frazzoli. Efficient collision checking in sampling-based motion planning via safety certificates. *The International Journal of Robotics Research*, 35(7):767–796, 2016.
3. Michael Otte and Emilio Frazzoli. RRTX: Asymptotically optimal single-query sampling-based motion planning with quick replanning. *The International Journal of Robotics Research*, 35(7):797–822, 2016.
2. Michael Otte and Nikolaus Correll. C-FOREST: Parallel shortest-path planning with super linear speedup. *IEEE Transactions on Robotics*, 29:798–806, June 2013.

1. Michael Otte, Scott Richardson, Jane Mulligan, and Gregory Grudic. Path planning in image space for autonomous robot navigation in unstructured environments. *Journal of Field Robotics*, 26:212–240, 2009.

## II.D. Published Conference Proceedings

### II.D.1. Refereed Conference Proceedings

33. **Han Yang, Mohamed Khalid M Jaffar**, and Michael W Otte. Trajectory tracking while stabilizing an inverted pendulum on a quadcopter using adaptive model-predictive control. In *AIAA Science and Technology Forum (SciTech)*. AIAA, 2024).
32. **George Kontoudis** and Michael Otte. Exploration-exploitation active learning of gaussian process surrogates for adaptive sampling. In *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. IEEE/RSJ, 2023 (To Appear). [Acceptance rate 43%].
31. **George Kontoudis** and Michael Otte. Closed-form active learning using gaussian process surrogates for high-dimensional adaptive sampling. In *American Control Conference (ACC)*. American Automatic Control Council, 2023. [Acceptance rate 68.7%].
30. **Jae-Kyung Cho**, Chan Kim, **Mohamed Khalid M Jaffar**, Michael W Otte, and Seong-Woo Kim. Low-level controller in response to changes in quadrotor dynamics. In *2023 IEEE International Conference on Robotics and Automation (ICRA)*. IEEE, 2023. [Acceptance rate 43%].
29. **Alkesh Kumar Srivastava, George P Kontoudis**, Donald Sofge, and Michael Otte. Distributed multi-robot information gathering using path-based sensors in entropy-weighted voronoi regions. In *International Symposium on Distributed Autonomous Robotic Systems (DARS)*, Montbéliard, France, 2022. [Acceptance rate 67%].
28. **Khalid M. Jaffar** and Michael Otte. PiP-X: Funnel-based online feedback motion planning/replanning in dynamic environments. In *International Workshop on the Algorithmic Foundations of Robotics (WAFR)*, College Park, Maryland, 2022. [Acceptance rate 56%].
27. **Mitali Gandhe** and Michael Otte. Decentralized robot swarm clustering: Adding resilience to malicious masquerade attacks. In *International Workshop on the Algorithmic Foundations of Robotics (WAFR)*, College Park, Maryland, 2022. [Acceptance rate 56%].
26. **Shivang Patel**, Senthil Hariharan, **Pranav Dhulipala**, Ming C Lin, Dinesh Manocha, Huan Xu, and Michael Otte. Multi-agent ergodic coverage in urban environments. In *2020 IEEE International Conference on Robotics and Automation (ICRA)*. IEEE, 2021. [Acceptance rate 49%].
25. **Paul Motter, Zachary Hoover**, and Michael Otte. Sailing a boat through a macroscopic smart-fluid composed of a robot swarm. In *International Symposium on Experimental Robotics (ISER)*, La Valletta, Malta, 2020. [Acceptance rate 50%].



24. **Sharan Nayak** and Michael Otte. Rapid: An algorithm for quick replanning under changed dynamical constraints. In *International Symposium on Experimental Robotics (ISER)*, La Valletta, Malta, 2020. [Acceptance rate 50%].
23. **Aditya Savio Paul** and Michael Otte. Autonomous motion planning for spacecrafts near small solar system bodies: simultaneously refining the gravitational field model and re-planing gravity dependent maneuvers. In *International Astronautical Congress (IAC)*. IAF, 2020.
22. Ruchir Patel, Eliot Rudnick-Cohen, Shapour Azarm, Michael Otte, Huan Xu, and Jeffrey W Herrmann. Decentralized task allocation in multi-agent systems using a decentralized genetic algorithm. In *2020 IEEE International Conference on Robotics and Automation (ICRA)*, pages 3770–3776. IEEE, 2020. [Acceptance rate 44%].
21. **Manas Gupta**, Ming C Lin, Dinesh Manocha, Huan Xu, and Michael Otte. Monitoring access to user defined areas with swarms of uavs in urban environments. In *International Symposium on Multi-Robot and Multi-Agent Systems (MRS)*, New Brunswick, 2019. [Acceptance rate 33%].
20. Michael Otte and Donald Sofge. Path planning for information gathering with lethal hazards and no communication. In *International Workshop on the Algorithmic Foundations of Robotics (WAFR)*, Merida, Mexico, 2018. [Acceptance rate 57%].
19. Rahul Rajan, Michael Otte, and Donald Sofge. Optimizing multiagent area coverage using dynamic global potential fields. In *IEEE Symposium on Series on Computational Intelligence (SSCI)*, Bangalore, India, 2018.
18. Michael Otte, Michael Kuhlman, and Donald Sofge. Multi-robot task allocation with auctions in harsh communication environments. In *International Symposium on Multi-Robot and Multi-Agent Systems (MRS)*, Los Angeles, 2017. [Acceptance rate 24%].
17. Rahul Rajan, Michael Otte, and Donald Sofge. Novel physicomimetic bio-inspired algorithm for search and rescue applications. In *IEEE Symposium on Series on Computational Intelligence (SSCI)*, Honolulu, 2017.
16. Michael Kuhlman, Michael Otte, Donald Sofge, and Satyandra K Gupta. Maximizing mutual information for multipass target search in changing environments. In *IEEE International Conference on Robotics and Automation (ICRA)*, Singapore, 2017. [Acceptance rate 41%].
15. Michael Otte, Michael Kuhlman, and Donald Sofge. Competitive two team target search game with communication symmetry and asymmetry. In *International Workshop on the Algorithmic Foundations of Robotics (WAFR)*, San Francisco, USA, 2016. [Acceptance rate 25%].
14. Michael Otte. Collective cognition & sensing in robotic swarms via an emergent group-mind. In *International Symposium on Experimental Robotics (ISER)*, Tokyo, Japan, 2016.
13. Michael Otte, William Silva, and Eric Frew. Any-time path-planning: Time-varying wind field + moving obstacles. In *IEEE International Conference on*

- Robotics and Automation (ICRA)*, Stockholm, Sweden, 2016. [Acceptance rate 35%].
12. Michael Otte and Emilio Frazzoli. RRT-X: Real-time motion planning/replanning for environments with unpredictable obstacles. In *International Workshop on the Algorithmic Foundations of Robotics (WAFR)*, Istanbul, Turkey, 2014.
  11. Michael Otte, Joshua Bialkowski, and Emilio Frazzoli. Any-com collision checking: Sharing certificates in decentralized multi-robot teams. In *IEEE International Conference on Robotics and Automation (ICRA)*, Hong Kong, China, 2014. [Acceptance rate 48%].
  10. Minghui Zhu, Michael Otte, Pratik Chaudhari, and Emilio Frazzoli. Game theoretic controller synthesis for multi-robot motion planning part i: Trajectory based algorithms. In *IEEE International Conference on Robotics and Automation (ICRA)*, Hong Kong, China, 2014. [Acceptance rate 48%].
  9. Joshua Bialkowski, Michael Otte, and Emilio Frazzoli. Free-configuration biased sampling for motion planning. In *IEEE International Conference on Intelligent Robots and Systems (IROS)*, Tokyo, Japan, 2013. [Acceptance rate 43%].
  8. Michael Otte, Nikolaus Correll, and Emilio Frazzoli. Navigation with foraging. In *IEEE International Conference on Intelligent Robots and Systems (IROS)*, Tokyo, Japan, 2013. [Acceptance rate 43%].
  7. Joshua Bialkowski, Sertac Karaman, Michael Otte, and Emilio Frazzoli. Efficient collision checking in sampling-based motion planning. In *International Workshop on the Algorithmic Foundations of Robotics (WAFR)*, Cambridge, Massachusetts, 2012.
  6. Michael Otte and Nikolaus Correll. Any-Com multi-robot path-planning: Maximizing collaboration for variable bandwidth. In *International Symposium on Distributed Autonomous Robotics Systems (DARS)*, 2010.
  5. Michael Otte and Nikolaus Correll. Any-Com multi-robot path-planning with dynamic teams: Multi-robot coordination under communication constraints. In *International Symposium on Experimental Robotics (ISER)*, 2010.
  4. Daniel J. Sutton, Peter Klein, Michael Otte, and Nikolaus Correll. Object interaction language (oil): An intent-based language for programming self-organized sensor/actuator networks. In *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2010. [Acceptance rate 46%].
  3. Michael Otte and Gregory Grudic. extracting paths from fields built with linear interpolation. In *International Conference on Intelligent Robots and Systems (IROS)*, St. Louis, 2009. [Acceptance rate 58%].
  2. Greg Grudic, Jane Mulligan, Michael Otte, and Adam Bates. Online learning of multiple perceptual models for navigation in unknown terrain. In *International Conference on Field and Service Robotics (FSR)*, Chamonix, France, 2007.
  1. Michael Otte, Scott Richardson, Jane Mulligan, and Gregory Grudic. Local path planning in image space for autonomous robot navigation in unstructured

environments. In *International Conference on Intelligent Robots and Systems (IROS)*, San Diego, 2007. [Acceptance rate 49%].

### II.D.3. Other

1. Aaron Cephers, Ilya Kushnir, Michael Otte, Clayton Lewis, and N Correll. Brain computer interfaces. In *AAAI Video Competition*, Atlanta, GA, USA, 2010.

## II.E. Conferences, Workshops, and Talks

### II.E.1. Keynotes

1. Multi-robot coordination when communication is unreliable. The 3rd Workshop on Wireless Networking, Planning, and Computing for UAV Swarms (Swarm-Net), at 22nd IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (WoWMoM), June 2021. Virtual.

### II.E.2. Invited Talks

24. Recent work from the motion and teaming lab: Efficiently replanning in response to changes in the environment and selected results on multi-robot collaboration, June 2024. University of Colorado, Boulder, CO.
23. Recent work from the motion and teaming lab: Efficiently replanning in response to changes in the environment and selected results on multi-robot collaboration, February 2023. West Virginia University, Robotics Seminar Series, Morgantown, WV.
22. Efficiently replanning in response to changes in the environment, robot, and mission objectives, November 2023. American University, Computer Science Seminar Series, Washington, DC.
21. Efficiently replanning in response to changes in the environment, robot, and mission objectives, November 2023. NASA Jet Propulsion Laboratory, Pasadena, CA.
20. Efficiently replanning in response to changes in the environment, robot, and mission objectives, September 2023. University of Oulu, Oulu, Finland.
19. Efficiently replanning in response to changes in the environment, robot, and mission objectives., August 2023. The Johns Hopkins University Applied Physics Laboratory, Intelligent Systems Center Seminar Series, Laurel, MD.
18. How can multiple robots better work together when communication is limited?, August 2023. Oregon State University, Robotics Seminars Series, Corvallis, OR.
17. Non-standard path/motion planning problems at the intersection of path and motion planning, information theory, and control, April 2023. University of North Carolina Charlotte, Robotics and Control Systems Seminar Series, Charlotte, NC.
16. Motion planning work and multi-robot systems, August 2022. NASA Langley Research Center, Hampton, Va.
15. A survey of planning work with NRL, August 2018. U.S. Naval Research Lab. Washington, D.C.



14. The motion of autonomous vehicles: Single agents, teams, and swarms, April 2017. University of Maryland. College Park, Maryland.
13. Collective cognition & sensing in robotic swarms via an emergent group-mind, October 2016. U.S. Naval Research Lab. Washington, D.C.
12. Any-com algorithms and multi-agent search and rescue, June 2016. U.S. Naval Research Lab. Washington, D.C.
11. Path planning in wind with moving obstacles, October 2015. U.S. Air Force Research Lab. Wright-Patterson AFB, Ohio.
10. Creating a group mind neural network over a swarm of robots, September 2015. Self-Organizing Systems Research Group, Harvard University. Cambridge, Massachusetts.
9. Improving dijkstra's algorithm, May 2015. U.S. Air Force Research Lab. Wright-Patterson AFB, Ohio.
8. Robotic motion planning, replanning, and parallelization, November 2014. George Mason University. Fairfax, Virginia.
7. Sampling based motion planning and replanning, July 2014. U.S. Naval Research Laboratory. Washington D.C.
6. Any-com algorithms for multi-agent systems, February 2014. Self-Organizing Systems Research Group, Harvard University. Cambridge, Massachusetts.
5. Image-space control, November 2013. Russ Tedrake's Group, Massachusetts Institute of Technology. Cambridge, Massachusetts.
4. Improving motion planning via intelligent collision checking, November 2013. George Washington University. Washington D.C.
3. Recent breakthroughs in robotic motion planning, February 2013. University of New Hampshire. Durham, New Hampshire.
2. Robots and artificial intelligence. *The Pinhead Institute's Scholars in the Schools Program*, May 2012. Ouray High School. Ouray, Colorado.
1. Any-com multi-robot path planning, February 2012. iRobot Corporation. Bedford, Massachusetts.

### II.E.3. Refereed Presentations

1. Michael Otte. Using many robots for fun and useful things. Maryland Robotics Center Virtual Research Symposium, May 2021. University of Maryland.

### II.E.5. Refereed Abstracts

2. **Alexander Mendelsohn**, Don Sofge, and Michael Otte. Enhancing search and rescue capabilities in hazardous communication-denied environments through path-based sensors with backtracking. In *International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*. IFAAMAS, 2024. extended abstract.
1. Michael Otte and Nikolaus Correll. C-FOREST: Parallel shortest-path planning with super linear speedup. In *International Conference on Automated Planning and Scheduling (Journal Track)*, Portsmouth, New Hampshire, 2014.

### II.E.6. Refereed Posters

10. Michael W. Otte **Alexander Mendelsohn**, Donald Sofge. Enhancing information gain and survival rates with path-based sensors through backtracking. In *International Symposium on Multi-Robot and Multi-Agent Systems (MRS), poster track*, Boston, MA, 2023.
9. Roderich Groß Michael W. Otte. Multi-defender single-attacker perimeter defense game on a cylinder: Special case in which the attacker starts at the boundary. In *International Symposium on Multi-Robot and Multi-Agent Systems (MRS), poster track*, Boston, MA, 2023.
8. **Alkesh K Srivastava**, **George P Kontoudis**, Donald Sofge, and Michael Otte. Path-based sensors: Will the knowledge of correlation in random variables accelerate information gathering? In *IEEE International Conference on Robotics and Automation, Workshop on Communication Challenges in Multi-Robot Systems: Perception, Coordination, and Learning*, 2023.
7. **Mitali Gandhe** and Michael Otte. Intrusion detection and response system in swarm robotics clustering algorithms. In *International Symposium on Multi-Robot and Multi-Agent Systems (MRS), poster track*, Cambridge, UK, 2021.
6. **Sharan Nayak** and Michael Otte. Bidirectional sampling-based motion planning without two-point boundary value solution. In *The Maryland Robotics Center Virtual Research Symposium*, University of Maryland, 2021.
5. **Aditya Savio Paul** and Michael Otte. Kino-dynamic motion planning for satellite systems. In *Finnish Satellite Workshop*, 2020.
4. Dmitry Yershov, Michael Otte, and Emilio Frazzoli. Sampling-based volumetric methods for optimal feedback planning. In *IEEE International Conference on Robotics and Automation, Workshop on optimal robot motion planning (WORMP)*, 2015.
3. Joshua Bialkowski, Michael Otte, and Emilio Frazzoli. Fast collision checking: From single robots to multi-robot teams. In *IEEE International Conference on Robotics and Automation: Crossing the Reality Gap - From Single to Multi- to Many Robot Systems (ICRA-CRG)*, 2013.
2. Michael Otte and Nikolaus Correll. The any-com approach to multi-robot coordination. In *IEEE International Conference on Robotics and Automation: Network Science and Systems Issues in Multi-Robot Autonomy (ICRA-NETSS)*, 2010.
1. Scott Richardson, Michael Otte, Michael Mozer, Amer Diwan, and Dan Conners. Discovering the runtime structure of software with probabilistic generative models. In *Neural Information Processing Systems Conference: Workshop on Machine Learning for Systems Problems (NIPS-MLSP)*, Whistler, Canada, 2007.

#### II.E.12. Non-Refereed Panels

8. What stereotypes need to be debunked? Workshop on Breaking Swarm Stereotypes, IEEE International Conference on Robotics and Automation (ICRA), May 2024. Yokohama, Japan.

7. Progress on the ONR “Tough Problems” in Scalable and Robust Distributed Collaboration. Office of Naval Research (ONR) Science of Autonomy (SoA) Program Meeting, August 2023. Alexandria, VA.
6. Scalable and Robust Distributed Collaboration. Office of Naval Research (ONR) Science of Autonomy (SoA) Program Meeting, August 2022. Arlington, VA.
5. “Sim-to-lab-to-real”: A discussion on current challenges of transferring multi-robot technologies to real-world problems. International Symposium on Multi-Robot and Multi-Agent Systems (MRS), November 2021. Cambridge, UK.
4. Future Fundamental Research Testbeds: Considerations of Adversarial and Malicious Actors. Office of Naval Research (ONR) Science of Autonomy (SoA) Program Meeting, August 2021. Virtual.
3. Junior Faculty Panel. Part of the Future Faculty Fellows (ENES602) Course Taught By Amy J. Karlsson, December 2020. (Virtual, Due to Covid-19) University of Maryland.
2. Faculty Panel. Women in Aeronautics and Astronautics (WIAA) Event, October 2020. (Virtual, Due to Covid-19) University of Maryland.
1. Career Paths in Robotics. Becoming a Robot Guru 3 (at Workshop on the Algorithmic Foundation of Robotics), December 2018. Mérida, Mexico.

## II.F. Professional and Extension Publications

### II.F.1. Reports and Non-Refereed Monographs

7. **Alkesh K Srivastava, George P. Kontoudis**, Donald Sofge, and Michael Otte. Path-based sensors: Will the knowledge of correlation in random variables accelerate information gathering? Technical Report arXiv:2305.06929, University of Maryland College Park, 2023.
6. Ilya Semenov, Robert Brown, and Michael Otte. Control and dynamic motion planning for a hybrid air-underwater quadrotor: Minimizing energy use in a flooded cave environment. Technical Report arXiv:2301.00936, University of Maryland College Park, 2023.
5. Michael Otte. On solving floating point SSSP using an integer priority queue. Technical report, University of Colorado, arXiv:1606.00726v1, 2016.
4. Michael Otte. Modifying dijkstra’s algorithm to solve many instances of SSSP in linear time. Technical Report Spring-2015, University of Colorado at Boulder, 2015.
3. Michael Otte, Dan Knights, Joseph J. Pfeiffer III, Jane Mulligan, and Greg Grudic. New techniques for path planning in image space. Technical Report CU-CS-1052-09, University of Colorado at Boulder, 2009.
2. Michael Otte. A survey of machine learning approaches to robotic path-planning. Technical Report PhD Preliminary Exam, University of Colorado at Boulder, 2008.
1. Michael Otte and Scott Richardson. An hmm applied to semi-online program phase analysis. Technical Report CU-CS-1034-07, University of Colorado at Boulder, 2007.

## II.J. Sponsored Research and Programs administered by the Office of Research Administration

- *Total funding as PI, Co-PI, and Performer: \$1,843,147*  
*(includes only my share of awards recieved prior to my employment at UMD plus only my share of internal and external awards and awards while at UMD)*
- ***Total funding while at UMD as PI, Co-PI, and Performer: \$1,623,147***  
*(includes only my share of internal and external awards)*
- *Total external funding while at UMD as PI, Co-PI, and Performer: \$1,509,847*  
*(includes only my share of external awards)*
- *Total funding as PI while at UMD: \$1,077,796*  
*(includes internal and external awards on which I am PI)*
- *Total external funding as PI while at UMD: \$964,496*  
*(includes external awards on which I am PI)*

### II.J.1. Grants

- ArtIAMAS, Y3 Project 1.9: Quick Path Replanning in Response to Opportunistic Multi-Robot Shannon Information Gathering about Hazards/Adversaries, Note: ARTIAMAS this is a large and I am one of many Performers, the numbers below reflect only the share of this project for work done by my lab. 06/01/2020 – 09/25/2022. PI: Derek Paley, Co-PIs: Jeffrey Herrmann, Dinesh Manocha, Performer: Michael Otte (Share: \$150,000)
- National Institute of Aerospace, Structural Concepts for Autonomous In-Space Assembly Part 2, \$70,391, 06/01/2020 – 09/25/2022. PI: Michael Otte (Share: %100).
- Office of Naval Research Autonomous Path Planning for Information Gathering In Lethally Hostile Environments with Severely Limited Communication \$590,314, 6/16/2020 – 6/15/2023. PI: Michael Otte (Share: %100).
- Northrop Grumman, Hacking Emergent Behavior in Robotic Swarms, \$56,000 (plus \$28,000 from UMD), 6/1/2020 – 5/30/2021. PI: Michael Otte (Share: %100).
- National Institute of Aerospace, Structural Concepts for Autonomous In-Space Assembly Part 2, \$11,547, 8/1/2020 – 8/31/2020. PI: Michael Otte (Share: %100).
- UMD Teaching Innovation Grant: ENAE 403 Aircraft Flight Dynamics, \$10,300, 7/1/2020 – 8/31/2020. PI: Michael Otte (Share: %100).
- Navair Digital Office, Reasoning Algorithms for Collaborative Autonomous Systems, \$67,727, 5/30/2019 – 5/29/2020. PI: Jeffrey W. Herrmann, Co-PI: Michael Otte (Share: \$33,864).
- National Institute of Aerospace, Structural Concepts for Autonomous In-Space Assembly, \$76,244, 8/01/2018 – 7/31/2020. PI: Michael Otte (Share: %100).
- AFRL Information Directorate, Planning and Metareasoning for Multi-agent Systems with Variable Communication Availability, \$690,000, 8/01/2018 – 3/20/2020, PI: Jeffrey W. Herrmann, Co-PIs: Shapour Azarm, Michael Otte, Huan Xu (Share: \$160,000)

- Minta Martin Fund (Clark School), High-stakes motion relearning and replanning, \$75,000, 09/18 – 08/19, PI: Michael Otte (Share: %100).

#### II.J.2. Contracts

- Navair NAWCAD, Safely Landing Autonomous UAVs on Naval Vessels in Emergency Scenarios, \$160,000, 12/7/20–9/30/21, PI: Michael Otte (Share: %100).
- Defense Advanced Research Projects Agency, Robust Semi-Autonomous Swarm Tactics for Situational Awareness in Uncertain Environments, \$430,407, 9/21/18–6/30/20, PI: Huan Xu. Co-PIs: Dinesh Manocha, Ming Lin, Michael Otte (Share: \$101,752.50).

#### II.K. Gifts, and Funded Research not administered by ORA

##### II.K.4 Others

- Office of Naval Research, Autonomous Multi-Agent Search and Rescue in Unpredictable Contested Environments, \$300,000, FY16 – FY17, PI: Don Sofge, co-PI: Michael Otte (Share: \$220,000).

#### II.P. Research Fellowships, Prizes, and Awards

- Senior Member, American Institute of Aeronautics and Astronautics (AIAA), since 2024.
- Senior Member, The Institute of Electrical and Electronics Engineers (IEEE), since 2024.
- Best Faculty Advisor Award, University of Maryland, Department of Aerospace Engineering, 2023.
- Best Paper Finalist (1 of 3), IEEE International Symposium on Multi-Robot and Multi-Agent Systems (MRS), 2019. [MRS conference acceptance rate was 33% in 2019]
- National Research Council RAP Postdoctoral Associate, 2016-2018.
- Graduate Student Research Community Development Award. University of Colorado at Boulder, Dept. Computer Science. 2009

### **III. Teaching, Extension, Mentoring and Advising**

#### III.A. Courses Taught

- ENAE 788V: Motion Planning for Autonomous Systems (Sp18, Sp19, Sp20, Sp21). (Autonomous systems, e.g., aircraft, vehicles, manipulators, and robots, must plan long-term movement that respects environmental constraints such as obstacles, other actors, and wind; system constraints such as kinematics, dynamics, and fuel; as well as factors such as time and safety. Robust autonomy also requires dealing with environmental changes, new information, and uncertainty. This course provides an overview of such problems and the methods used to solve them.). Course evaluations:  
Sp23 = 3.75 (first questions) or 3.56 (all questions) (6 students in class, 2 responding to survey);



Sp23 = 3.18 (first questions) or 3.36 (all questions) (11 students in class, 4 responding to survey);

Sp22 = 3.38 (first questions) or 3.53 (all questions) (16 students in class, 10 responding to survey);

Sp21 = 3.4 (14 students in class, 13 responding to survey);

Sp20 = 3.54 (15 students in class, 6 responding to survey);

Sp19 = 3.23/3.544 (20 students in course, 12 responding to survey);

Sp18 = 3.35/3.37 (14 students in course, 4 responding to survey).

- ENAE 403: Aircraft Dynamics (Fa18, Fa19, Fa20, Fa21, Fa22, Fa23). (This is a required senior level course for undergraduate Aerospace Engineering students on the “Air Track” (Aerospace Undergraduates must pick between “Air Track” and “Space Track” During their 3rd year). This course covers the study of motion of aircraft, equations of motion, aerodynamic force representation, longitudinal and lateral motions, response to controls and to atmospheric disturbances, handling qualities criteria and other figures of merit). Course evaluations:  
Fa23 = 3.46 (first 6 questions) or 3.49 (all questions) (41 students in course, 13 responding to survey);  
Fa22 = 3.1 (first 6 questions) or 3.16 (all questions) (66 students in course, 12 responding to survey);  
Fa21 = 3.0 (65 students in course, 25 responding to survey);  
Fa20 = 3.12 (77 students in course, 33 responding to survey);  
Fa19 = 2.36/3.24 (66 students in course, 34 responding to survey);  
Fa18 = 2.124/3.228 (49 students in course, 18 responding to survey).
- ENAE 488O/788O: Selected Topics in Aerospace Engineering; Introduction to Autonomous Multi-Robot Swarms (Sp23). (Overview of problems, applications, and methods for autonomous multi-robot swarms, including coordination, cooperation, navigation, planning, control, and distributed sensing. This course will also cover different organizations of multi-robot swarms and the concept of emergent behavior. Assignments will involve programming the behavior of multi-robot swarms in simulation and in testbeds.) Course evaluations:  
Sp24 (488O) = 4.0 (first 6 questions) or 4.0 (all questions) 14 students in course, 1 responding to survey);  
Sp24 (788O) = 2.6 (first 6 questions) or 2.85 (all questions) (5 students in course, 3 responding to survey);  
Sp23 (488O) = 3.4 (first 6 questions) or 3.39 (all questions) (15 students in course, 6 responding to survey);  
Sp23 (788O) = 3.21 (first 6 questions) or 3.32 (all questions) (5 students in course, 4 responding to survey);
- ENPM 661: Planning for Autonomous Robots (Sp17). (Planning is a fundamental capability needed to realize autonomous robots. Planning in the context of autonomous robots is carried out at multiple different levels. At the top level, task planning is performed to identify and sequence the tasks needed to meet mission requirements. At the next level, planning is performed to determine a sequence of motion goals that satisfy individual task goals and constraints. Finally, at the low-

est level, trajectory planning is performed to determine actuator actions to realize the motion goals. Mobile robots will be used as examples to illustrate the concepts during this course. However, techniques introduced in the course will be equally applicable to robot manipulators.). Course evaluations: Sp17 = 3.43/3.374 and 4/3.374 (41 students in course across all sections, sections 0101 and SM01 with 17 and 1 students responding to survey, resp.).

### III.B. Teaching Innovations

#### III.B.6. Course or Curriculum Development

- ENAE 403: Aircraft Dynamics. Fall 2019: new textbook, new slides, added glider project. Fall 2020: mastery system, new homeworks and evaluation materials.
- ENAE 788V: Motion Planning that was aimed at a robotics audience, I added new material, lectures, homeworks and refocused the course for students from across Engineering and Computer Science.
- ENAE 7488O/788O: Designed new project-based aerospace course course on swarm robotics.

### III.C. Advising: Research

#### III.C.1. Undergraduate

*Undergraduate Honors Research Advisor (graduated):*

1. Jordan Kreh (2023-2024), ENAE Undergraduate Honors Research, “Hitting a Moving Target: Autonomous Path Planning Methods For an Evolving Environment” — *winner of the UMD Honors College Winston Family Honors Award for Outstanding Honors Thesis in 2024.*
2. Ryland Lillibridge (2020-2021) ENAE Undergraduate Honors Research, “Anonymous Routing and Node-Relative Navigation with Scale-Invariant Path Encoding on Sparse Physical-Agent Networks”
3. William Sherman (2019-2021) ENAE Undergraduate Honors Research, “Crazyswarm: Micro Air Vehicles in Formation Flight”
4. Noah Schultz (2018-2020), ENAE Undergraduate Honors Research, “Motion planning for UAVs in caves.”

*Undergraduate Summer, Independent, or Internship Research Advisor (completed):*

5. Brian Lee (2018), Paid Undergraduate Research Internship as part of the OFF-SET program (Co-advised with Prof. Huan Xu).
6. Kevin Lin (2018-2019), Paid Undergraduate Research Internship Topic “Multi-agent sensing and planning with Turtlebot robots.”
7. Andres Christensen (2018), Paid Undergraduate Research Internship Topic “Controllers for quadrotors with failing motors.”
8. Darius Lukas (2018) ASPIRE Summer Research Topic “Using and integrating turtlebots and sensors in ROS”
9. Zachary Hoover (2018-2019), ENAE AEROS Summer Research Topic “Collective transport with a multi-agent swarm.”

10. Brian Lee (2019), Paid Undergraduate Research Internship Topic “Swarm sensing.”
11. Savya Konkalmatt (2019-2020), ENAE Elective Research Topic “Emulating maze solving capabilities of slime molds using a swarm of kilobots.”
12. Richard Yu (2019-2020), ASPIRE Summer Research Topic & ENAE Elective Research Topic “Motion planning on a Turtlebot.”
13. James Bollinger (2019-2020), ENAE Elective Research Topic “Zombie Population Dynamics using a Kilobot Simulator.”
14. Paul Motter (2019-2020), CMCS Independent Undergraduate Research & Paid Research Internship Topic “Sailing a boat through a macroscopic smart-fluid composed of a robot swarm.” Presented at the International Symposium of Experimental Robotics (ISER) 2020.
15. Chris Martinez Reina (2020), ASPIRE Summer Research Topic “April tag recognition with openCV in Gazebo.”
16. Jared Allanigue (2020), ASPIRE Summer Research Topic “Adversarial hacking of Boid’s flocking algorithm using a Kilobot simulator.”
17. Leon Stevenson (2020), COTS Summer Research Topic “Determining the source of a signal in a Kilobot simulator.”
18. Mya Thompkins (2020), MDSGC Summer Research Topic “Predator and prey in a Kilobot simulator.”
19. Darius Lukas (2020), Paid Undergraduate Research “Adversarial hacking of distributed consensus algorithms using a Kilobot simulator.”
20. Hridoy Rozario (2020), ENAE AEROS Summer Research Topic “Adversarial hacking of smart materials using a Kilobot simulator.”
21. Neel Godhani (2020), ENAE Elective Research Topic “Disributed detection of malfunctioning sensors in a robot swarm.”
22. Miles Jones (2021), ASPIRE and AEROS Summer Research Topic “Interactions Between Emergent Behaviors in Robot Swarms.”
23. Charles Demery (2021), MDSGC Summer Research Topic “Interactions Between Emergent Behaviors in Robot Swarms.”
24. Marvellous Achugbu (2021), JET Summer Research Topic “Emergent Behaviors in Robot Swarms.”
25. Chris Martinez Reina (2021), Paid Undergraduate Research Internship Topic “Experimental Validation of Hacking Robot Swarms.”
26. Justin DeVito (2021), CMSC Elective Research Topic “Integrating a Lever Servo with a Turtlebot3.”
27. David Kirkpatrick (2022), MDSGC Summer Research Topic “Painterbot: Tracing Images With Bzier Curves Using Turtlebot3.”
28. Nigel Campbell-Christie (2022), MDSGC Summer Research Topic “Interaction Between Environmental Factors.”
29. Tom West (2022), ENAE AEROS Summer Research Topic “Emergant ID sorting of kilobots.”

30. Favour Madu (2022-2023), COTS Summer Research Topic and LSAMP Research Topic “Turtlebots and Sinesthesia.”
31. Robert Baratta (2023), ASPIRE Research Topic “Restabilizing a Quadcopter After Single Rotor Failure.”
32. Han Yang (2023-2024) “Trajectory Tracking while Stabilizing an Inverted Pendulum on a Quadcopter Using Model-Predictive Control.” Accepted to 2024 AIAA SciTech Forum.
33. Zachary Friedman-Hill (2023), Paid Undergraduate Research Internship Topic “Algorithms and Experiments with Kilobot Robot Duos.”
34. Emily Kosloski, Sam Collins, Jaxon Lee, Jeffrey Xu, Jordan White, Luke Rose, Nicholas Sremac Saari, Aidan English, Raed Ahmed, Addison Harrattie (2023), ARL Summer Student Team Research “Robot-drop challenge.”
35. Ayomikun Fadina (2023) MDSGC Summer Research Topic “Racing Kilobot robots.”
36. Kaitlyn Reidy (2023) COTS and ASPIRE Summer Research Topic “Emergent Behaviors in Kilobots.”
37. Sneha Alicia Sunilkumar (2023) COTS and ASPIRE Summer Research Topic “Sharks and Minnows (with swarms of Kilobot Robots).” Presented at 2023 AIAA Young Professionals, Students, and Educators Conference (YPSE).

*Undergraduate Honors Research Advisor (in progress):*

38. Gemstone Team OARS, members: Liam Allen, Mats Luk De Lausnay, Jakub Gelvanovski, Griffin Thomas Hevesy, Vijay Jetton, Akshith R Kantareddy, Patrick Miller, Harald Park, Kush Patel, Aditya Prashanth, Aaron Webb. *Gemstone is a four-year team-based multidisciplinary honors program. The team I advise (Team OARS) will be Juniors in the 2024-2025 academic year. Team OARS won first place in the 2024 University Libraries Award For Outstanding Gemstone Team.*

### III.C.2. Masters

*M.S. Thesis Advisor (graduated):*

1. Ryan Ernandis (2018-2020, ENAE), M.S. Dissertation “Sampling based motion planning for minimizing uncertainty with Stewart platforms.” Placement: Astrobotic. [Advisor]
2. Akshay Vinay Bapat (2019-2020, ENSE), M.S. Dissertation “Development of a multi-agent task allocation algorithm for low communication scenarios.” Placement: Magna International. [Co-Advisor with Jeffrey Herrmann]
3. Aditya Savio Paul (2019-2020 University of Tartu, Estonia), M.S. Dissertation “Autonomous motion planning for spacecrafts near small solar systembodies: simultaneously refining the gravitational field model andre-planning gravity dependant maneuvers.” Placement: Tartu Observatory. [External Co-Advisor]
4. Loy McGuire (2018-2021, ENAE), M.S. Dissertation “Overcomming local minima through viscoelastic fluid-inspired swarm behavior.” Placement: On-going Ph.D. student. [Advisor]

5. Anshuman Singh (2020-2021, ENSE), M.S. Dissertation “Proof of concept for pair based approach for swarm robotics.” Placement: Ulendo Software Solutions for Manufacturing Automation. [Co-Advisor with Huan Xu]

*M.S. (Non-Thesis Option) Advisor (graduated):*

6. Sharan Nayak (2018-2020, ENAE), M.S. Non-Thesis Option, Placement: First continued on as a Ph.D. student, defended Ph.D. in 2023, now at SpaceX. [Advisor]
7. Alex Mendelsohn (2018-2023, CMCS), M.S. Non-Thesis Option, Placement: Ongoing Ph.D. student. [Advisor]

*Master’s Paid Internship Research Advisor (completed):*

8. Pranav Dhulipala (2018, OAEE), M.E. Paid Research Internship, DARPA OFFSET. Placement: Microsoft [Co-advised with Huan Xu]
9. Shivang Patel (2018–2019, OAEE), M.E. Paid Research Internship, DARPA OFFSET. Placement: University of West Virginia Ph.D. Program. [Co-Advised with Huan Xu]
10. Manas Gupta (2018–2019, OAEE), M.E. Paid Research Internship, DARPA OFFSET. Placement: Torc Robotics [Co-advised with Huan Xu]
11. Alkesh Kumar Srivastava (2021-2023, MAGE), M.E. Paid Research Internship. Placement: Temple University Ph.D. Program [Advisor]

*M.S. Thesis Committee Member:*

12. Joshua Shaffer (2019, ENAE) M.S. Thesis “Expanding constrained kinodynamic path planning solutions through recurrent neural networks.” [Committee]
13. Ruchir Patel (2019, ENME) M.S. Thesis “Multi-vehicle route planning for centralized and decentralized systems.” [Committee]
14. Derek Bertrand Thompson (2020, ENAE) M.S. Thesis “Robust Control of an Evtol Through Transition with a Gain Scheduling LQR Controller.” [Committee]
15. Midhun Varghese (2021, ENME) M.S. Thesis “Manufacturing and experimental characterization of a bioinspired metamaterial for soft robotics applications. [Committee]
16. Yash Bansod (2021, ENMS) M.S. Thesis “.” [Committee]
17. Oghenetekewe Akoroda (2021, ENME) M.S. Thesis “A method for improving decentralized task allocation for multiagent systems in low-communication environments.”
18. Samuel Langlois (2021, ENME) M.S. Thesis “Decentralized multiagent metareasoning applications in task allocation and path Finding.” [Committee]
19. Eashwar Sathyamurthy (2021, ENSE) M.S. Thesis “Multi-Flight Algorithms for Multi-UAV Arc Routing Problem” [Committee]
20. Nathan Toombs (2022, ENAE) M.S. Thesis “Autonomous Estimation and Guidance of an Amphibious Quadrotor for Bistatic Underwater Laser Imaging.” [Committee]



21. Srijal Shekhar Poojari (2023, ENSE) M.S. Thesis “Outdoor Localization and Path Planning for Repositioning a Self-Driving Electric Scooter.” [Committee]
22. Siddharth Gopal (2023, ENSE) M.S. Thesis “Learning Meta reasoning Policies for Motion Planning.” [Committee]
23. Evan Harris Feinberg (2023, ENAE) M.S. Thesis “Examining the Passive Stiffness Workspace for Variable-Stiffness Robots.” [Committee]
24. Ruth Gomez Quezada (2023, ENAE) M.S. Thesis “Fault Detection and Emergency Path Planning for Fixed Wing UAVs.” [Committee]
25. Sidney Leigh Molnar (2024, ENSE) M.S. Thesis “Metareasoning Strategies to Correct Navigation Failures of Autonomous Ground Robots.” [Committee]
26. Cashen Diniz (2024, ENME) M.S. Thesis “Denoising the Design Space: Diffusion Models for Accelerated Airfoil Shape Optimization.” [Committee]
27. Ahmed Mohamed Mohamed Elanwar Ashry (2024, ENAE) “Indoor Target Search, Detection, and Inspection with an Autonomous Drone.” [Committee]

*M.S. Thesis Advisor (in progress):*

28. Miles Jones (2023–present, ENAE) [Advisor]

### III.C.3. Doctoral

*PhD Thesis Advisor (graduated):*

1. Sharan Nayak (2018–2023), Ph.D. Dissertation “Fast Feasible Motion Planning Without Two-Point Boundary Value Solution.” Placement: Space Exploration Technologies Corporation (SpaceX). [Advisor]

*PhD Thesis Advisor (in progress):*

2. Mohamed Khalid (2018–present, ENAE), Ph.D. Dissertation Research in progress [Advisor]
3. Ollie Rodriguez (2019–present, ENAE), Ph.D. Dissertation Research in progress [Advisor]
4. Loy McGuire (2020–present, ENAE), Ph.D. Dissertation Research in progress [Advisor]
5. Dalan Loudermilk (2020–present, ENAE), Ph.D. Dissertation Research in progress [Advisor]
6. Alex Mendelsohn (2021–present, CMCS), Ph.D. Dissertation Research in progress [Advisor]
7. Yi-Hsuan Chen (2022–present, ENAE), Ph.D. Dissertation Research in progress [Advisor]

*PhD Thesis Committee Member:*

8. Lin Zhenyu, (2019, ECE), Ph.D. “Planning, Monitoring and learning with safety and temporal constraints for robotic systems.” [Committee]
9. Eliot Rudnick-Cohen, (2019, ENME), Ph.D. “Combined Robust Optimal Design, Path and Motion Planning for Unmanned Aerial Vehicle Systems Subject to Uncertainty.” [Committee]
10. Brian Free (2019, ENAE), Ph.D. “Bioinspired Sensing and Control for Underwater Pursuit.” [Committee]

11. Estefany Carrillo (2021,ENAE), Ph.D. “Controller Synthesis and Formal Behavior Inference in Autonomous Systems.” [Committee]
12. Miguel Alvarez (2021,ENME), Ph.D. “Trajectory Optimization of a Tethered Underwater Kite.” [Committee]
13. Fouad Sukkar (2022, University of Technology Sydney, Australia), [Examiner]
14. Tin Lai (2022, University of Sydney, Australia), [Examiner]
15. Jacek Garbulinski (2022,ENAE), Ph.D. “Extensile Fluidic Artificial Muscles in Payload-Carrying Continuum Soft Robots.” [Committee]
16. Anthony Thompson (2023,ENAE), Ph.D. “Dynamics and Control of Bioinspired Swimming, Schooling, and Pursuit.” [Comittee]
17. Jacek Garbulinski (2023,ENAE), Ph.D. “Extensile Fluidic Artificial Muscles in Payload-Carrying Continuum Soft Robots.” [Comittee]
18. Kwun Yiu Cadmus To (2024), University of Technology Sydney, Australia, [Examiner]
19. Adarsh Jagan Sathyamoorthy (2024, CMCS), Ph.D. “Autonomous Robot Navigation in Challenging Real-World Indoor and Outdoor Environments.” [Committee]

#### III.C.4. Post-doctoral

1. George P. Kontoudis (2022-2023) Placement: Tenure Track Assistant Professor, Mechanical Engineering, Colorado School of Mines [Advisor]

#### III.C.5. Other Directed Research

(NOTE: the names of the high school *students* that I have advised are omitted in the list that appears below because the students were minors at the time of their internships in my lab.)

- Advisor of 5 students, High School Summer Research Internship from Poolsville High School, 2022.
- Advisor, ASEE Science and Engineering Apprenticeship Program intern from Thomas Jefferson High School (Alexandria, VA) 2019-2021
- Advisor, High School Summer Research Internship from Eleanor Roosevelt High School, 2021-2022.
- Advisor of 3 students, High School Summer Research Internship from Poolsville High School, 2021.
- Advisor, High School Summer Research Internship from Dunbar Engineering High School, DC Public, 2021.
- Advisor, High School Summer Research Internship from Wilson Computer Science High School, DC public, 2021.
- Advisor of 2 students, High School Summer Research Internship from Poolsville High School, 2020.
- Advisor, High School Summer Research Internship from Montgomery Blair High School, Silver Spring, Maryland , 2019.

- Advisor, High School Summer Research Internship from St. Anselms Abbey School, Washington, DC, 2019.
- Advisor ASEE Science and Engineering Apprenticeship Program intern from Thomas Jefferson High School, Alexandria, VA, 2018-2019
- Co-Advisor ASEE Science and Engineering Apprenticeship Program intern from Thomas Jefferson High School, Alexandria, VA, 2016-2018.
- Advisor, Pinhead Institute Sponsored Summer Intern, Telluride High School, Telluride, Colorado, 2013.

### III.D. Mentorship

#### III.D.2. Other

- Mentor for a Graduate Student as part of “Robot Guru 3, Integrating Science Engineering , and Creativity Workshop”. At WAFR 2018, December 8th, Mérida, Mexico.
- ENAE100 Projects Advised
  - 2023, Advisor for 7 students (Co-advised with George Kontoudis): Julia Litovchick, Alexa Giantelli, Anirudh Chari, George Peregoy Elias Kischelev, Anirudh Chari, Ryan Saylor.
  - 2022, Advisor for 8 students: Jolicia Taylor, John Taylor, Isaac Paternostro Mora, Caleb Hyder, Ethan Paritz, Liam Allen, Samuel Badalov, Yohannes Gebrechirstos.
  - 2021, Advisor for 8 students: Ryan Abedi, Luke Bieneman, Evan Gary, Anthony Huynh, Kai McKeown, Minh Nguyen, Gabe Szybalski, Alexander Leyzerzon.
  - 2019, Advisor for 5 students: Akash Lujan, Matthew Visnich, Kirit Saroha, Dylan McPhillips, Arul Gnanasivam.
  - 2018, Advisor for 8 students: Sahil Kochar Jake Wilson Daniel Barteldes Yash Atitkar Darius Lukas Isaac Rose Ryan Buck Paola Herbas.

### III.E. Advising: Other than Research Direction

#### III.E.1. Undergraduate

##### Acedemic Advising

- Spring 2024, 19 students.
- Fall 2023, 23 students.
- Spring 2023, 16 students.
- Fall 2022, 25 students.
- Spring 2022, 19 students.
- Fall 2021, 22 students.
- Spring 2021, 17 students.
- Fall 2020, 14 students.
- Spring 2020, 8 students.
- Fall 2019, 8 students.

#### III.E.4. Post-doctoral

- Mentor for George P. Kontoudis (2022-2023). Placement: Tenure Track Assistant Professor, Mechanical Engineering, Colorado School of Mines.

### IV. Service and Outreach

#### IV.A. Editorships, Editorial Boards, and Reviewing Activities

##### IV.A.2. Editorial Boards

- Associate Editor, International Journal of Robotics Research (IJRR), 2023–present.
- Guest Editor, International Journal of Robotics Research (IJRR) WAFR Special Issue, 2023–2024.
- Guest Editor, Autonomous Robots (AURO), Springer, Robot Communication in the Wild: Real-World Problems, Systems, and Methods, 2017-2019.

##### IV.A.3. Reviewing Activities for Journals and Presses

International Journal of Robotics Research, IEEE RAS Transactions on Robotics, Journal of Field Robotics, Autonomous Robots, Journal of Aerospace Information Systems, Journal of Optimization Theory and Applications, Journal of Intelligent and Robotic Systems, Journal on Autonomous Agents and Multi-Agent Systems, ACM Transactions on Autonomous and Adaptive Systems, Computers and Electrical Engineering, IEEE Transactions on Automation Science and Engineering, Advances in Mechanical Engineering, IEEE Robotics and Automation Letters, IEEE Control Systems Letters, International Journal of Computer Engineering Research, International Journal of Advanced Robotic Systems, Sensors, IEEE Access, Robotics and Autonomous Systems, Swarm Intelligence, Internet of Things, Journal of Combinatorial Optimization, IEEE Transactions in Intelligent Vehicles, AIAA Journal of Aerospace Information Systems

##### IV.A.4. Reviewing Activities for Agencies and Foundations

National Science Foundation, Office of Naval Research, Netherlands Organisation for Scientific Research, European Research Council

##### IV.A.5. Reviewing Activities for Conferences

Robotics: Science and Systems Conference, International Symposium on Experimental Robotics, International Symposium on Distributed Autonomous Robotic Systems, International Symposium of Robotics Research, International Conference on Automated Planning and Scheduling, IEEE International Conference on Robotics and Automation, IEEE International Conference on Intelligent Robots and Systems, International Workshop on the Algorithmic Foundations of Robotics, International Symposium on Multi-Robot and Multi-Agent Systems, International Conference on Swarm Intelligence, The Conference on Robot Learning, IEEE Conference on Decision and Control, American Control Conference, Research in Applied Computation Symposium, Conference on Robot Learning

#### IV.B. Committees, Professional & Campus Service

##### IV.B.1. Campus Service – Department

- Member, Colloquium Committee, 2023–present
- Member, Merit Review Committee, 2022–2024
- Member, Faculty Search Committee, 2022–2023
- Faculty Commencement Usher, Aerospace Dept. Representative, Spring 2022
- Coordinator, Aerospace Graduate Student First Year Student Monthly Luncheon, 2022–2023
- Coordinator, Aerospace Graduate Student Women and Underrepresented Student Monthly Luncheon, 2022–present
- Member, Lab/Hardware/Software Curriculum Committee, 2022–present
- Member, Dynamics/Controls/Autonomy Curriculum Committee, 2019–present

#### IV.B.2. Campus Service – College

- Coordinator, Clark School Junior Faculty Monthly Luncheon, 2020–2023
- Member, Maryland Robotics Center (MRC) Executive Committee, 2023–present
- Member, Maryland Robotics Center (MRC) Future Leaders in Robotics and AI Seminar Series Committee, 2022–present

#### IV.B.3. Campus Service – University

- Aerospace (ENAE) TTK representative, University Senate, 2022–2024

#### IV.B.8. Leadership Roles in Meetings and Conferences

##### *Chair/Co-Chair:*

- 2024 Maryland Robotics Center Research Symposium Industry Night (Co-Chair). College Park, Maryland.
- 2023 Maryland Robotics Center Research Symposium (Chair). College Park, Maryland. *As part of this role I also organized the inaugural UMD MRC Research Symposium Industry Night.*
- 2022 International Workshop on the Algorithmic Foundations of Robotics (WAFR) (Co-Chair). College Park, Maryland.

##### *Organizing Committee Member:*

- 2024 17th International Symposium on Distributed Autonomous Robotic Systems (DARS) (Program Chair). Manhattan, New York.
- 2024 4th IEEE International Symposium on Multi-Robot and Multi-Agent Systems (IEEE MRS) (Award Committee Member). Boston, Massachusetts.
- 2023 Communication Challenges in Multi-Robot Systems: Perception, Coordination, and Learning: Meeting the Challenges of Real-World Systems (Co-Organizer). Workshop At 2023 International Conference on Robotics and Automation (ICRA). London, United Kingdom.
- 2018 15th International Symposium on Distributed Autonomous Robotic Systems (DARS) (Publication Chair). Boulder, Colorado.
- 2017 Robot Communication in the Wild: Meeting the Challenges of Real-World Systems (Co-Organizer). Workshop At 2017 Robotics Science and Systems. Cambridge, Massachusetts.

##### *Associate Editor:*



- 2024 International Conference on Intelligent Robots and Systems (IROS). Abu Dhabi, UAE.
- 2024 International Conference on Robotics and Automation (ICRA). Yokohama, Japan.
- 2023 International Conference on Intelligent Robots and Systems (IROS). Detroit, Michigan.
- 2023 International Conference on Robotics and Automation (ICRA). London, United Kingdom.
- 2022 International Conference on Intelligent Robots and Systems (IROS). Kyoto, Japan.
- 2022 International Conference on Robotics and Automation (ICRA). Philadelphia, Pennsylvania.
- 2021 International Conference on Intelligent Robots and Systems (IROS). Prague, Czech Republic.
- 2021 International Conference on Robotics and Automation (ICRA). Xi'an, China.
- 2020 International Conference on Intelligent Robots and Systems (IROS). Las Vegas, Nevada.
- 2020 International Conference on Ubiquitous Robot. Kyoto, Japan.
- 2020 International Conference on Robotics and Automation (ICRA). Paris, France.

*Area Chair/Co-Chair:*

- 2021 Robotics: Science and Systems (RSS). Held Virtually due to Covid-19.
- 2019 International Symposium on Multi-Robot and Multi-Agent Systems (MRS). New Brunswick, New Jersey

*Session Chair/Co-Chair:*

- 2023 International Symposium on Distributed Autonomous Robotic Systems (DARS). Montbéliard, France.
- 2023 International Conference on Robotics and Automation (ICRA-Planning). London, United Kingdom.
- 2014 International Conference on Automated Planning and Scheduling (ICAPS-Robotics). Portsmouth, New Hampshire
- 2013 IEEE/RSJ International Conference on Intelligent Robots and Systems (ICRA-Navigation). St. Louis, Missouri
- 2009 IEEE/RSJ International Conference on Intelligent Robots and Systems (ICRA-Navigation and Path Planning). St. Louis, Missouri
- 2007 IEEE/RSJ International Conference on Intelligent Robots and Systems (ICRA-Navigation and Path Planning). San Diego, California

*Conference Program Committee Member:*

- 2021 Robotics: Science and Systems (RSS). Held Virtually due to Covid-19.
- 2020 International Workshop on the Algorithmic Foundations of Robotics (WAFR). Oulu, Finland.

- 2016 International Symposium on Experimental Robotics (ISER). Tokyo, Japan
- 2014 International Symposium on Experimental Robotics (ISER). Marrakech and Essaouira, Morocco
- 2014 International Conference on Automated Planning and Scheduling (ICAPS). Portsmouth, New Hampshire
- 2013 International Conference on Automated Planning and Scheduling (ICAPS). Rome, Italy
- Member, IEEE Technical Committee on Multi Robot Systems, 2014–present

#### IV.C. External Service and Consulting

##### IV.C.3. Corporate and Other Board Memberships

- Pinhead Science Advisers (National Advisory Board). Pinhead Institute. Telluride, Colorado. 2015-present

#### IV.D. Non-Research Presentations

##### IV.D.1. Outreach Presentations

9. Robots. *The Pinhead Institute's Scholars in the Schools Program*, March 2013. Naturita Elementary School. Naturita, Colorado.
8. Robots. *The Pinhead Institute's Scholars in the Schools Program*, March 2013. Norwood Elementary School. Norwood, Colorado.
7. Robots. *The Pinhead Institute's Scholars in the Schools Program*, March 2013. Telluride Mountain School. Telluride, Colorado.
6. Robots. *The Pinhead Institute's Scholars in the Schools Program*, March 2013. Telluride Intermediate School. Telluride, Colorado.
5. Robots and artificial intelligence. *The Pinhead Institute's Scholars in the Schools Program*, May 2012. Ridgway Secondary School. Ridgway, Colorado.
4. Robots and artificial intelligence. *The Pinhead Institute's Scholars in the Schools Program*, May 2012. Telluride High School. Telluride, Colorado.
3. Robots and artificial intelligence. *The Pinhead Institute's Scholars in the Schools Program*, May 2012. Pinhead Institute Science Soiree. Telluride, Colorado.
2. Robots and artificial intelligence, March 2012. Art and Science. Cambridge, Massachusetts.
1. Robots and artificial intelligence, February 2012. Aspen Rotary Club. Aspen, Colorado.

#### IV.E. Media Contributions

##### IV.E.4. Digital Media

- Press Release, A James Clark School of Engineering, *interviewee*, “Disaster Pending” by Maggie Haslam.  
<https://eng.umd.edu/disaster-pending>
- Press Release, Department of Aerospace Engineering, “Nayak, Redhal Receive Outstanding Research Assistant Awards,” January 8, 2021.

- <https://aero.umd.edu/news/story/nayak-redhal-receive-outstanding-research-assistant-awards>
- Press Release, Department of Aerospace Engineering, *interviewee*, “Survivability as a sensor,” September 22, 2020.  
<https://aero.umd.edu/news/story/survivability-as-sensor>
  - Fall’20 Newsletter, UMD Maryland Robotics Center, *interviewee*, “Assessing Auction Algorithms in Lossy Conditions,” Fall, 2020, page 8.  
<https://view.publitas.com/maryland-robotics-center/maryland-robotics-center-mrc-news-fall-2020/page/8-9>
  - Press Release, Institute for Systems Research, “Clark School team wins AFRL funding for swarm autonomy planning and metareasoning,” December 11, 2018.
  - Engineering.com, “How Do You Make a Robot Swarm Smile?” December 10, 2018.  
<https://www.youtube.com/watch?v=da0x13mnFvU&feature=youtu.be>
  - Engineering.com, “Robots with a Group Mind Swarm with a Smile,” by Meghan Brown, December 5, 2018.  
<https://www.engineering.com/DesignerEdge/DesignerEdgeArticles/ArticleID/18127/Robots-with-a-Group-Mind-Swarm-with-a-Smile.aspx>
  - Press Release, A James Clark School of Engineering, *interviewee*, “It takes a swarm: These robots talk to each other, make decisions as a group,” November 7, 2018.  
<https://eng.umd.edu/news/story/it-takes-a-swarm-these-robots-talk-to-each-other-make-decisions-as-a-group>
  - The Diamondback, *interviewee*, “UMD researchers will help create drones and surveillance tools after getting federal grant” by Lindsey Feingold, April 5, 2018.
  - Press Release, Maryland Robotics Center, “Maryland researchers awarded DARPA cooperative agreement to develop robotic swarm strategies,” April 3, 2018.
  - PC magazine, *interviewee* “Light Shows Look Cool, But How Do They Work?” By S.C. Stuart, January 22, 2018.  
<https://www.pcmag.com/news/358651/drone-light-shows-look-cool-but-how-do-they-work>

## V. Other Information

### Academic and/or Research UMD Awards My Students Have Won

- Mohamed Khalid Mohamed Jaffar (ENAE PhD student), UMD Ann G. Wylie Dissertation Fellowship, 2024.
- Gemstone Team OARS (Gemstone Honors Team), first place in the University Libraries Award For Outstanding Gemstone Team, 2024.

- Jordan Kreh (ENAE BS Honors student), UMD Honors College Winston Family Honors Award for Outstanding Honors Thesis, 2024.
- Sharan Nayak (ENAE PhD student), Clark Clark Doctoral Fellowship 2020-2023.
- Sharan Nayak (ENAE MS student — before becoming a PhD student), Outstanding Research Assistant Award 2020-2021.

Other (non-academic and non-research) UMD Awards My Students Have Won

- Motion and Teaming Lab, first place, UMD Aerospace Dept. Aerolympics, 2023.

Other (non-academic and non-research) UMD Awards

- Michael Otte, first place, Aerospace Dept. Annual Chili Cook-Off, 2024.
- Michael Otte, first place, Aerospace Dept. Annual Chili Cook-Off, 2023.