Onur Bagoren

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onur-bagoren | onurbagoren | Google Scholar | U.S. Citizen

Ann Arbor, MI - 48104, USA

Education

- **University of Michigan** *May 2023 - Present*
  Ph.D. in Robotics Ann Arbor, MI, USA
  - GPA: 4.00/4.00
  - Relevant Coursework: Advanced Topics in Computer Vision; Autonomous Vehicles

- **University of Michigan** *August 2021 - May 2023*
  M.S. in Robotics Ann Arbor, MI, USA
  - Grade: 3.87/4.00
  - Relevant Coursework: Deep Learning for Computer Vision; Mobile Robotics; Information Theory; Statistical Inference, Estimation, and Learning; Trajectory Optimizaion; Learning for Robot Control

- **University of Rochester** *August 2015 - April 2019*
  B.S. in Mechanical Engineering Rochester, NY, USA
  - Grade: 3.58/4.00
  - Minor in Computer Science

Publications

C=Conference, J=Journal, P=Patent, S=In Submission

[S.1] **Bagoren, O.***, Isaacson, S.*, Sundar, S., Sun, Y.C., Sheppard, A., Ma, H., Shariff, A., Vasudevan, R., Skinner, K. A., "SurfSLAM: Sim-to-Real Underwater Stereo Reconstruction For Real-Time SLAM" *In Submission*, 2026

[J.1] Sethuraman, A.V., Rucker, M., **Bagoren, O.**, Kung, P. C., Amutha, N.N.B., Skinner, K. A., Skinner, K. A., "SonarSplat: Novel View Synthesis of Imaging Sonar via Gaussian Splatting" IEEE Robotics and Automation Letters, 2025

[J.2] Sethuraman, A.V., Sheppard, A., **Bagoren, O.**, Pinnow, C., Anderson, J., Havens, T. C., Skinner, K. A., "Machine Learning for Shipwreck Segmentation from Side Scan Sonar Imagery: Dataset and Benchmark" the International Journal on Robotics Research, 2024

[C.1] Song, J., Ma, H., **Bagoren, O.**, Sethuraman, A.V., Zhang, Y., Skinner, K. A., "OceanSim: A GPU-Accelerated Underwater Robot Perception Simulation Framework" *International Conference on Intelligent Robots and Systems (IROS) 2025*

[C.2] **Bagoren, O**, Micatka, M., Skinner, K.A., Marburg, A. "PUGS: Perceptual Uncertainty for Grasp Selection in Underwater Environments". *IEEE International Conference on Robotics and Automation (ICRA) 2025 Conference Proceedings*

[C.3] Sethuraman, A.V.*, **Bagoren, O.***, Seetharaman, H., Richardson, D., Taylor, J., & Skinner, K.A. (2024). "VAIR: Visuo-Acoustic Implicit Representations for Low-Cost, Multi-Modal Transparent Surface Reconstruction in Indoor Scenes". *IEEE International Conference on Robotics and Automation (ICRA) 2025 Conference Proceedings* (* denotes equal contribution)

[C.4] Song, J.*, **Bagoren, O.***, Andigani, R., Sethuraman, A.V., Skinner, K. A. "TURTLMap: Real-time Localization and Dense Mapping of Low-texture Underwater Environments with a Low-cost Unmanned Underwater Vehicle" *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2024 Conference Proceedings* (* denotes equal contribution)

[C.5] Song, J.*, **Bagoren, O.***, Skinner, K. A. "Uncertainty-Aware Acoustic Localization and Mapping for Underwater Robots" *IEEE/MTS OCEANS Conference and Exhibition Proceedings, 2023* (* denotes equal contribution)

Experience

- **Applied Physics Lab at the University of Washington [🌐]** *May 2024 - August 2024*
  Research Intern Seattle, WA
  - Worked with Dr. Aaron Marburg and the Ocean Perception and Autonomy Lab (OPAL) on deep-sea manipulation,
  - Researched enabling fine-grained underwater manipulation, helping with experiments in a test-tank setup to emulate real-world scenarios,
  - Investigated learning-based representations for uncertainty modeling to enable improved manipulation under high amounts of perceptual uncertainty,
  - Work from the internship was published at the 2025 IEEE International Conference on Robotics and Automation (ICRA).
- **Field Robotics Group at the University of Michigan [🌐]** *August 2021 - May 2023*
  Graduate Student Researcher Assistant Ann Arbor, MI
  - Worked with Dr. Katherine Skinner throughout my master's degree, leading research projects, supporting engineering development, and running field test operations.
  - Specialty in probabilistic and learning methods for 3D reconstruction, visual SLAM, and sensor fusion.
  - Developed novel uncertainty-aware localization and 3D mapping methods for underwater robots operating in highly unstructured and dynamic environments, enhancing navigation accuracy by 24%.
  - Advanced robust acoustic and inertial SLAM methodologies coupled with dense 3D mapping for marine robots operating in low-textured environments, improving navigation accuracy by 62.5%
  - Research and contributions led to conference proceedings in scientific and robotic conferences.
- **iRobot Corporation [🌐]** *May 2019 - May 2021*
  Test Engineer Bedford, MA, USA
  - Led data-driven test development across the testing department, implementing supervised learning methods for hardware failure mode detection. The initiative resulted in **decreasing test time by 75%** on certain module-level tests, using models trained on historical system-level test data.
  - Designed test plans for defining validation metrics for the next-gen mobile floor care robots.
  - Promoted within a year for involvement in completing two major projects that prevented the halt of manufacturing; key contributions were the automation of data collection, visualization, and analysis using custom built software packages.

Selected Projects

Full list of projects can be found here

- **Factor Graph Initialization Methods for Underwater SLAM** *February 2023 - May 2023*
  Tools: Nonlinear Optimization, ROS, GTSAM [🐙]
  - Developed a novel factor graph initialization technique utilizing Invariant Kalman Filters (InEKF)
  - Integrated the measurement and noise model of a Doppler Velocity Logger (DVL) into the Python binding of GTSAM, a nonlinear optimization and factor graph package
  - Demonstrated the method on an underwater cave exploration dataset, showing that using inertial-only sensors performed as well as Simultaneous Localization and Mapping (SLAM) methods that used exteroceptive sensors

Honors and Awards

- **Technical Session Chair** *September 2025*
  IEEE OCEANS 2025 Great Lakes [🌐]
  - Acted as the technical chair for three sessions: *Artificial Intelligence & Machine Learning for Ocean & Great Lakes*; *Ocean Exploration*; and *Sonar Imaging*.
- **Spotlight Speaker at the 2025 Doctoral Consortium** *May 2025*
  IEEE International Conference on Robotics and Automation (ICRA) [🌐]
  - Was selected for a spotlight presentation for work on the thesis topic of "Perceptual Uncertainty for Marine Autonomy".
- **Rackham Graduate Student Fellowship** *September 2023*
  Rackham Graduate School, University of Michigan [🌐]
  - Graduate student fellowship awarded to students in their first year of their Ph.D.
- **Student Poster Competition Finalist** *June 2023*
  OCEANS 2023, Limerick [🌐]
  - Accepted into the student poster competition at the OCEANS 2023, Limerick conference for my collaborated work on uncertainty aware localization and mapping for underwater robots

Invited Talks

- **"Robot Navigation in Underwater Environments"** *March 2026*
  Invited Guest Lecture for ROB 572: Marine Robotics
- **"Adaptive Multi-modal Sensing for Marine Autonomy"** *March 2025*
  Invited Guest Lecture for EECS 542: Advanced Topics in Computer Vision
- **"Perception for Marine Robotics"** *September 2025*
  Invited Guest Lecture for ROB 330: Localization, Mapping, and Navigation
  ◦ Invited to give a talk on the use of deep generative models for sensor fusion.
- **"Multi-Sensor Fusion"** *April 2025*
  Invited Guest Lecture for ROB 599: Deep Learning for Robot Perception [🌐]
  ◦ Invited to give a talk on the use of deep generative models for sensor fusion.
- **"Machine Learning for Shipwreck Detection from Robotically-Gathered Sonar Data"** *September 2024*
  Society of Naval Architects and Marine Engineers Conference [🌐]
  ◦ Invited to give a presentation on the advances my lab and I have made on the use of AI techniques for marine exploration.

Teaching Experience

- **Instructional Aide for ROB 572: Marine Robotics** *January 2026 - Current*
  Robotics Department, University of Michigan Ann Arbor, MI
  ◦ Assisting in teaching Marine Robotics
- **Graduate Student Instructor for ROB 550: Robotics Systems Lab** *January 2023 - May 2023*
  Robotics Department, University of Michigan Ann Arbor, MI
  ◦ Taught a graduate-level course on mobile robotics, manipulation, and computer vision. I ran 6-hour-long lab sessions, where I played a key role in supporting the software and hardware of the instructional lab.
  ◦ Nominated for the *Best Graduate Student Instructor* award in the College of Engineering.
- **Graduate Student Instructor for ROB 330: SLAM & Navigation** *May 2022 - December 2022*
  Robotics Department, University of Michigan Ann Arbor, MI
  ◦ Instructor for the pilot offering of an undergraduate-level course on robot navigation, helping develop the curriculum, assignments, and projects.
  ◦ Ran 3-hour-long lab sessions, also holding lectures on topics related to computer vision, robot dynamics, and deep learning.
  ◦ Worked on the introduction of a newly offered deep learning module to perform object detection during navigation tasks.
  ◦ Developed, maintained, and documented a large codebase for instructional purposes and to support the course development.

Leadership Experience

- **Organizer of "From Sea to Space: Advancing Perception in Harsh Domains"** *June 2026*
  Workshop for IEEE International Conference on Robotics and Automation (ICRA) 2026 [🌐]
  ◦ Organizer for a technical workshop at the International Conference on Robotics and Automation (ICRA) on the topic of robot perception in harsh environments.
  ◦ Led the sponsorship and financial funding of the workshop, raising over $1000 to fund a sponsorship for early-stage researchers to attend the conference.
  ◦ Formed of an international committee of academic and industry leaders to engage with the broader robotics community.
- **Robotics Representative at the Graduate Student Advisory Council** *January 2022 - January 2023*
  University of Michigan
  ◦ Served as the representative of the Robotics Graduate Student Council (RGSC) at the Graduate Student Advisory Council (GSAC) at the University of Michigan.
  ◦ Regularly attended monthly cross-department meetings to identify practical improvements and align on engineering priorities.

Mentorship Experience

- **Field Robotics Group at the University of Michigan** *May 2022 - Present*
  University of Michigan [🌐]
  - Supported and monitored 15 Master's research projects and 4 undergraduate research projects, with topics including:
    1. Hardware and sensor integration
    2. Neural representations for sensor fusion and novel sensor modeling
    3. Control and planning of autonomous underwater vehicles (AUV)
    4. Software optimization for embedded devices for real-time robot navigation
    5. Active perception
    6. High fidelity GPU simulation for underwater robotics
    7. Sensor fusion for path planning

Professional Memberships

- **IEEE Membership**, Membership ID: 98208417 *May 2022 - Present*

Additional Information

Languages: Turkish (Native), English (Native), French (Beginner)