Jake Bonney

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Ocean engineer and Ph.D. candidate working on SLAM and sensor fusion for ROV navigation in turbid water. ROV pilot and navigator with 360+ days at sea aboard E/V Nautilus, and software engineer building control, perception, and operator interface systems for research ROVs.

Education

Ph.D. in Ocean Engineering *September 2022 – Present*
University of Rhode Island, Kingston, RI. Advisor: Chris Roman. GPA: 4.0/4.0
Dissertation: SLAM and sensor fusion for ROV navigation in turbid environments

M.S. in Ocean Engineering *September 2019 – December 2021*
University of Rhode Island, Kingston, RI. GPA: 3.97/4.0

B.S. in Ocean Engineering *September 2015 – May 2019*
University of Rhode Island, Kingston, RI

Professional Experience

Independent contractor through BONROV LLC (founder) for the clients below.

ROV Pilot, Navigator, and Software Engineer *June 2019 – Present*
Ocean Exploration Trust, E/V Nautilus

- Piloted the 4000 m rated ROV Hercules (300+ hours) and 6000 m rated towsled Atalanta over 360+ days at sea. Responsible for electrical and hydraulic maintenance and troubleshooting, pre- and post-dive inspections, and launch and recovery of ROV, AUV, and ASV platforms using crane, winch, and A-frame systems.
- Led software integration of the 2024 vehicle upgrades, including hydraulic valve packs and manipulator controls. Organized and documented the existing codebase.
- Led software integration and UI development for the 2025 vehicle upgrades, including hydraulic thruster controllers and relay boards. Provide software support for shipboard operations remotely.
- Performed ROV work for the Ocean Networks Canada (ONC) cable observatory, including multi-ship cable lay, two-wire operations, and subsea inspection, maintenance, and installation around the Endeavour hydrothermal vent fields.
- Navigated ROV and mapping operations, directing vessel positioning in dynamic positioning (DP) under changing sea conditions.

Software Engineer *July 2024 – Present*
Seaward Science LLC

- Developed echoflow, a ROS 2 package that converts marine radar sector data into a real-time 2D grid map for navigation and situational awareness, and runs a multi-target particle filter on that map to track dynamic obstacles.
- Supported development of a ROS 2 acoustic image viewer for multibeam data, using GPU shaders for high-resolution rendering.
- Provided software support during the engineering verification cruise of the 4000 m rated ROV Taurus aboard R/V Western Flyer for Pelagic Research Services, debugging the new control system at sea.

Ocean Engineer and ROV Pilot *July 2025 – Present*
Ocean Exploration Cooperative Institute (OECI), University of Rhode Island

- Developed a photogrammetry and 3D reconstruction workflow for historic shipwrecks from ROV navigation and stereo image datasets using COLMAP and RealityScan.
- Tested remote operation capabilities of ROV Rhody via satellite connections for subsea inspection and photogrammetry surveys of shipwrecks in Lake Ontario.

Research Projects

ROV Navigation in Turbid Environments (Ph.D. research) *January 2026 – Present*

- Developing SLAM and sensor fusion methods for ROV navigation in turbid water on ROV Rhody (Voyis stereo camera, Nortek DVL, Subsonus USBL, Gemini forward-looking sonar, depth, and IMU).
- Building a ground-truthed field SLAM dataset (inverse LBL trajectory and multibeam reconstruction ground truth) and benchmarking state-of-the-art SLAM with incremental DVL, depth, USBL, and sonar fusion.

Autonomous Kayak and Winch System *September 2022 – May 2024*

- Advanced the capability of a custom-built autonomous surface vessel and winch system for collecting water quality and bathymetric survey data in freshwater and estuarine ecosystems.

Acoustic Fish Tag Detection Range in Shallow Water *January 2019 – December 2021*

- Helped design, deploy, and maintain an array of acoustic receivers for detecting tagged fish, and modeled acoustic propagation to estimate tag detection range and probability.

DEEPi Deep-Sea Camera and Computer System *January 2019 – May 2021*

- Helped develop a low-cost deep-sea camera system built around a Raspberry Pi, 3D-printed parts, and pressure-tolerant electronics potted in epoxy resin.

Technical Skills

Languages: Python, C++, MATLAB, QML
Frameworks and tools: ROS 2, Qt, NVIDIA Isaac ROS (cuVSLAM, nvblox), Git, Linux, COLMAP, RealityScan
Navigation and perception: SLAM, sensor fusion, particle filters, state estimation, photogrammetry, sensor integration (DVL, USBL, stereo camera, multibeam, forward-looking sonar)
Hardware and field: ROV piloting and navigation, hydraulic and electrical troubleshooting, electronics and soldering, 3D printing, IoT, boat handling and sailing

Certifications

STCW Personal Survival Techniques (PST)	*2023*
FAA Part 107 Remote Pilot Certificate (Small Unmanned Aircraft Systems)	*2022*
NASBLA Boating Safety Education	*2020*
SDI Open Water Scuba Diver	*2016*

Publications

1. **J. Bonney**, P. M. Parisi, D. Casagrande, and C. Roman, "Underwater Range-Only Particle Filter Localization of a Full Ocean Depth Autonomous Profiler," in *Proc. OCEANS 2024 – Halifax*, IEEE, 2024, pp. 1–6. doi.org/10.1109/OCEANS55160.2024.10754285
2. **J. Bonney**, "Characterizing the Seasonal and Environmental Effects on High Frequency Acoustic Fish Tag Detection in Shallow Water Settings," M.S. thesis, University of Rhode Island, 2021. URI Digital Commons
3. B. T. Phillips, S. Licht, K. S. Haiat, **J. Bonney**, J. Allder, N. Chaloux, R. Shomberg, and T. J. Noyes, "DEEPi: A Miniaturized, Robust, and Economical Camera and Computer System for Deep-Sea Exploration," *Deep Sea Research Part I: Oceanographic Research Papers*, vol. 153, 103136, 2019. doi.org/10.1016/j.dsr.2019.103136

Expeditions

E/V Nautilus, Ocean Exploration Trust

2024 Shakedown, Ocean Networks Canada, Palau I, Palau II, Palau III
2023 Ocean Networks Canada, Ala ʻAumoana Kai Uli in Papahānaumokuākea Marine National Monument, OECI Multi-vehicle Exploration
2022 Kingman Reef and Palmyra Atoll, OECI Technology Integration
2021 Luʻuaeaahikiikapapakū (Ancient Volcanoes in Papahānaumokuākea Marine National Monument), Luʻuaeaahikiikekualonokai (Chautauqua Seamounts)
2020 Olympic Coast NMS and Gradients of Blue Economic Seep Resources, Central California NMS, Channel Islands NMS and Santa Lucia Bank, Benthic Communities and their Biopharmaceutical Potential
2019 Kingman Reef, Palmyra Atoll, and Jarvis Island

R/V Endeavor, URI Graduate School of Oceanography

2022 New England Seamounts with the Wire Flyer towed vehicle
2019 MARIMBA: Marine Mammal Monitoring at Block Island with Passive Acoustics

R/V Western Flyer, Pelagic Research Services

2024 ROV Taurus Engineering Verification

Leadership and Service

Founder and President, Stride SCI *2026 – Present*

501(c)(3) non-profit that empowers individuals living with paralysis through personalized, activity-based training that promotes strength, independence, and lifelong wellness.