

RAYMOND YOUNG

he/him/his

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RESEARCH STATEMENT

My research focuses on current-aware autonomy/optimal path planning for marine robots. I primarily work in simulation where we can analyze a large number of paths for data-driven insights. More generally, I enjoy applying theory from robotics, optimization, and estimation to improve the capabilities of autonomous systems for scientific applications.

PROFESSIONAL EXPERIENCE

Scripps Institution of Oceanography - University of California San Diego
Coastal Observing Research and Development Center (CORDC)

- Postdoctoral Scholar Jan 2026 - Present
- Graduate Student Researcher Sep 2020 - Dec 2025
- Undergraduate Researcher/Engineering Intern Jan 2018- Aug 2020

EDUCATION

Scripps Institution of Oceanography - University of California San Diego

- Ph.D., Oceanography (Applied Ocean Science) 2025
- Dissertation Title: Energy-Optimal Path Planning in Ocean Currents

University of California San Diego

- M.S., Engineering Sciences (Mechanical Engineering) 2022
- B.S., Mechanical Engineering (*Cum Laude*) 2020

HONORS AND AWARDS

- National Defense Science and Engineering Graduate (NDSEG) Fellowship 2022-2025
- Scripps Fellowship Fall 2020

IN REVIEW/IN PREP

1. **R Young**, FH Akins, S Merrifield, (in prep). Energy-Optimal Path Planning for Autonomous Underwater Vehicles via Imitation Learning and Transformers.
2. **R Young**, FH Akins, S Merrifield, (in review). Energy-Optimal Trajectory Planning for Autonomous Underwater Vehicles with Pontryagin's Maximum Principle. *IEEE Journal of Oceanic Engineering*.

JOURNAL PUBLICATIONS

1. M Siegelman, W Orielly, J Becker, C Olfe, **R Young**, PL Colin, E Terrill, S Merrifield, (2025). Spectral Refraction Modeling of Waves around the Steep Reef at Palau. *Journal of Geophysical Research: Oceans*. [DOI](#)
2. **R Young**, S Merrifield, M Anderson, M Mazloff, E Terrill, (2024). A Greedy Depth Seeking Behavior for Energy-Efficient Transits by an Autonomous Underwater Vehicle. *IEEE Journal of Oceanic Engineering*. [DOI](#)
3. S Merrifield, S Celona, RA McCarthy, A Pietruszka, H Batchelor, R Hess, A Nager, **R Young**, K Sadorf, LA Levin, DL Valentine, JE Conrad, EJ Terrill, (2023). Wide-Area Debris Field and Seabed Characterization of a Deep Ocean Dump Site Surveyed by Autonomous Underwater Vehicles. *Environmental Sciences and Technology*. [DOI](#)

CONFERENCE PUBLICATIONS

1. M Anderson, A Nager, S Merrifield, E Terrill, **R Young**, J Chang, (2025). Analysis and Test of an Optimal Propeller Speed Schedule to Reduce AUV Energy Consumption. *in proceedings of OCEANS 2025: Brest*, Brest, FRA. DOI
2. T Kwan*, **R Young**, A Nager, M Anderson, E Terrill, S Merrifield, (2024). Chasing Currents: Onboard Depth Optimization for AUV Energy Savings. *in proceedings of OCEANS 2024: Halifax*, Halifax, CAN. DOI
3. **R Young***, S Merrifield, M Anderson, E Terrill, (2023). A Simulation Framework for Environmentally-Aware Autonomous Underwater Vehicle (AUV) Mission Planning and Algorithm Development. *in proceedings of OCEANS 2023-MTS-IEEE US Gulf Coast*, Biloxi, USA. DOI
4. J Chang*, M Anderson, S Merrifield, A Nager, R Hess, **R Young**, S Kitchen, and E Terrill, (2022). Power Efficiency Autonomy for Long Duration AUV Operation. *in proceedings of the 2022 IEEE/OES Autonomous Underwater Vehicles Symposium (AUV)*, Singapore. DOI
5. **R Young***, S Merrifield, M Anderson, E Terrill, (2021). USV Navigation Geometry for Surface Current Inference. *in proceedings of OCEANS 2021: San Diego-Porto*, San Diego, USA. DOI
6. A Amador*, S Merrifield, R McCarthy, **R Young**, E Terrill, (2021). Wave Glider Speed for Real-time Planning, *in proceedings of OCEANS 2021: San Diego-Porto*, San Diego, USA. DOI
7. S Merrifield, J Shapiro, **R Young***, LS Laurent, H Simmons, M Otero, J Hazard, E Walsh, G Gesiriech, E Terrill, (2019). Autonomy system for USV/UUV coordinated sampling, *in proceedings of OCEANS 2019 MTS/IEEE Seattle*, Seattle, USA. DOI

* presenting author

SELECTED PRESENTATIONS

1. **R Young**, FH Akins, M Anderson, S Merrifield, (2025). How classic optimal control can enable deep learning for current-aware AUV path planning. *WHOI APOE Seminar*, Woods Hole, MA. (oral)
2. **R Young**, FH Akins, S Merrifield, (2024). Time-Optimal Path Planning in 3-D with the Maximum Principle. *2024 IEEE OES AUV Symposium*, Boston, MA. (poster)
3. **R Young**, (2024). Current-Aware Autonomy. *5th Annual NDSEG Fellowship Conference*, New Orleans, LA. (oral/poster)
4. **R Young**, FH Akins, S Merrifield, (2024). Optimal Path Planning for Underwater Vehicles: Methods and Simulation. *SIO Applied Ocean Science Seminar*, La Jolla, CA. (oral)
5. **R Young**, FH Akins, S Merrifield, (2024). Time Optimal Path Planning for Underwater Vehicles in Time-Dependent Flows with the Maximum Principle. *Southern California Applied Mathematics Symposium*, La Jolla, CA. (poster)
6. **R Young**, S Merrifield, M Anderson, E Terrill, (2022). A Sampling Based Approach to Energy-Optimal Planning in Time-Varying Flows. *2022 IEEE/OES AUV Symposium*, Singapore. (oral)

FIELD WORK

ONR DRI First- and Second Island Arc Turbulent Eddy Regional Exchange ([ARCTERX](#))

- TN441 - 12 days. R/V Thomas G. Thompson - Guam, USA 2025
- TN417 - 16 days. R/V Thomas G. Thompson - Koror, Palau 2024
- RR2203 - 12 days. R/V Roger Revelle - Guam, USA 2023
- Role: Scientist - Data analysis of shipboard data: ADCP, Coherent Doppler Radar, and flow-through CTD. Deployment, recovery, and data analysis for autonomous vehicles: Wave Glider USVs; Slocum and Remus AUVs.

Mapping and Water Column Exploration Offshore Palau

- NA169 - 17 days. E/V Nautilus - Koror, Palau 2024
- Role: Scientist - Data analysis of shipboard data: ADCP, echosounder, and flow-through CTD. Deployment, recovery, and data analysis for autonomous vehicles: Wave glider and Wam-V USVs.
- [Expedition Summary](#)

ONR DRI Northern Ocean Rapid Surface Evolution ([NORSE](#))

- AR60-02 - 35 days. R/V Neil Armstrong - Reykjavik, Iceland 2023
- Role: Scientist - assisted deployment/recovery and operation of a Wave Glider for collaborative sampling.

TEACHING

Instructor of Record

UCSD, MAE Department

- MAE 142: Dynamics and Control of Aerospace Vehicles Summer 2025

Teaching Assistant

UCSD, SIO Department

- SIO 111: Introduction to Ocean Waves, prof. Falk Feddersen Winter 2024
- SIOC 209: Hacking for the Oceans, prof. Sophia Merrifield Spring 2021

Volunteer Instructor

SIO Incoming Graduate Student Mathematics Workshop

- Lectures on Probability and Statistics 2022, 2024

Training

UCSD Teaching and Learning Commons

- Advanced College Teaching: Equitable Course Design & Instruction 2025
- Introduction to College Teaching: Foundations of Equitable Teaching 2024

MENTORING/SERVICE

Mentoring

- Erin Beazley - Electrical Engineering Georgia Tech (with S Merrifield) Summer 2025
- Trevor Kwan - Computer Engineering UCSD (with S Merrifield) 2024
- Luke Colosi & Océane Boulais - Scripps Graduate Student Peer Mentor Program 2021-2023

Service

- Incoming Graduate Student Mathematics Workshop (leadership) 2024
- Scripps Graduate Student Peer Mentor Program (leadership) 2022-2023
- Applied Ocean Science Seminar Organizing Committee 2021-2022
- Unlearning Racism in Geosciences (URGE) subpod member on demographic data 2021-2022