# ALAN WILLIAMS

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## EDUCATION

**University of Maryland Cener for Environmental Science (UMCES)** Horn Point Lab, MD
Current Ph.D. Candidate, Marine Estuarine Environmental Science Expected May 2027
Dissertation: *Inadvertent and Deliberate: Sediment Suspension by Remote Operated Vehicles within On-Bottom Oyster Leases*
Advisor: Matthew Gray

**University of Arizona (UArizona)** Tucson, AZ
B.S., Mechanical Engineering May 2020
Minor, Marine Science, Mathematics

## RESEARCH EXPERIENCE

**UMCES** Horn Point Lab, MD
*GRA, Marine Estuarine Environmental Science (MEES)* April 2021 – Present

- Determining aspects regarding the dispersal of sediment caused by remote operated vehicle (ROV) use within on-bottom oyster leases. Specifically, measuring the height of ROV thrusters above sediment beds, and relating the measured distance to thruster pulse-width modulation and sediment grain size. Lab experiments deriving this relationship are being used to inform field efforts to reduce sediment disturbance caused by ROV activity.
- Evaluating the effectiveness of a remotely operated vehicle (ROV) in removing sediment-based fouling from oyster shell substrates to enhance oyster larval recruitment. Scuba diving will be conducted to photograph sediment-covered shell plots before and after ROV deployment, which utilizes low buoyancy and thruster action to clear the fouling. Following this, oyster larvae will be processed and released onto plots, with spat recruitment assessed one month after larval setting.
- Developing an ROV attachment device capable of dispensing oyster larva precisely onto designated oyster substrate zones. With the support of UMD Engineering Capstone Project Students, this separate functioning device is capable of releasing a 1 L volume of water containing 1 million oyster larvae that can be easily loaded onto the ROV and released at the will of the user. Testing of this device will occur within the field onto designated oyster shell plots to evaluate precision of release.

**Maryland Sea Grant REU Experience 2019** Chesapeake Biological Lab, MD
*Research Experience for Undergraduates Fellow* May 2019 – August 2019

- Assisted Dr Dong Liang and Dr Chris Rowe on their collaborative research on the impact of climate change on diamondback terrapin, *Malaclemys terrapin*, individuals and populations.
- Developed an algorithm with Dr Liang using R Studio that used a Regression Spline Mixed Model to relate 2018 diamondback terrapin nest temperatures to the air temperature of the nesting site and make predictions for 2019 nest temperatures using known air temperatures.
- Conducted field research with Dr Rowe on the beaches of NAS PAX involving the catching of diamondback terrapin females after their nests were laid and the measuring of the eggs within those nests.
- Practiced several steps to conduct research in academia, including creating a proposal, writing a research paper, orally presenting project results, and designing conference posters for Ocean Sciences 2020.

## Publications

Chen, W., Wang, C.-Y., Joshi, K., **Williams, A.**, Hevaganinge, A., Lin, X., Kumar, S.S.S., Pattillo, A., Yu, M., Chopra, N., Gray, M., Tao, Y. (2025) A Kinodynamic Model for Dubins-Based Trajectory Planning in Precision Oyster Harvesting. *Sensors*, *25*, 4650. https://doi.org/10.3390/s25154650

Campbell, B., **Williams, A.**, Baxevani, K., Campbell, A., Dhoke, R., Hudock, R. E., Lin, X., Mange, V., Neuberger, B., Suresh, A., Vera, A., Trembanis, A., Tanner, H. G., & Hale, E. (2025). Is AI currently capable of identifying wild oysters? A comparison of human annotators against the AI model, ODYSSEE. *Front. Robot. AI.* https://doi.org/10.3389/frobt.2025.1587033

Lin, X., Mange, V., Suresh, A., Neuberger, B., Palnitkar, A., Campbell, B., **Williams, A.**, Baxevani, K., Mallette, J., Vera, A. and Vincze, M., 2025, May. Odyssee: Oyster detection yielded by sensor systems on edge electronics. In *2025 IEEE International Conference on Robotics and Automation (ICRA)* (pp. 5290-5297). IEEE. https://doi.org/10.1109/ICRA55743.2025.11128133

Xu, M., Karapetyan, N., Rajasekaran, K., **Williams, A.**, Patillo, D. A., Tokekar, P., Hudson, B., Tao, Y., Webster, D., Gray, M. & Yu, M. (2025). Machine-Learning Based Classification of On-Bottom Oyster Farms using a Mechanical Scanning Sonar. *IEEE Sensors Journal*, 25, 12, 22068-22079.
https://doi.org/10.1109/JSEN.2025.3563788

Wang, C.-Y, Appiya Dilipkumar Peethambari, G.-N., Shen, Y.-T., Chen, W.-Y., Sharan Senthil Kumar, S., Long, A., **Williams, A**., Magnusson, G., Pattillo, A., Webster, D., Gray, M., Yu, M., & Tao, Y. (2024). ShellCollect: A Framework for Smart Precision Shellfish

Harvesting Using Data Collection Path Planning. *IEEE Access*, *12*, 177829–177843. https://doi.org/10.1109/ACCESS.2024.3505849

## PRESENTATIONS

*Oral Presentations*

**Williams A.,** Gray M. Monitoring Suspended Sediment Plumes Induced by Remote Operated Vehicle Surveys within and On-Bottom Oyster Lease Aquaculture 2025. New Orleans, Louisiana, United States. March 7, 2025.

**Williams A.** ROVs, UAVs, and Suspending Sediments within On-Bottom Oyster Leases. 2023 MEES Colloquium. Grasonville, Maryland, United States. March 23, 2024

**Williams A.** Drone Imagery, Sonar, and the Impact of Oyster Harvesting. 2023 Chesapeake Oyster Science Symposium. Cambridge, Maryland, United States. October 26, 2023.

Pattillo A, **Williams A**. Robotics for Shellfish Aquaculture – Demonstration, Seed to $$$ 2023. Philip Merrill Environmental Center, Annapolis, Maryland, United States. March 31, 2023.

Xu M, Tajasekaran K, **Williams A**, Pattillo A, Gray M, Yu M. Seabed Classification of Oyster Farms using a Single Beam Scanning Sonar with Machine Learning, National Shellfish Association Annual Meeting. Baltimore, Maryland, United States. March 26-30, 2023.

*Poster Presentations*

**Williams A,** Gray M. Monitoring Water Quality Impact of Remote Underwater Vehicle Use Within an Oyster Lease, Aquaculture America 2023. New Orleans, Louisiana, United States. February 23, 2023.

**Williams A,** Gray M. Mitigating Water Quality Impact of Shellfish Aquaculture with Remote Underwater Vehicles, S3AM Summit 2022. Doubletree Hotel, Annapolis, MD, United States. September 12, 2022.

Yiannis Aloimonos, Nikhil Chopra, Matthew Gray, Xiaomin Lin, Tianchen Liu, Keshav Rajasekaran, Behzad Sadrfaridpour, Talita da Silva, Yang Tao, Chiao-Yi Wang, **Alan Williams**, Miao Yu. S3AM Progress: Monitoring and Harvesting Technologies. USDA SAS/CAP 2022 Meeting, Kansas City, MO, April 18-20, 2022

**Williams A,** Liang D, Rowe C. The Temperatures inside the Nest of Diamondback Terrapins, *Malaclemys terrapin*, and its Relationship with the Air Temperature of the Nesting Site, Ocean Sciences 2020. San Diego, California, United States. February 20, 2020.

**Williams A,** Brinkerhoff O, Schlecht A, Schraven K, Wright D. Smart EMILY Transmitter, University of Arizona Engineering Senior Design Day 2019. Tucson, Arizona, United States. April 29, 2019.

## HONORS & AWARDS

**Marine Estuarine Environmental Science Graduate Program Fund** May 2024
*Awarded for good academic standing in the graduate program, a cumulative grade point average of 3.5 or above, and research focused on the Chesapeake Bay.*

**Horn Point Lab Student Travel Award** March 2024
*Awarded for participation in the Horn Point Lab Student Seminar Series of Spring 2024, for attendance and presenting at the Aquaculture 2025 conference in New Orleans.*

## GRANTS & FELLOWSHIPS

List according to departmental/college recommended citation format. Include $ if notable. Recipient, Year/s *(example below).*
National Science Foundation Graduate Research Fellowship ($130,000) 2014-2017

## ACADEMIC SERVICE

**UMCES Graduate Student Council (GSC)** October 2023 – July 2025
*Co-Chair / HPL Active Member*

- As co-chair, assisted GSC Chair in attending various UMCES government bodies as a student representative, including the UMCES DEI Committee, UMCES Faculty-Senate, and University System of Maryland Student Council.
- As an active member, participated in response and feedback of developed UMCES policies, attended Horn Point Lab (HPL) Faculty Meetings as the campus student representative.
- Generally, served as the ear and voice of the Horn Point Lab student body, conveying general sentiment to UMCES and HPL governing bodies with co-Horn Point Lab rep Julia Charest.

**HPL Faculty-Student Workshop Series** May 2025
*Chair*
Conducted a series of HPL faculty-lead workshops designed to allow workshop leaders to provide knowledge and tools on their desired topic for HPL. This series consisted of four HPL faculty, teaching topics from Proposal Writing Guidelines to Self-Efficacy and Training to be Mentor.

**MEES Colloquium 2024** September 2024 – November 2024
*Co-Runner*

As part of a joint effort between the HPL representatives of the UMCES Graduate Student Council and MEES Graduate Student Organization, supported in organizing and managing the MEES Colloquium of October 2024. This event hosted over 100 MEES program students attending from six different campuses over a two-day event, focused on connecting a physically divided student body onto one campus to celebrate accomplishments, present research, and devise potential collaborations. Specifically, I supported the colloquium's meal planning, scheduling of events, breakout room topic decisions, and operational support.

**HPL Faculty-Student Lunches** September 2022 – May 2024
*Co-Chair*
To provide a deeper connection between HPL faculty and students following the lifting of pandemic separation, my co-chair Bruna Sobrinho and I ran a weekly series of lunches in which one faculty from the HPL campus would sit and have lunch with the student body. Bruna and I would invite the faculty and students, work with the HPL Housekeeping Lead Laura Seabrease to select and order food from local spots. This lunch series occurred over two consecutive school years.

**UArizona Biosystems Engineering Club** September 2017 – May 2020
*Senior Student Advisor / President / Communications Officer*
- As Senior Student Advisor, assisted newly elected officers integrate into the BEC and the Biosystems Engineering Department as well fulfill their roles as President, Vice-President, Project Manager, and Communications Officer.
- As President, preside and speak at all general body meetings, delegate task among officers and committees, upkeep the BEC's membership with various campus activities, act as public relations between the BEC and student/faculty body.
- Current/previous member of the Aquaponics, ROV, Girl Scout's Garden, Biosphere 2 Quarantine Tank and Water-shed Committees.

**UArizona Marine Awareness and Conservation Society** January 2018 – May 2020
*Active Member*
- Volunteered in over 5 outreach events a semester which both informed the public about ocean ecosystems and raised money for various conservation efforts.
- Advocate for the effects of ocean pollution, overfishing and other harmful actions which negatively affect ocean ecosystems.

**UArizona Wildcat Archery Club** August 2018 – May 2020
*Recreation Captain / Active Member*
- Attended all official practices, maintain good relations between club members and practice site officials, assist other officers in their duties, make executive decisions when the club President is unable to, and ensure cooperation and accountability with the competition team.

- As Rec Captain: attend all campus recreation practice sessions, maintain relations between Wildcat Archery and UA Club Sports, provide resources and opportunities of Club Sports to club members.
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## LEADERSHIP & OUTREACH

*Oral Presentations*
**Williams, A**. Personal Pathway and The Smart, Sustainable Shellfish Aquaculture Management ($S^3AM$) Project. Upward Bound Engineering Pathway Discussion. Wye Mills, Maryland, United States. August 2, 2023

## PROFESSIONAL AFFILIATIONS

Title of Organization, Year/s *(example below)*
National Society of Physics Students (SPS) 2008 – 2013

## PROFESSIONAL EXPERIENCE

**MMT Observatory** Tucson, Arizona
*R&D Mech Engineer I* June 2017 – August 2020

- Created 50+ SolidWorks 2016/2020 software drawings of parts and assemblies, based off archived AutoCAD measurements.
- Designed a mount and cart transport system for purchased telescope jack, designed to lift malfunctioning hydraulics.
- Designed a new trailer system to transport vacuum blower equipment for the telescopes mirror.
- Located, organized, and archived over 1000 AutoCAD drawings of parts, assemblies, and components using Microsoft Excel.