# DECLAN GAYLO

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## 👤 About Me

I am a Ph.D. candidate at MIT studying Hydrodynamics. My research is on turbulent bubbly flow, particularly in relation to ship wakes. Through my research, education, and experience, I have demonstrated skill in

- Fundamental hydrodynamics research
- Naval architecture and marine engineering
- Development of novel computational methods
- Teaching and communication

## 🎓 Education

### Ph.D., Hydrodynamics — **Pursuing**
Massachusetts Institute of Technology – Cambridge, MA
Thesis: *Evolution of Turbulent Bubbly Flow Beneath an Entraining Free Surface* (tentative)

### S.M., Naval Architecture & Marine Engineering — **2021**
Massachusetts Institute of Technology – Cambridge, MA
Thesis: *Effects of Power-Law Entrainment on Bubble Fragmentation Cascades*

### B.S., Naval Architecture & Marine Engineering — **2019**
Webb Institute – Glen Cove, NY
Thesis: *Pressure Effects of Transom Lift Devices on Prismatic Planing Hulls*

## 💼 Experience

**Research Assistant**    Massachusetts Institute of Technology – Cambridge, MA    **2019 – Present**
Performed fundamental research on turbulent bubbly flows near the free surface, including formulating new computational tools necessary to measure bubble statistics in simulations. This included development of a parallelized two-phase CFD program to run on large HPC clusters. Additional responsibilities included system administration of the lab's cluster.

**Teaching Assistant**    Massachusetts Institute of Technology – Cambridge, MA    **2020 – 2023**
Graduate courses: Marine Hydrodynamics (2.20), Design Principles for Ocean Vehicles (2.22), and Stochastic Systems (2.122). Responsible for recitations, office hours, and creation/grading of assignments.

**Student Intern**    Navatek, Ltd. – Portland, ME    **Winter, 2019**
Worked on 3D-modeling of advanced hull concepts and a graphical user interface to provide stability criteria while exploring trimaran design space.

**Student Intern**    Donald L. Blount and Associates – Chesapeake, VA    **Summer, 2018**
Analyzed dynamic and static stability and interpreted tow tank test data for military and recreational high-speed craft.

## 📖 Selected Publications

For a complete list, see dgaylo.com/publications

### Journal Papers

– Gaylo, Hendrickson, and Yue (2024). Effect of degassing on bubble populations in air-entraining free-surface turbulent flows. *Journal of Fluid Mechanics*.
– Gaylo, Hendrickson, and Yue (2022). An Eulerian label advection method for conservative volume-based tracking of bubbles/droplets. *Journal of Computational Physics*.

### Conference Presentations

– Gaylo, Hendrickson, and Yue (2022). *Quantifying Fragmentation Statistics in Two-Phase Turbulent Flows for Ship Wake Applications.* 34th Symposium on Naval Hydrodynamics, Washington, D.C..

## 🔧 Skills

- Hydrodynamics
- Two-phase Fluid Simulation
- Linux System Administration
- High-Performance Computing
- C++ and FORTRAN (with MPI)
- MATLAB, Git, and Bash
- Naval Architecture
- GHS, XFOIL, and OpenProp
- AutoCAD, Rhino, and SolidWorks