

Halley Wallace

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PROFILE

Mechanical and biomedical engineer with 3+ years of hands-on experience in propulsion system design, fabrication, and experimental testing through a DARPA project at Georgia Tech. Advanced proficiency in CAD, CNC machining, and additive manufacturing (FDM, SLA, SLS). Incoming fully funded M.S. student in Mechanical Engineering at Cornell University, concentrating in fluid mechanics and propulsion. Experienced in research, lab management, and executive leadership roles.

EDUCATION

Cornell University Ithaca, NY

Incoming Fully Funded M.S., Mechanical Engineering – Concentration: Fluid Mechanics & Propulsion Fall 2026

Georgia Institute of Technology Atlanta, GA

B.S. in Biomedical Engineering, Minor in Chinese December 2025

- Relevant Coursework: Quantitative Laboratory I, Biomedical Systems & Modeling, Circuits & Electronics, Biomedical Engineering Design (CAD), Biomechanics (Statics & Dynamics), Biotransport (Fluid Mechanics & Heat Transport), Biosolid Mechanics, Engineering Materials, Systems Physiology

Georgia Tech Shenzhen Institute, Tianjin University Shenzhen, CN

Engineering & Mandarin Language Immersion Program – U.S. Department of State Gilman Scholar 2025

TECHNICAL SKILLS

CAD & Design: Autodesk Fusion 360, SolidWorks, Onshape, NX (FEA), COMSOL

Fabrication & Manufacturing: FDM, SLA, SLS additive manufacturing; silicone & injection molding; 3-axis CNC routers; manual mills & lathes; CAM software; laser cutting

Instrumentation & Testing: Load cell instrumentation, Arduino DAQ, force/thrust/RPM measurement, PIV & PTV, high-speed imaging

Software & Analysis: MATLAB (DLTdv8a, PIVLab), Python, R, Microsoft Office

Other: Mandarin Chinese (Professional Working Proficiency), Executive Leadership & Management

EXPERIENCE & LEADERSHIP

Research Assistant – DARPA Squid-Inspired Superpropulsion 2024–Present

The Bhamla Lab, Georgia Institute of Technology Atlanta, GA

- Designed and fabricated a soft bio-inspired nozzle system for enhanced thrust generation in autonomous underwater vehicles (AUVs), achieving a **30% improvement in thrust** at equivalent power consumption as part of a DARPA-managed propulsion project.
- Designed precision mechanical assemblies and engineering drawings in SolidWorks, Fusion 360, and Onshape; fabricated prototypes across FDM, SLA, and SLS additive manufacturing; machined metal components using 3-axis CNC routers, manual mills, and lathes with CAM software.
- Designed and built a full-scale aluminum test structure mounted to a single-hull vessel with full waterproofing for open-water validation; built custom force load test rigs integrating load cell instrumentation, linear guides, and Arduino-based DAQ pipelines.
- Performed Particle Image Velocimetry (PIV) and high-speed imaging to analyze fluid-structure interactions; used MATLAB and Python to post-process data, develop performance metrics, and generate reports for DARPA program managers and naval contractors.
- Applied a multi-fidelity Bayesian optimization framework to refine nozzle geometry and material design spaces, reducing experimental testing time by **70%**; collaborated with CFD and FEA simulation teams to integrate computational outputs into hardware decisions.
- Co-author on two peer-reviewed publications and a provisional patent; third paper in review at *Science Advances* (2026).

Ecofiltro – Reusable In-Line Medical Suction Filter (Senior Capstone) 2025

Georgia Institute of Technology Atlanta, GA

- Led mechanical design and validation of a frugal, reusable medical suction filter for low-resource clinical settings, improving suction safety and reliability by **50%**.
- Conducted material and mesh analysis, porosimeter testing, and BFE (Bacterial Filtration Efficiency) validation confirming performance across 30 sterilization cycles; performed FEA in NX and fluid-structure simulations in COMSOL.
- Funded by the GT Mechanical Engineering department and Project Impact to conduct field testing in Antigua, Guatemala alongside nurses, clinicians, and biomedical technicians.
- Collaborated with BME Engineers Without Borders and Ecofiltro (Guatemala) on user needs research and filtration manufacturing standards; maintained design control documentation consistent with ISO 13485.

Vice President – Medical Robotics Club

2023–2025

Georgia Institute of Technology

Atlanta, GA

- Led a 200+ member engineering organization and 20+ person executive board; oversaw strategic planning, cross-functional team coordination, and large-scale technical events with 200+ attendees.
- Served as Chief Engineer for Team Humanoid and Team Industry, leading mechanical design of actuator and geartrain systems and structural design of MRI-compatible robotic platforms under strict material, actuation, and environmental constraints, supported by the Georgia Tech BM2 Lab.
- Evaluated MRI-compatible material selection, non-ferromagnetic actuation strategies, and system-level design constraints for surgical robotics applications in high-field MRI environments.
- Secured industry sponsorships from Stryker, Intuitive Robotics, Autodesk, and the GT Student Government Association; mentored undergraduate engineers through technical projects and professional development.

Lab Manager – The Bhamla Lab

2025–Present

Georgia Institute of Technology

Atlanta, GA

- Managed procurement, budget tracking, capital equipment scheduling, and vendor coordination for an active research lab with publications in *Nature*, *Science Robotics*, and *PNAS*.
- Built and maintained standardized SOPs, equipment calibration records, and documentation workflows; trained and mentored undergraduate researchers in lab safety, experimental setup, and prototyping.
- Coordinated across postdocs, PhD students, and undergraduates to maintain experimental and hardware workflows; contributed to grant writing.

PRESENTATIONS & PUBLICATIONS

Publications

- Rohilla et al. (incl. **Wallace, H.**). Mastering the Manu — How humans create large splashes. *Journal of the Royal Society Interface*, 2025.
- Choi et al. (incl. **Wallace, H.**). Three-dimensional tracking method for water-hopping mudskippers. *Integrative & Comparative Biology*, 2025.
- Choi et al. (incl. **Wallace, H.**). Squid-inspired soft nozzles enable superpropulsive jet thrusters. In review, *Science Advances*, 2026.

Presentations

- APS Division of Fluid Dynamics 2025 — Oral Presentation (DARPA)
- APS Global Physics Conference 2025 & 2026 — Oral Presentation (Manu & DARPA)
- SICB Annual Meeting, January 2026 — Oral Presentation (DARPA)
- Southeast Regional SICB Meeting, Fall 2024 — Oral Presentation

AWARDS

Benjamin A. Gilman International Scholarship + Critical Need Language Award (U.S. Department of State) | President's Undergraduate Research Award (PURA) | PURA Travel Award | SGA Career Development Fund