Zihui(Andy) Liu

liuzihui@uw.edu | nightingale-lzh.github.io
(650)922-3192 | Seattle, WA 98195

EDUCATION

University of Washington, Seattle, WA
Ph.D. in Atmospheric Sciences — Expected June 2029

University of Washington, Seattle, WA
M.S. in Applied Computational Mathematics — June 2024

University of Washington, Seattle, WA
B.S. in Computer Engineering (ABET Accredited) — June 2022
B.S. in Atmospheric Sciences: Data Science — June 2022
Minor in Mathematics — January 2020

EXPERIENCE — ATMOSPHERIC SCIENCE

Graduate/Undergraduate Research with Dr. Robert Wood

Graduate Research Assistant — **September 2022 — Present**
Undergraduate Research Assistant — **October 2021 — September 2022**

- Implemented machine learning algorithms (e.g., GRU, LSTM) to predict low marine cloud coverage in the Lagrangian specification.
- Implemented bias filters in various methods to improve machine learning output.
- Applied the algorithms above to perturbation-sensitivity studies, blank-filling meteorological measures, etc.
- Self-studied and applied part of game theory, such as Shapley Value

Graduate Research with Dr. Dale Durran — **January 2023 — Present**

- Implemented preprocessing algorithms to fill and filter Outgoing Longwave Radiation (OLR) satellite data from ISCCP HXG for the subsequent process.
- Incorporated real-world OLR data into machine learning algorithms to improve prediction accuracy.

WxChallenge — **September 2022 — June 2023**

- Competed in WxChallenge, a collegiate-focused meteorological forecast competition.
- Predicted max/min temperature, 2-min average wind speed, and precipitation of the cities in North America.

EXPERIENCE — ENGINEERING

UW Human Powered Submarine

Honorary Lead — **September 2022 — Present**

- Advised and transferred knowledge to new student leads and general members.
- Assisted and educated new members with embedded systems and data analysis skills.
- Led the projects in the Safety and Electronics Subsystem.

Electronics Subsystem Lead **June 2024 — Present**
Electronics Subsystem Project Manager **September 2018 — June 2021**

- Designed and built the hardware for the control system of the submarine.
- Assisted in coding the control software and libraries.
- Retrofitted the mechanical joystick with hall-effect sensors for digital outputs. Modeled and manufactured the centering mechanism to improve the usability of the joystick.

Safety Subsystem Lead **June 2021 — June 2022**
Safety Subsystem General Member **June 2020 — June 2021**

- I am the first lead of the newly established safety subsystem, dedicated to designing, testing, and maintaining safety devices on the submarine. Before, it was an annex to the dive team.
- Set the foundation of the safety subsystem, including design philosophy, adapting industry standards (e.g., IP rating, lithium-ion battery SOP), and establishing rigorous test methods.
- Upgraded the old safety system with an electronics-assisted safety system.
- Conducted a series of tests on the safety system, including battery, waterproofing, emergency fail-safe tests, etc.
- Composed lithium battery handling standard operation procedure.
- Educated the new general members about the subsystem and skills needed to design and fabricate parts.

Manufacturing Subsystem General Member **September 2018 — June 2019**

- Learned machining techniques for manual and CNC mill and lathe.
- Machined the parts for other subsystems.

UW Husky Precious Plastics **April 2024 — Present**

- Manufactured plastic stock material (sheet, rod, pellet) from recycled plastics.
- Designed and manufactured mold for plastic injection molding.
- Hosted outreach event to raise awareness of plastic recycling and its environmental impact.

UW Design Build Fly

Score Optimization Sub-team Lead **September 2019 — December 2022**

- Modeled and ran an optimization algorithm (primarily genetic optimization) at the beginning of the academic year to maximize the competition score under several constraints: competition requirements, different materials, designs, etc.
- Used machine learning algorithms (e.g., k-mean cluster) to process raw output from optimization algorithms.
- Introduced and educated other general members about the score optimization project and various optimization algorithms.

Mold Preparation Project Lead **September 2021 — June 2022**

- Researched the manufacturing process of composite mold (vacuum bagging, autoclave, etc.)
- CNC routed the high-density foam and prepared it for the autoclave process.

Manufacturing Sub-team General Member **September 2019 — June 2021**

- Fabricated RC aircraft, including woodworking, 3d printing, and composite layering.

UW Concrete Canoe

Construction General Member **September 2018 — June 2019**

- Made a canoe out of concrete to compete with other teams at regional and national levels.

Mix Team General Member **September 2018 — June 2019**

- Helped to design and test the concrete formula for the canoe.

PRESENTATION

AGU Annual Meeting 2023, Oral Presentation **December 2023**

- A Machine Learning Approach to Cloud Cover Forecasting Using Lagrangian Air Mass History

HONORS AND AWARDS

- FURE's International Submarine Race 17 (2023), with UW Human Powered Submarine
  - Second Place in Overall Performance
- Academic Achievement Award (2022), University of Washington, Department of Atmospheric Sciences
- IMarEST's European International Submarine Races 2022, with UW Human Powered Submarine
  - Fourth Place in Overall Performance
  - Award for Perseverance
  - Second Place in Agility
- AIAA's Design/Build/Fly 2022, with UW Design Build Fly
  - Ninth Place in Overall Performance
- FURE's Virtual International Submarine Race 16 (2021), with UW Human Powered Submarine
  - First Place in Human Factor Engineering Design Process
  - First Place in Future Submarine Technical And Design Challenge
  - First Place in Maneuvering and Control Design
  - First Place in Operational Problem Solving Challenge
  - Second Place in Drivetrain Design
- IMarEST's European International Submarine Races 2020, with UW Human Powered Submarine
  - First Place in the Design Challenge
- ASCE's Concrete Canoe Competition 2019, with UW Concrete Canoe
  - First Place in Pacific Northwest Regional

SKILLS

- **Programming Languages:** C/C++, Python, Java, JavaScript, MATLAB, Objective Pascal
- **Software:** PyTorch, TensorFlow, scikit-learn, HTML, CSS, Unity Engine, MPI, OpenBLAS, LAPACK, Django
- **Hardware:** Embedded Systems, Digital Circuits, SystemVerilog, ModelSim
- **Machining and Fabrication Skills:** Mill, Lathe, Composite Manufacturing, 3D-printing, Soldering, Carpentry
- **Computer-Aided Design:** SolidWorks, Fusion 360

LANGUAGE

- English (Proficient), Chinese (Native)