Zihui(Andy) Liu

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EDUCATION

University of Washington, Seattle, WA

M.S. in Atmospheric Science	Expected June 2027
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 Science: 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.

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

- <u>I am the first lead of the newly established safety subsystem</u>, 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.

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.

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
- 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
- **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)