Bill Fan

Robotics Researcher

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EDUCATION

OLIN COLLEGE OF ENGINEERING **Needham, Massachusetts**
Bachelor of Science in Engineering: Robotics *June 2024*

- Recipient of 4-year, 50% tuition Olin Merit Scholarship

RESEARCH EXPERIENCE

University of Massachusetts, Amherst - REU *Summer 2023*
Advisor: Gina Olson
Prof. Olson's lab is using modeling to inform the design of highly capable continuum robots

- Identified areas of the continuum robot design space that are traditionally underexplored due to the lack of models.
- Performed model-informed design of a high strength continuum robot arm inspired by elephant trunks.

This work is in preparation for submission to RAL in early 2024.

TWIST Soft Robotics Research Lab *September 2021 - Current*
Advisor: Melinda Malley
TWIST lab is a new student research group focused on controlling biomimetic musculo-skeletal systems for manipulation.

- Lead ten students in a new research group to design, control, and motion capture novel continuum soft robot systems.
- Submitted campus grant proposals and research result summaries, securing $5500 total funding for the research group.
- Designed and constructed an array of soft robot designs inspired by different octopus muscle structures.
- Set up a motion capture system to validate the model I derived at Oregon State University

This work resulted in a publication in Robosoft 2023.

Oregon State University Robotics - REU *Summer 2021*
Advisor: Ross L Hatton
Performed research at an Oregon State University biomimetic robotics lab creating novel soft robotic snakes.

- Derived a novel linear kinematics model for sidewinding robot snakes using coordinate-free differential geometry.

This work resulted in a publication in Robosoft 2023.

Olin Robotic Fish Research *October 2020 - May 2021*
Advisor: David Barrett
The Olin RoboTuna Project is building a large biomimetic robotic tuna to perform autonomous missions in open waters.

- Developed visual-inertial UKF based Apriltag-SLAM for robot fish underwater localization.
- Constructed Gazebo and Matlab 3D kinematics simulations for creating ground-truth pose trajectory data.
- Collected video datasets of underwater vehicles navigating amongst Apriltags for testing localization.

PUBLICATIONS

Peer-Reviewed Conference Papers

Linear Kinematics for General Constant Curvature and Torsion Manipulators *Robosoft 2023*
Bill Fan[*], *Farhan Rozaidi, Capprin Bass, Gina Olson, Melinda Malley, Ross L Hatton*

- Presented poster and lightning talk at Robosoft 2023. Third place best poster at the Reduced Order Modeling workshop.

TEACHING

Head Course Assistant - Modeling and Simulation in the Physical World *Fall 2023*
Course Assistant - Quantitative Engineering Analysis 2 *Spring 2023*
Course Assistant - Quantitative Engineering Analysis 3 *Fall 2022*
Course Assistant - Controls *Spring 2022*
Writing Tutor - Identity from the Mind and Brain *2021-2022*

OTHER EMPLOYMENT

Dusty Robotics *Summer 2022*

Dusty Robotics is leveling up the construction process by printing building CAD files for entire floors to within 1mm accuracy.

- Created motion capture system tooling to further development and testing of core robot state estimation.
- Implemented and improved sensor integration in 3D for core robot state estimation.

Detroit Electric Boats *Summer 2020*

Detroit Electric Boats was a startup building an electric autonomously hydrofoiling catamaran.

- Implemented simulation and control of a hydrofoiling catamaran, capable of achieving multiple minutes of air time.
- Wrote robust ROS hardware interfaces, including a servo driver for servo control, monitoring, and debugging.

Volvo Cars Asia *June 2019 - February 2020*

- Prototyped a system that collects and labels video data from active safety events to help users track past incidents.
- Constructed a demo that uses facial recognition to achieve keyless car unlocking and user profile retrieval.