Bill Fan

Robotics Researcher

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EDUCATION AND FELLOWSHIPS

University of Texas, Austin **Austin, TX**
PhD Student, Electrical and Computer Engineering *Aug. 2025 - Present*
- **National Science Graduate Research Fellow recipient** (2600 selected nationally)

Olin College of Engineering **Needham, MA**
Bachelor of Science in Engineering: Robotics *Sept. 2020 - May 2024*
- Recipient of a 4-year 50% tuition scholarship ($100,000 value)

RESEARCH EXPERIENCE

University of Texas, Austin *Summer 2025 - current*
Advisor: Lillian Chin
- Creating computational methods for optimizing touch sensor placement in soft robot grippers and feet, using finite-element simulations, nonlinear optimization, and generative modelling.
- Starting up a project between eight professors across five of UT's colleges to address UT's campus inaccessibility with long-term sociotechnical solutions, using methods like participatory design, AI, and informed by disability studies.

University of Massachusetts, Amherst *Summer 2023 - Fall 2024*
Advisor: Gina Olson
- Developed a novel algorithm for 80x faster computation of a soft robot's arm's ability to complete given tasks.
- Characterized novel soft robot actuators by designing test fixtures and software to simplify and speed up testing.
- Implemented continuum arm simulations and compared different arm design parameters against specified tasks.

This work resulted in a publication and oral presentation at IEEE Robosoft 2025, and ICRA 2025 workshop contribution.

Olin College of Engineering *September 2021 - Summer 2023*
Advisor: Melinda Malley
- Founded a student research group with 10 members to design, control, and motion capture novel soft robot systems.
- Created soft robot arms based on snake and octopus muscle structures to validate novel biomechanics models.
- Published and presented experiment results at Robosoft - the only undergraduate attendee invited to deliver a talk on stage.
- Secured $7,500 total funding for the research group through campus grant proposals and research result reports.

This work resulted in a publication and oral presentation at IEEE Robosoft 2023. 3rd best poster at workshop.

Oregon State University Robotics *Summer 2021*
Advisor: Ross L Hatton
- Derived a novel linear muscle mechanics model for robot snakes and octopuses using coordinate-free differential geometry.
- Created extensible Matlab implementation of the model and simulated arms with varied muscle structures in 2D and 3D

This work resulted in a publication and oral presentation at IEEE Robosoft 2023. 3rd best poster at workshop.

Olin College of Engineering *October 2020 - May 2021*
Advisor: David Barrett
- Developed visual-inertial UKF based Apriltag-SLAM to enable underwater localization of a robotic tuna fish.
- Constructed Gazebo and Matlab 3D motion simulations to create ground-truth pose trajectory data to validate algorithms.
- Collected video datasets of underwater vehicles navigating amongst Apriltags to validate algorithms.

PEER REVIEWED ARTICLES

Fan, Wang, Nanayakkara, Lee, Chin, Huff Jr. "BathMap: Designing a Platform for Mapping University Bathroom Accessibility" . Poster at *ACM ASSETS 2026* *2025*

Fan, Roulier, Olson, "A Fast and Model Based Method For Evaluating Task-Competence of Antagonistic Continuum arms" . Oral presentation at *IEEE Conference on Soft Robotics (RoboSoft)*

Abbot, Lan, Raus, **Fan**, del Rosario. "Beyond 'How's it going?': A Collaborative Autoethnographic Study by Early Instructors in a First-Year Engineering Studio Course". In American Society of Engineering Ed. Annual Conference *2024*

Fan, Rozaidi, Bass, Olson, Malley, Hatton. "Linear Kinematics for General Constant Curvature and Torsion Manipulators". Lightning talk at *IEEE Conference on Soft Robotics (RoboSoft)* *2023*

WORKSHOP CONTRIBUTIONS

Fan*, Chang*, Lai, Kingston, Chin, "Evaluating Barometric Tactile Sensor Designs in Simulation" . Poster and invited talk at 2026 IEEE International Conference on Intelligent Robots & Systems (IROS): *Robot Learning Co-Design: Generative and Iterative Approaches*. **Invited speaker for Young Researcher Talk.** *2025*

Fan, Roulier, Olson, "A Fast and Model Based Method For Evaluating Task-Competence of Antagonistic Continuum arms" . Poster at 2025 IEEE International Conference on Robotics and Automation (ICRA): *Second Unconventional Robots: Rethinking Robotic Systems Beyond Convention*

Fan, Rozaidi, Bass, Olson, Malley, Hatton, "Linear Kinematics for General Constant Twist Manipulators". Poster at Soft Robotics (RoboSoft), 2023 IEEE Conference on: *Reduced-Order Modelling for Soft Robots*. *2023*
3rd Place, Best Poster Award.

INVITED TALKS

Young Researcher Talk at IROS 2026 workshop on Robot Learning Co-Design. "Evaluating Barometric Tactile Sensor Designs in Simulation" *2026*

Talk at Robosoft 2025. "A Fast and Model Based Method For Evaluating Task-Competence of Antagonistic Continuum arms" *(Delegated to Prof. Gina Olson due to funding)* *2025*

Lightning talk at Robosoft 2023. "Linear Kinematics for General Constant Curvature and Torsion Manipulators" *2023*

UMass Amherst Robotics Journal Club. "Reinforcement Learning in Soft Embodiments" *2023*

Olin College Community Research Seminar. "The Geometry of General McKibben Arms" *2023*

TEACHING

Controls - *Course Assistant* *Spring 2022 & 2024*
- Designed a magnetic levitation final project system and prepared kits for a class of 17 students.
- Hosted office hours, tutored students 1-on-1, and graded all problem sets for the class.

Modeling and Simulation in the Physical World - *Head Course Assistant* *Fall 2023*
- Worked with three other CAs to teach in classrooms, design new course material, grade, and host office hours.
- Performed meta-analysis of the new studio instructor experience with three other CAs, results published in ASEE 2024.

Quantitative Engineering Analysis 3 - *Course Assistant* *Fall 2022*
- Sole in-class course assistant for a studio-style course on ODEs with 80+ second year students.

Identity from the Mind and Brain - *Writing Tutor* *Fall 2021 & 2022*
- Tutored students on concepts and worked on essays for a first-year seminar on personal identity, psychology, and philosophy

SERVICE

Conference Service

- Session chair, “Representing 3D Space for Robot Reasoning”, IEEE IROS

Publication Peer Reviewer

- IEEE/ASME Transactions on Mechatronics (TMech): 3 papers reviewed
- IEEE Robotics and Automation Letters (RA-L): 1 paper reviewed

Dearborn STEM Academy - *Collegiate Partner* *Fall 2023 - Summer 2024*

- Created in-class and after-school STEM activities for students at a Boston public school in a team of 8 Olin students.
- Worked with three 10th grade students to collaboratively launch an after-school makerspace. Mentored the students in the operation and maintenance of 3D printers and simple shop tools.
- Met with students, teachers, parents, and admin to perform stakeholder-engaged design, and shared resulting reports.

INDUSTRY EXPERIENCE

XGenomes *June 2024 - August 2025*
R&D Engineer *Cambridge, MA*
XGenomes is creating a single-molecule DNA sequencing method that simultaneously reads genome and epigenome.

- Created liquid handler and microscope control software to enable our biologists to automate an 8hr-long protocol
- Scaled automated fluidics system from proof-of-concept to 1500 cycles of fluid delivery per month with 95% success rate.
- Designed a novel electro-mechanical system and experiments for stretching and imaging individual DNA molecules.
- Lead revamp of company project management practices, website, and brand identity,

Dusty Robotics *Summer 2022*
Robotics Software Intern *Mountain View, CA*
Dusty Robotics builds a robot that prints construction blueprints onto jobsites to within 1mm accuracy.

- Created Python and C++ motion capture tools to analyze datasets with millions of robot poses against ground-truth.
- Applied said tools to demonstrate the redundancy of an expensive robot sensor, reducing robot costs by $10,000 each.
- Implemented 3D sensor integration in the robot’s factor graph state estimator to improve navigation in sensor-deprived spots

Detroit Electric Boats *May 2020 - October 2020*
Controls Engineer *Detroit, MI*
Detroit Electric Boats was a startup building an electric autonomously hydrofoiling catamaran.

- Modified a standard catamaran hull with motors and control electronics to enable autonomous control of hydrofoiling.
- Implemented cascading PID control of a hydrofoiling catamaran, capable of achieving multiple minutes of air time.
- Built a Gazebo simulation to enable offline development of a hydrofoiling boat controller that worked first-try on hardware.
- Performed design reviews and oversaw manufacturing of custom hardware and electronics.

Volvo Cars - Asia *June 2019 - February 2020*
Infotainment Intern *Shanghai, China*

- Created functional demos for unlocking a car using facial recognition, and for an integrated dash-cam reporting system. Latter project won a company internal innovation award