# XIAOTONG ZHANG

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## EDUCATION

***Massachusetts Institute of Technology*** — Cambridge, MA
Ph.D. Candidate in Robotics and Artificial Intelligence — GPA: 5.0/5.0 — June 2019 – May 2024
Minor: Computer Science
Master of Science in Mechanical Engineering — GPA: 5.0/5.0 — Sep. 2017 – June 2019

***Shanghai Jiao Tong University*** — Shanghai, China
Bachelor of Science in Naval Architecture and Ocean Engineering — GPA: 89.88/100 — Sep. 2013 – June 2017
Ranking: 3/73
Graduated with ***2017 Excellent Undergraduate Thesis (Top 1%) of SJTU***
Second Major: Business Administration

## PUBLICATIONS

***Journal Publications***

- **X. Zhang** and K. Youcef-Toumi. "Magnetohydrodynamic Energy Harvester for Low-Power Pipe Instrumentation", *IEEE/ASME Transaction on Mechatronics*, 2022.
- F. Xia, J. Quiglcy, **X. Zhang**, C. Yang, Y. Wang, and K. Youcef-Toumi. "Design and Implementation of a Modular Low-cost Atomic Force Microscope for Precision Instrumentation Education", *Mechatronics*, 2021.
- Y. Peng, **X. Zhang**, D. Wan, and C. Huang. "Numerical Study of Wave-current Loads Acting on Foundation of Fixed Offshore Wind Turbine", *Chinese Journal of Hydrodynamics*, 2017.

***Conference Proceedings***

- **X. Zhang**, J. Chong, K. Youcef-Toumi. "How Does Perception Affect Safety: New Metrics and Strategy", *International Conference on Robotics and Automation (ICRA),* 2024.
- A. Kothari, T. Tohme, **X. Zhang**, K. Youcef-Toumi. "Enhanced Human-Robot Collaboration using Constrained Probabilistic Human-Motion Prediction", 2024 *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS),* under review.
- **X. Zhang**, A. Alsheikh, K. Youcef-Toumi. "Systematic Evaluation and Analysis on Hybrid Strategies of Automatic Agent Last-mile Delivery", *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS),* 2022.
- **X. Zhang**, D. Fan, and D. Wan. "Numerical Study of Oscillatory Dual Cylinders in Tandem Arrangement", *International Ocean and Polar Engineering Conference (ISOPE)*, 2017.
- D. Fan, **X. Zhang**, and M. Triantafyllou. "Drag Coefficient Enhancement of Dual Cylinders in Oscillatory Flow", *International Ocean and Polar Engineering Conference (ISOPE)*, 2017.
- **X. Zhang**, Y. Peng, and D. Wan. "Numerical Analysis of the Coupling Response of a Semi-submersible Platform with its Mooring System", *Conference of Global Chinese Scholars on Hydrodynamics (CCSH)*, 2016.

## PATENTS

- "A Device for Undersea Mineral Adsorption, Collection and Separation with Spiral Flow", patent granted 2019, CN105665118B.
- "A Mechanical Mineral Lifting Device", patent granted 2019, CN105645037B.
- "A Submarine Intelligent Mining Vehicle", patent granted 2019, CN105863644B.
- "A Calibration Device and Method for Three-component-force Sensor", patent granted 2018, CN105784271B.
- "An Efficient Cable Cleat and Its Installation and Removal Method", patent granted 2017, CN105697883B.
- "A Circular Impulse Water Jet Device for Ore Crushing", patent granted 2016, CN205422718U.
- "An Oscillatory Type Web-shaped Propelling Device", patent granted 2016, CN205707259U.
- "A Drag Reduction Structure for Low-speed Full-formed Ships", patent granted 2016, CN105197179B.

## WORK EXPERIENCE

**Intel Inc.** *May 23, 2022 – Aug. 19, 2022*

*Graduate Intern (Manager: Vikas Sharma)* *Cambridge, MA (Remote)*

- Worked on Back End of Line (BEOL) Design Technology Co-Optimization (DTCO).

**Massachusetts Institute of Technology**

*Research Assistant (Advisor: Prof. Kamal Youcef-Toumi)* *Cambridge, MA*

Topic: Robotics for Smart Logistics *June 2020 – May 2022, Aug. 2022 – Present*

- Last-mile delivery: Modeled the key metrics to evaluate the performance of different hybrid robotic last-mile delivery concepts, including noise pollution, energy consumption, costs, delivery time, throughput and coverage rate. Analyzed the limitations of drone delivery and effectiveness of hybrid concepts in real-world applications based on the mathematical model, numerical simulation and a case study for Boston. Implemented K-means clustering to determine drone taking off locations for truck-drone tandem delivery.
- Current research: efficient and safe human robot collaboration in fast, dynamic, and unpredictable environments.

Topic: Smart Robotic Systems for Leak Detection and Repair *Sep. 2017 – June 2020*

- Designed and developed a magnetohydrodynamic energy harvester for low-power sensor nodes and robot hubs.
- Developed and integrated a novel spiral flow diverter and a magnetic concentrator, which are optimized globally using numerical simulations, to dramatically amplify the MHD energy harvester performance.
- The project involved the development of leak detection sensors, energy harvesters, in-pipe leak detection robots, and in-pipe leak repair robots.

Topic: Development of an Educational Atomic Force Microscopy *June 2019 – Sep. 2019*

- Developed a modular, low-cost AFM for educational purposes using buzzer-actuated scanners, an NI LabVIEW data acquisition system, and an active cantilever probe with piezoresistive sensing.
- Designed the PCB layout of an analog lock-in amplifier for synchronous demodulation.

**Shanghai Jiao Tong University** *Sep. 2014 – June 2017*

*Undergraduate Researcher (Advisor:Prof. Decheng Wan, Prof. Longfei Xiao)* *Shanghai, China*

- Used computational fluid dynamics to mathematically model and analyze the mechanisms of (1) ship resistance performance; (2) deep-sea mining efficiency; (3) coupling response of offshore structures and its mooring system; (4) dual cylinder fluid-structure interaction.

## SELECTED HONORS AND AWARDS

- **2023 Best Transaction Paper Award for IEEE/ASME Transactions on Mechatronics** 2023
- **De Florez Award for Graduate Design at MIT** 2022
- **Excellent Undergraduate Thesis (Top 1%) of SJTU** 2017
- **RongChang Scholarship for Scientific Innovation (Top 10 among SJTU on scholarly excellence)** 2016
- **First Prize in the Tenth National Zhou Pei-Yuan Undergraduate Mechanics Competition** 2015
- **First Prize in China Undergraduate Physics Competition** 2014
- American Bureau of Shipping Scholarship (Merit-based Award) 2016
- Singapore Technologies Engineering Scholarship (Merit-based Award) 2015
- China Classification Society (CCS) Scholarship (Merit-based Award) 2014

## EXTRACURRICULAR EXPERIENCE

- **Co-chair**, Graduate Association of Mechanical Engineers (GAME), MIT *Feb. 2018 – Feb. 2019*
- **Officer**, Brunch Committee, Ashdown House, MIT *May 2018 – May 2020*
- **Volunteer**, Kerry Group Kuok Foundation *Sep. 2014 – Nov. 2014*

## SKILLS

- **Programming Language**: Python, MATLAB, C++.
- **Software and Platform**: Linux, ROS, PyTorch, TensorFlow, Simulink, LabVIEW, SolidWorks, ANSYS.