

# Jonathan Tagoe

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## EDUCATION

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### Massachusetts Institute of Technology

Master of Science in Engineering: Mechanical Engineering, GPA: 4.80/5.00

May 2023

Cambridge, MA

### Massachusetts Institute of Technology

Bachelor of Science in Engineering: Mechanical Engineering, GPA: 4.60/5.00

May 2021

Cambridge, MA

## RELEVANT SKILLS

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**Fabrication:** Waterjet, Laser Cutting, 3D Printing, CNC Mills/Lathes, Injection Molding, Die Casting, Sheet Metal

**Design & Machining:** Solidworks, Mastercam, Autodesk Fusion 360, AutoCAD

**Languages:** MATLAB, Arduino IDE, Python, Spanish

## WORK EXPERIENCE

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### Metis Design Corporation, Boston, MA

#### *Associate Engineer*

June 2023 – Present

- Designed sensor enclosure in Solidworks for monitoring helicopter rotor deflection and fatigue stress fracture
- Coordinated with electrical engineer to design 5+ PCBs to facilitate efficient spacing and assembly within enclosure
- Improved accuracy of short beam shear testing of carbon laminates by designing four-point bending fixture using Solidworks

### MIT Therapeutic Technology Design and Development Lab, Cambridge, MA

#### *Master's Thesis – Respiratory Simulator for Diaphragmatic Assist Devices*

Sept 2021 – June 2023

- Created human respiratory simulator to serve as a bench-top model for verification of minimally invasive soft robotic diaphragmatic assist devices
- Designed 3D-printed rib and sternum components based on anatomical research to quantify ribcage motion found in prior in-vivo validation data
- Conducted verification testing of simulator, documenting results at each iteration to ensure successful fulfillment of design requirements like achieving physiological pressures
- Collaborated with lab mate to develop mechanism to simulate active motion of diaphragm to model different levels of unassisted respiratory functions
- Validated simulator through several rounds of testing prototype assistive devices, measuring pressures, volumes, and flows using PowerLab DAQ

#### *Bachelor's Thesis – Epicardial Patch Delivery Tool*

June 2020 – June 2021

- Interfaced with lab mate and conducted industry research of prior cardiac surgical tools to create design requirements for new minimally invasive delivery tool for assistive hydrogel patches
- Developed multi layered plastic film inflatable tool over multiple iterations, cycling through different material and thickness combinations heat pressed together using custom mold
- Designed 3D printed molds to rapid prototype silicone rubber vacuum suction components designed to maintain stability of delivery tool during deployment
- Performed series of compression tests using Instron testing machine to verify tool inflation would provide required 77.5 kPa of pressure over 5 seconds for proper hydrogel adhesion
- Performed ex vivo test on extracted porcine hearts to validate tool performance in subxiphoid surgery, with criteria like tissue damage and rate of successful patch adhesion

## PROJECTS

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### MIT Course 2.76 – Global Engineering

Sept 2022 – Dec 2022

- Worked on team of 4 to fabricate, test, and document development of a low-cost component to convert off-the-shelf leaf blowers into fish feed pellet distribution tools for aquaculture
- Regularly interfaced with business clients based in Boston & Ghana to conduct background research, develop functional requirements, and assess progress of solution strategies
- Piloted design of multiple iterations of fish feed converter component in Solidworks, using data collected during rapid prototyping phase
- Conducted series of launching tests with 3D printed models of prototypes using fish feed used in client's farms

### MIT Course 2.75 - Medical Device Design

Feb 2022 – May 2022

- Collaborated with 4 colleagues to design sound wave transmission detection system for identifying pneumothoraxes in pre-hospital settings
- Interfaced with emergency health providers to develop functional requirements, design parameters, and analysis methods
- Fabricated a silicone rubber-based benchtop model of chest cavity and lungs to simulate pneumothoraxes and test iterations of detection device
- Analyzed sound wave transmission using Audacity and MATLAB to determine common markers of pneumothorax

## LEADERSHIP

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**MIT Institute Committee on Student Life (2019-2020)** - Developed campus-wide initiative to incorporate meditation in daily routines of 4500+ undergraduate students to reduce stress; spearheaded endeavor to gather student-focused data for developing proposals bottom up, coordinating with 30+ students to compile data on experiences

**MIT Chocolate City (2017-2021)** - strengthened group relationships with MIT offices and black student organizations of other colleges through regular meetings and conversations; served as Resident Peer Mentor for class of 2024, helping them adjust to college life and providing support for their initiatives for the brotherhood and Institute

**MIT 2021 Class Council (2017-2021)** - Developed budgets between 20 to 250k to effectively finance 15 small- & large-scale events during tenure; collaborated with 6 other officers to conceptualize new and engaging events for the class

## INTERESTS AND ACTIVITIES

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Reading, listening to music, DJing, dancing, skateboarding