Jonathan Tagoe

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EDUCATION

Massachusetts Institute of Technology **May 2023**
Candidate for Master of Science in Engineering: Mechanical Engineering *Cambridge, MA*

Massachusetts Institute of Technology **May 2021**
Bachelor of Science in Engineering: Mechanical Engineering *Cambridge, MA*
GPA: 4.60/5.00

RELEVANT SKILLS

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

EXPERIENCE

MIT Therapeutic Technology Design and Development Lab, Cambridge, MA **June 2020 – Present**
Research Assistant – Respiratory Simulator for Diaphragmatic Assist Devices

- Facilitated rapid prototyping & testing of biocompatible actuators by designing pig based respiratory simulator
- Fabricated model ribcage and sternum to test physical effects of actuation on skeletal system based on in vivo data
- Constructed simulator prototype with pressurized thoracic and abdominal chambers and silicone rubber diaphragm
- Validated model with experiments to measure pleural/abdominal pressures and volumetric change

Undergraduate Researcher – Myocardial Patch Delivery Tool
Modeled preliminary delivery tool assembly meant for minimally invasive subxiphoid surgery on pigs in Solidworks

- Constructed 3 prototypes of inflatable, plastic heart sleeve prototypes based on pig ventricle solid models
- Designed vacuum pores for sleeve stability during surgery using 3D printed molds and liquid silicone rubber
- Performed ex vivo test on porcine hearts to measure stress and strain of due to inflation

Metis Design Corporation, Boston, MA **Jan 2020 – Feb 2020**
Mechanical Engineering Intern

- Improved accuracy of short beam shear testing on carbon laminates by redesigning three-point bending fixture using Solidworks & manufacturing parts
- Eliminated error in prototyping process by developing precise engineering drawings of 7 machined components with proper GD&T and design reviews with supervisor
- Directly negotiated machine costs with rapid manufacturing contractors to reduce machining costs by 20%
- Redesigned and constructed desktop CNC with double bed width , increasing curved laminate sheet production

OMG Inc. - FastenMaster New Product Design & Innovation, Agawam, MA **June 2019 – Aug 2019**
New Product Design and Innovation Intern

- Conducted compression tests on 100+ units of Mechanically Enhanced Wood on a 100kN Instron® machine, testing 10 unique 6" screw patterns on 8' wood beams
- Increased accurate screw insertion yield by 50% using screw installation jig designed on Solidworks
- Accelerated study by running 4 FEA compression studies, with custom orthotropic material file based on my research on material properties of wood
- Received praise for effective communication of experiment results, displaying 30% increase in deflection at failure of wood beams through PowerPoint visuals & Minitab graphs for data

MIT CSAIL Distributed Robotics Lab, *Cambridge, MA* **June 2018 – May 2019**
Undergraduate Researcher – Auxetic Actuators/Rubber Trunk

- Redesigned rotary fixtures to eliminate defects in laser cutting of Teflon auxetic tubes, increasing yield by 33%
- Designed text fixtures in CAD and conducted materials screening of alternate polymers using 3-point bending test
- Boosted degree of control of rubber trunk by 25%, redesigning rubber segments on CAD to make room for additional pneumatic attachment
- Prototyped 3 different segment molds that eliminated critical fabrication defects including air bubbles and leaks

MIT Course 2S.009 – Explorations in Product Design **Sept 2020 – Dec 2020**

- Collaborated with 15 colleagues to develop original exercise supplementing product over 12 week period
- Prototyped multiple flywheels out of various materials like aluminum, steel, and brass, using mills and lathes
- Engaged in 4 peer/professional reviews, incorporating feedback into future iterations of product
- Designed entire base component in Autodesk Fusion 360 after critical technical review pivot, integrating electronics and designing for manufacturability

MIT Course 2.008 – Design & Manufacturing II **Sept 2019 – Dec 2019**

- Mass produced 400+ parts and assembled 50 yo-yos through coordination with 5 colleagues and dividing up responsibilities for each component
- Created an organically shaped injection molded chocolate sauce component using Autodesk Fusion to run through 5 iterations to ensure robust fit with other parts
- Met all deadlines & milestones on time by reducing chocolate mold CNC machining time by 40%, creating 10 high quality halves & molding 100+ sauce components with negligible errors

MIT Course 2.007 – Design & Manufacturing 1 **Feb 2019 – May 2019**

- Constructed functional competition robot from 40+ self-made plastic/metal components from raw stock using sheet metal tools & machine lab equipment and parts provided by lab
- Designed 3 Solidworks assemblies with different mechanism and electrical sub-assemblies using potential game strategies, selecting based on construction feasibility & scoring potential
- Received high marks for maintaining detailed documentation of entire design process, including 30+ sketches, 100+ part bill of materials and feedback from weekly peer design reviews

MIT Course 2.00B – Toy Product Design **Feb 2018 – May 2018**

- Increased usability and appeal of toy designs by applying feedback gathered through bi-weekly play-testing sessions at Boston Children's Museum
- Created 3 functional "Bumper Clouds" toys, going through multiple modeling stages in design process using foam-core, cardboard, electronics, and store-bought materials
- Implemented essential function of toy by programming accelerometers to detect impact & LED Strips Electronics to light up in rainbow pattern in response

LEADERSHIP

MIT Institute Committee on Student Life - 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 - 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 Class Council 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 ACTIVITES

Reading, listening to music, DJing, dancing, skateboarding