Melissa Klein

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EDUCATION

Massachusetts Institute of Technology (MIT) Cambridge, MA
B.S. in Mechanical Engineering & B.S. in Music, GPA: 5.0/5.0 *June 2021*
Relevant Coursework: Bio-inspired Robotics, Precision Machine Design, Explorations in Product Design, Robotics, Mechanics and Materials I/II, Dynamics and Control I/II, Design and Manufacturing I/II, Thermal-Fluids Engineering I/II, Measurement and Instrumentation

RESEARCH EXPERIENCE

MIT Media Lab Cambridge, MA
Undergraduate Researcher with Biomechatronics Group *May 2020 – May 2021*
- Thesis: "Design and Characterization of a Nonlinear Stiffening Spring for a Series-Elastic Ankle-Foot Prosthesis." Advisor: Hugh Herr
- Developed a parametric design of a nylon foot spring for a powered ankle-foot prosthesis by CAD modeling in SolidWorks, creating a mathematical model of spring deflection, and simulating the spring's complex geometries using Ansys
- Designed and built an experimental setup to test the spring's deflection due to a compressive force using an Instron Test System

MIT Department of Mechanical Engineering Cambridge, MA
Undergraduate Researcher at Traverso Lab in collaboration with Lincoln Laboratories *September 2019 – May 2020*
- Designed and fabricated prototypes of kirigami (patterned cut) surfaces wrapped around airfoil geometries to determine their potential for generating lift and drag and be embedded into aerial robot wing designs
- Performed FEA simulations using Abaqus and SolidWorks to determine the metamaterial's response when stretched

German Aerospace Center (DLR) Stade, Germany
Mechanical Engineering Intern *June 2019 - August 2019*
- Designed tow winding device, material supply unit, and robotic end-effector prototypes for the testing of carbon composite heating methods used in the Automated Fiber Placement process for airplane frame manufacturing
- Created prototypes by CAD modeling, generating engineering drawings, and assembling and adjusting features to fit design constraints

MIT Department of Mechanical Engineering Cambridge, MA
Undergraduate Researcher at Therapeutic Technology Design and Development Lab *September 2018 - May 2019*
- Designed a soft robotic jellyfish prototype by generating design parameters via MATLAB, CAD modeling silicone molds using SolidWorks and fabricating pre-curved fiber-reinforced actuators capable of controlled complex bending motion
- Investigated actuator flexing with different pressure inputs, helped analyze the data using digital image correlation and helped demonstrate successful movement of the prototype in media such as water

MIT Media Lab Cambridge, MA
Undergraduate Researcher with Biomechatronics Group *February 2018 - August 2018*
- Designed a protective case using SolidWorks for single-board computers that can be attached to a sensor-driven prosthesis
- Ran dynamometer tests by co-fabricating a test bench, creating an algorithm to automate motor characterization and setting up communication between 2 microcontrollers and motors

INDUSTRY EXPERIENCE

ASML Wilton, CT
Mechanical Design Engineer *July 2021 - present*
- Developing early-stage mechanical components for a next-generation deep ultraviolet (DUV) lithography machine by identifying module requirements, modeling parts and assemblies using Siemens NX, and performing first-order machine design calculations to ensure that cleanliness, throughput, and nanometer-level precision requirements for the overall system are met

Boeing Commercial Airplanes Everett, WA
Flight Controls Engineering Intern with 777X Primary Flight Controls *May 2020 – August 2020*
- Developed tests to verify linear modeling software with flight simulation data by performing frequency sweeps of signals
- Analyzed and facilitated discussions regarding discrepancies in flight test data
- Assessed flight controls test bench signal outputs to ensure pre-determined controls requirements were met

Box Fort, Inc. Norwood, MA
Design and Engineering Intern *January 2020*
- Hosted play-tests for prototypes, designed sketch models and pitched concepts for interactive entertainment experiences

LEADERSHIP & TEACHING EXPERIENCE

MIT Pi Tau Sigma (PTS) Mechanical Engineering Honor Society Cambridge, MA
Vice President *February 2020 – January 2021*

- Introduced and organized "Faculty Chats," monthly informal sessions connecting undergraduates to MIT mechanical engineering faculty where faculty guests discuss their career journeys and give advice
- Served on the Student Advisory Board for the mechanical engineering department, providing an undergraduate perspective to ongoing issues in the department and giving planning advice during the transition from in-person to virtual education due to COVID
- Actively led and advised over 50 members; boosted morale by hosting study breaks and creating care packages
- Hosted workshops for mechanical engineering undergraduates on course planning and career development

MIT Toy Product Design Class Cambridge, MA
Lab Assistant *February 2020 – March 2020*

- Guided first-year mechanical engineering students through the early stages of product development and supervised them in the machine shop

MIT International Science and Technology Initiatives Pavia, Italy
Math and Physics Instructor *January 2019*

- Individually prepared and presented 5 hours daily of lecture and activities to teach kinematics, probability and statistics to 200 2nd-5th year Italian secondary school students and advised teachers on how to make STEM education more interactive

PUBLICATIONS

Hu, L., Gau, D., Nixon, J., **Klein, M.**, Fan, Y., Menary, G., and Roche, E. T., 2021, "Precurved, Fiber-Reinforced Actuators Enable Pneumatically Efficient Replication of Complex Biological Motions," Soft Robotics.

AWARDS & DISTINCTIONS

2021 Tau Beta Pi Engineering Honor Society Membership
2021 Phi Beta Kappa Honor Society Membership
2021 Thomas Sheridan Prize: *awarded to mechanical engineering capstone project team for creativity in man-machine integration*
2021 MIT MTA Philip Loew Memorial Award: *in recognition of creative accomplishments in music*
2020 ATHack (Assistive Technology Hackathon) Documentation Award
2020 MIT Burchard Scholar: *for excellence and engagement in humanities, arts, and social sciences*
2019 Pi Tau Sigma Mechanical Engineering Honor Society Membership
2017 MIT Emerson Scholar: *conservatory-level program funding private music lessons; performed in a 50-minute solo piano recital*

SKILLS & AFFILIATIONS

Design/Analysis Software: SolidWorks (Proficient), Siemens NX (Proficient), Ansys (Proficient), Autodesk Fusion 360 (Basic), Abaqus (Basic)
Prototyping/Manufacturing: CNC Machining (Lathe, Mill), 3D Printing, Laser Cutting, Soldering, Thermoforming, Injection Molding
Programming: MATLAB (Proficient), Python (Proficient), Java (Basic), C++ (Basic)
Languages: Fluent in English, German and Chinese
Additional Affiliations: Sigma Kappa Sorority, MIT Chamber Music Society