

Mark D. Galperin

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EDUCATION

Northwestern University Evanston, IL

Master of Science in Mechanical Engineering with concentration in robotics

Bachelor of Science in Mechanical Engineering, Segal Design Certificate

Jun. 2021

GPA: 3.55 / 4.00

GPA: 3.52 / 4.00

MS Thesis: *Whisker Frames: A Mechanism for the Biomimetic Actuation of Rodent Whiskers*

Relevant Coursework: *Robotic Manipulation, Soft Robotics and Sensory Acquisition, Control Theory, Mechanical Design Principles*

WORK AND RESEARCH

The Ruta Lab at The Rockefeller University

Jan. 2022 – Present

Mechatronics Engineer

- Working as the sole engineer assisting neuroscientists by building complex “virtual reality” systems for flies
- Wrote user-friendly and performant software to control multi-component virtual reality experiments
- Manufactured precision instrumentation to accurately acquire data, calibrate stimuli, and tether fruit flies
- Managed and organized a shop space for optomechanical assemblies and electronics prototyping
- Created teaching guides and wrote documentation to relay engineering information to the laboratory
- Used Robotic Operating System 2 (ROS2) to modularize and integrate experimental software

SeNSE Group of Prof. Mitra Hartmann

Jan. 2019 – Jan 2022

Graduate Student Researcher

- Designed an original mechanism to mimic the movement of rat whiskers, for use in robotic sensing
- Built, programmed, and tested a robotic mechanism composed of machined, 3D-printed, and laser-cut parts
- Derived a mathematical model relating the system kinematics to biological motions
- Wrote MATLAB packages to calculate and visualize optimal mechanism motion to replicate behavior from video data
- Synthesized theory and results into an MS Thesis and working on a manuscript for publication

Northwestern Prototyping and Fabrication Lab Evanston, IL

Oct. 2018 – Apr. 2021

Shop Trainer

- Trained Northwestern students to operate milling, turning, laser-cutting, and woodworking equipment
- Assisted with fabrication and consultation for Northwestern design projects

DESIGN PROJECTS

Northwestern University Solar Car Team

Sep. 2019 – Mar. 2020

Senior Capstone Consultant

- Designed A-arms and other suspension components for use in the 2020 American Solar Challenge
- Used Solidworks to model weldments, perform finite-element analysis, and produce drawings
- Procured materials and managed manufacturing of self-made machined and welded components
- Documented progress with weekly status reports, specification sheets, and design documents

Encouraging Foraging Activity at the Shedd Aquarium

Jan. 2019 – Jun. 2019

Design Capstone Project

- Worked with the Chicago Shedd Aquarium to improve the active health of Nickel, a sea turtle
- Performed FMEA to ensure safety of surrounding fish and water quality over time
- Engineered an underwater feeding system composed of pneumatic, mechanical, and electronic parts

LEADERSHIP EXPERIENCE

Engineers for a Sustainable World at Northwestern Evanston, IL

Apr. 2017 – Mar. 2020

Co-President

- Managed a collection of sustainability-oriented design projects with more than 40 active members
- Expanded recruitment, organized social events, and fostered new projects

TECHNICAL SKILLS

Modeling and Manufacturing

- Proficient in Solidworks, OnShape, and Siemens NX for modeling, assemblies, and CNC programming
- Adept in traditional machining, turning, rapid prototyping, and CNC machining

Mechatronics and Programming

- Proficient in Python, C/C++, MATLAB, Julia
- Worked extensively with PIC32 microcontrollers, as well as Arduino and Adafruit CircuitPython boards
- Experienced in PCB design, peripheral communication protocols, PID control, and motor implementation
- ROS2 for system integration, modeling and simulation