

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, Human Centered Product Design, Linear, Digital, Non-linear Control Theory, Mechanical Design Principles*

DESIGN AND RESEARCH PROJECTS

SeNSE Group of Prof. Mitra Hartmann Northwestern Dept. of Mechanical Engineering, Evanston, IL
Researcher

Jan. 2019 – Present

- Conceived, modeled, and built an original mechanism for the biomimetic actuation of rat whiskers in a 5x-scale robotic rat head
- Developed a mathematical model for whisker trajectories as a function of mechanism input
- Used MATLAB 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 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
- Optimized suspension geometry, modeled assemblies and performed FEA in Solidworks
- Created drawings and machined fixtures and components for A-Arms

DSGN 384: Interdisciplinary Design Projects

Jan. 2019 – Jun. 2019

- Worked with the Shedd Aquarium to improve the active health of Nickel, a sea turtle
- Produced *Nickel Surprise*: a system of underwater food dispensers controlled by trainers above water
- Engineered a system composed of electronic controls, pneumatic actuation, and movable units

NU Urban Agriculture Evanston, IL

Oct. 2016 – Mar. 2020

Head Project Manager

- Leading a design project to produce a miniature “tabletop” hydroponics system for student use
- Pitched a novel, modular hydroponic design to Northwestern and Compass Food Services executives
- Built ebb-and-flow hydroponic systems to efficiently yield tomatoes, leafy greens, and beans

DSGN 308: Human-Centered Product Design

Jan. 2018 – Mar. 2018

- Developed *Chalk-Chilla*, an unconventional chalk bag for recreational climbers
- Observed and tested *Chalk-Chilla* with climbers at First Ascent in Chicago

Architectural Projects

Sep. 2018 – Sep. 2019

- Designed a 2600 sq. foot house for an Evanston site following a thorough architectural design process
- Reimagined the façade of BBVA Tower in Madrid at the NU+ARUP Façades Week in Madrid, Spain

TECHNICAL SKILLS

Modeling and Fabrication

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

Mechatronics and Programming

- Worked extensively with PIC32 microcontrollers, as well as Arduino and Adafruit CircuitPython boards
- Experienced in PCB design, SPI and I²C communication, PID control, and motor implementation
- Performed modeling and simulation with Robotic Operating System (ROS)
- Proficient in Python, MATLAB, C

LEADERSHIP AND WORK EXPERIENCE

Engineers for a Sustainable World at Northwestern Evanston, IL
Co-President

Apr. 2017 – Present

- Managing a collection of sustainability-oriented design projects with more than 40 active members
- Helped organize a clean energy-focused career event in coordination with Dayaway careers
- Expanded recruitment, organized social events, rebranded and revitalized older projects

Northwestern Prototyping and Fabrication Lab Evanston, IL
Shop Trainer

Oct. 2018 – Present

- Training Northwestern students to operate milling, turning, laser-cutting, and woodworking equipment
- Assisting with fabrication for Northwestern design projects