Mark D. Galperin

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WORK AND DESIGN EXPERIENCE

CATALOG Technologies Inc. Charlestown, MA — Sep. 2023 – Mar. 2025
Mechatronics Engineer II

- Designed critical mechanical subsystems for a next-generation DNA data storage system in a fast-paced R&D environment
- Developed diverse rapid prototypes (electromechanical, pneumatic, fluid) to de-risk concepts and refine design scope
- Provided analyses to steer early, system-level design decisions, ensuring system reliability and scalability
- Worked with biologists to define test plans, investigate chemical robustness, and communicate results across domains
- Built and led in-house manufacturing capabilities, serving as a primary prototyping resource and mentor

The Ruta Lab at The Rockefeller University. New York City, NY — Jan. 2022 – Sep. 2023
Mechatronics Engineer

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

SeNSE Group of Prof. Mitra Hartmann Evanston, IL — 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 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

TECHNICAL SKILLS

Mechanical Design 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

Embedded Systems and Programming

- Proficient in Python and MATLAB for numerical analysis, symbolic algebra, live visualization, and just about anything else
- Skilled in C++ for robotic system programming, GUIs, and Arduino-framework prototyping
- Experienced with integrating industrial IO (PLCs, actuators, data acquisition) with computer interfaces
- Practiced in PCB design (KiCAD, Eagle), and manual soldering for electronic prototypes
- Robotic Operating System (ROS2) for system integration, modeling and simulation

EDUCATION

Northwestern University Evanston, IL
Master of Science in Mechanical Engineering with concentration in robotics — Jun. 2021
Bachelor of Science in Mechanical Engineering, Segal Design Certificate — Jun. 2020

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

PUBLICATION AND PATENTS PENDING

Galperin, M., Kleczka, K., Hartmann, M., et al. (2025). "Vibrissa-inspired control of the orientation of an array of end-effectors." Preprint. Research Square. https://doi.org/10.21203/rs.3.rs-6017734/v1

Named pending inventor on the following Patent Applications:

- #63/756,894: 'Fluid Recovery System (Recovery Jig)' (Inventors: Mark Galperin, Genevieve Steever – all pending)
- #63/704,880: 'Nucleic acid writer' (Inventors: David Kleiman, Mark Galperin, Ellen Simmons – all pending)