Samuel Kirschner

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Education

Massachusetts Institute of Technology — Cambridge, MA
Ph.D. in Mechanical Engineering (in progress), GPA 5.0 — Sept. 2025 - Present

Georgia Institute of Technology — Metz, France | Atlanta, GA
B.S. in Mechanical Engineering, GPA 3.98 — Jan. 2022 - May 2025

Experience

Fabrication-Integrated Design Lab — Cambridge, MA
Therapeutic Technology Design & Development Lab — Sept. 2025 - Present
Graduate Researcher

- Developing water-reactive metal power systems for untethered robots, integrating reactor design, electrochemical energy conversion, pneumatic actuation, and magnetic controls.
- Designing medical devices for actuation and sensing, including a compact device for monitoring intramuscular compartment pressure and a hydraulic piston drive for an artificial heart ventricle.
- Experimentally characterized a catalytic hydrogen peroxide decomposition engine for pneumatic soft robots, demonstrating compact, high-output pressure generation.

NASA Johnson Space Center — Houston, TX
Engineering Intern — June 2024 - Aug. 2024

- Modeled end-to-end lunar water-mining and processing architectures, integrating component, energy, and resource flows for sustained lunar operations.
- Translated strategic mission objectives into technical design requirements and presented an MBSE software trade study to division leadership to standardize tool standardization.

Geometry of Materials Lab — Atlanta, GA
Undergraduate Researcher — Jan. 2022 - May 2025

- Developed mechanically programmed wearable structures with spatially varying mechanical anisotropy to tailor knee torque–angle behavior; co-authored a paper demonstrating the concept (*arXiv:2509.22971*).
- Designed experimental hardware and characterized wearable-device mechanics using motion capture, EMG, torque–angle testing, and custom instrumentation to inform optimization-based design.
- Characterized anisotropic elephant-skin mechanics using digital image correlation and translated biological mechanisms into engineered soft-material concepts.

NASA Marshall Space Flight Center — Huntsville, AL
Engineering Intern — June 2022 - Aug. 2022

- Developed a dynamic model of crewed lunar surface operations, adopted by NASA's Architecture and Baseline Definitions team to support Artemis III mission planning.
- Integrated Monte Carlo simulation capabilities into the Lunar Exploration Architecture Framework using SysML to predict operation timing and probability of mission success.

Relevant Coursework

2.810 Advanced Manufacturing
2.77 Precision Product Design
2.S986 Robotic Locomotion Across Fluids
2.131 Advanced Instrumentation and Measurement

Skills

Design: AI-in-the-Loop Design, Precision Machine Design, CAD (SolidWorks, Fusion 360), DFM
Analysis and Modeling: MATLAB, Python, Model-Based Systems Engineering (SysML)
Manufacturing: Additive Manufacturing, Injection Molding, Elastomer Casting, Milling, Lathe, Waterjet
Experimental Characterization: Precision Metrology, Custom Instrumentation, Mechanical Testing