

# Madison Voytko

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## EDUCATION

**University of Colorado Boulder**, *College of Engineering and Applied Science*    Boulder, CO | Expected Graduation May 2026

- B.S in Biomedical Engineering, Minor in Materials Science & Engineering
  - Involvements: Society of Women Engineers (SWE), MPOWR Kickboxing, CU Boulder Hiking Club
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## PROFESSIONAL EXPERIENCE

**Undergraduate Researcher**, *Neu Research Lab*

Boulder, CO | August 2025 - Present

- Investigated joint-on-chip systems to model osteoarthritis progression by integrating microfluidic design with tissue engineering techniques, enabling more physiologically relevant disease modeling for therapeutic testing.
- Performed molecular assays, including qPCR, ELISA, and confocal microscopy to quantify cellular responses and validate experimental outcomes, contributing to reproducible and data-driven insights.
- Refined lab safety protocols and SOPs through detailed documentation and visual onboarding guides, improving compliance and onboarding efficiency for new lab members.
- Authored fabrication and equipment protocols, including chip piece preparation and plasma treater operation, to standardize experimental workflows and ensure reproducibility in biomedical research.
- Collaborated with faculty and peers across disciplines to align engineering and biological approaches, enhancing the translational relevance of research findings.

**Startup Operations & Innovation Intern**, *MPOWR Kickboxing*

Golden, CO | May 2025 - August 2025

- Worked side-by-side with the founder to launch a new fitness-based company and franchise, contributing to brand development, operational systems, and community engagement from inception.
  - Designed and implemented the member onboarding process, creating scalable workflows and training materials with minimal guidance.
  - Led onboarding for new team members by delivering targeted training on proprietary platforms and operational tools, accelerating ramp-up efficiency and reinforcing system-wide consistency in client deliverables.
  - Managed social media strategy and created branded content to build awareness, foster community, and drive early membership growth.
  - Led client outreach and engagement efforts, translating brand values into personalized experiences and cultivating a loyal member base.
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## ENGINEERING PROJECTS

**Test & Systems Engineer**, *3D-Printed Biomimetic Phantom Development for qMRI*

Boulder, CO | August 2025 – Present

- Collaborated with CaliberMRI and a six-engineer team to develop and validate a biomimetic 3D-printed phantom for quantitative MRI calibration.
  - Designed and executed system-level testing protocols evaluating seal integrity, structural stability, and thin-wall performance.
  - Identified critical failure modes, including SLA cupping, 300- $\mu$ m wall fracture, seal degradation, and chamber leakage, and translated findings into targeted design modifications.
  - Optimized print orientation, venting, and support strategy with fabrication partners to reduce cupping forces and improve thin-feature fidelity.
  - Built a comprehensive FMEA to prioritize high-risk mechanisms and guide iterative redesign efforts.
  - Prepared detailed technical documentation, test logs, and failure analyses to support traceability and design decision-making.
  - Delivered comprehensive presentations to CaliberMRI, communicating test results, risks, and proposed design improvements.
  - Next Steps: Validate the phantom under MRI, introduce biomimetic hydrogels to reduce barrier diffusion, and further refine sealing strategies for long-term stability.
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## TECHNICAL SKILLS

**Engineering Applications:** Prototype Development · Ergonomic Design · Sustainable Materials Selection · User-Centered Design · Systems Optimization · Design Validation

**Laboratory & Research:** Experimental Design · Protocol Development · Data Analysis · Biotransport Modeling · Laboratory Safety Practices

**Software & Tools:** SolidWorks (CAD & FEA) · MATLAB · Workflow Training Tools · Visual Communication Platforms

**Technical Communication & Coordination:** Technical Documentation · Team Collaboration · Training & Onboarding · Process Design · Public Presentations · Strategic Communication · Technical Writing

**Additional Strengths:** Startup Operations · Client Engagement · Coaching & Team Motivation