

# Ashley Miller

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## SUMMARY

Biomedical and mechanical engineer (MS Biomedical Engineering, Columbia; BS Engineering Physics, Cornell) working across the full development cycle — from CAD and 3D-printed prototypes to FEA, DOE-driven optimization, and cGMP verification & validation. Hands-on experience building medical devices, automated diagnostic platforms, and AI-assisted hardware systems, with a track record of owning projects end-to-end and translating engineering work into field- and clinic-ready outcomes.

## EDUCATION

### Columbia University

MS in Biomedical Engineering, GPA: 4.0/4.0

New York, NY

Sep 2024 — Feb 2026

Coursework: Drug & Gene Delivery, Quantitative Physiology, Biomechanics, Numerical Methods, Robotics, Life Sciences Entrepreneurship

### Cornell University

BS in Engineering Physics, GPA: 3.5/4.0

Ithaca, NY

Aug 2020 — May 2024

Coursework: Mathematical Physics, Mechanics, E&M, Quantum Mechanics, Statistical Thermodynamics, Electronic Circuits, Nuclear Engineering, OOP & Data Structures, MATLAB, Cell & Developmental Biology, Orthopedic Tissue Mechanics

## TECHNICAL SKILLS

**Design & Fabrication:** SolidWorks, Autodesk Inventor, Fusion 360, AutoCAD, Engineering Drawings, DFM, GD&T, 3D Printing, Manual Mill/Lathe, Soldering, Laser Cutting, Embedded Systems

**Simulation & FEA:** Ansys (Mechanical, HFSS, Fluent), Genesys, OnScale, LTSpice, PyBullet

**Programming:** Python, C++, MATLAB, Java, ROS

**Data & Statistics:** Excel, Minitab, DOE, statistical analysis

**Lab & Regulatory:** cGMP, V&V protocols, wet lab, DOE, root cause analysis

## PROFESSIONAL EXPERIENCE

### Brekland

Mechanical Engineering Intern (part-time)

Brooklyn, NY

Feb 2026 — May 2026

- Owned full-cycle development of two AI-assisted vision systems for precision sprayers, delivering a field-ready MVP in 3 months.
- Managed the BOM, designed components in Fusion 360, and programmed C++/Arduino controls; conceived a novel object-selection algorithm and built Python GUI tools for calibration and monitoring.
- Engineered and 3D-printed custom mounting hardware and a benchtop validation enclosure for structured, repeatable testing under real-world conditions; authored operator documentation and a market-informed commercialization roadmap.

### Werfen

R&D Systems Engineering Co-op (full-time)

Norcross, GA

Jun 2025 — Aug 2025

- Executed cGMP-compliant V&V protocols on two novel automated blood-testing platforms; debugged 5+ hardware/software failures through hands-on repairs and cross-functional work with internal teams and external manufacturers.
- Reduced reagent waste by 64% by optimizing pipettor parameters through data-driven DOE and assay-constraint analysis.
- Investigated well spillage via root-cause analysis — modeling centrifuge ramp profiles in Excel and analyzing packaging, storage, and lot variation in Minitab — exposing an injection-molding defect in specific batches.

### Adie Research Group, Cornell University

Undergraduate Researcher (part-time)

Ithaca, NY

Jun 2023 — May 2024

- Innovated mechanical components enabling a 65 MHz increase in ultrasound frequency for an ARF-OCE (Acoustic Radiation Force – Optical Coherence Elastography) imaging system, incorporating user feedback to accelerate clinical translation.
- Led FEA in Ansys to reconstruct phantom mechanical properties, predict acoustic-radiation-force effects, and validate against gold-standard equipment — bridging simulation and experimental biomechanics.

### TTM Technologies

RF and Microwave Engineering Intern (full-time)

Syracuse, NY

Jun 2023 — Aug 2023

- Evaluated RF component designs end-to-end: modeled manufacturability via tolerance analysis in HFSS/AutoCAD, ran hands-on testing with network analyzers, and benchmarked results against customer specifications.
- Diagnosed the root cause of a manufacturing defect by x-ray imaging the internal structure, reverse-engineering it in simulation, and validating with experimental test data.

## Cornell Electric Vehicles

*Drivetrain Sub-system Lead (part-time)*

Ithaca, NY

*Jan 2023 — May 2023*

- Led 20 engineers through the team's first full jiggling and assembly project, synchronizing all mechanical subsystems with tolerance-driven jig design; partnered with five leads on data-driven motor selection (torque, RPM, performance).

*Drivetrain Engineer (part-time)*

*Oct 2020 — Jan 2023*

- Designed and manufactured drivetrain components (sprockets, brake mount, axles) using Autodesk Inventor, Ansys stress analysis, and manual machining; modeled holistic vehicle efficiency with physics-based calculations.

## Climate Engineering Lab, Cornell University

*Undergraduate Research Assistant (part-time)*

Ithaca, NY

*Oct 2021 — Jan 2022*

- Edited climate-model code in MATLAB and Fortran on the GAUSS project (with Dr. Douglas MacMartin) to simulate cooling of the Great Barrier Reef; generated IPCC-style plots of regional climate change.

## TEACHING

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### Introduction to Controlled Fusion, Cornell University

*Teaching Assistant / Grader (part-time)*

Ithaca, NY

*Jan 2024 — May 2024*

- Held weekly office hours, graded problem sets and exams, and led lectures in the professor's absence for a class of 30 undergraduate and graduate students, communicating advanced physics in clear, simple terms.

### Private Tutor

*Self-Employed (part-time)*

Mountain Lakes, NJ

*Sep 2018 – March 2020 & Feb 2026 -- Present*

- [Tutored students in (subjects / level); add scope or outcome — e.g., number of students, results, or focus area.]

## SELECTED PROJECTS

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### ElectroBottle | Innovation, Design & Entrepreneurship, Columbia University

*Sep 2025 — Present*

- Leading a team of 4 to design a smart water bottle for passive electrolyte and hydration tracking; grounding design in 20+ patient/expert interviews and prototyping 3+ novel electromechanical dispensing systems in SolidWorks.

### Rainbow RoboCat | Robotics Studio, Columbia University

*Jan 2025 — May 2025*

- Owned full-cycle development of a walking quadruped robot on a \$100 budget (Autodesk Inventor, Raspberry Pi, 3D printing, Python); achieved a 38 cm/s gait optimized with ROS and ML-based gait tuning in PyBullet.

### CFD Modeling of Arterial Obstruction | Advanced Experimental Physics Lab, Cornell University

*Jan 2024 — May 2024*

- Simulated blood flow through healthy vs. obstructed arteries in Ansys Fluent (CAD, meshing, boundary conditions); uncovered a 7% peak-wall-stress increase and identified regurgitation regions indicating elevated aneurysm risk.

### Atelier Vintage | Independent Sustainable-Fashion Project

*Sep 2025 – December 2025*

- Founded and built Atelier Vintage, an independent sustainable-fashion project, owning it end-to-end from concept through launch and applying an engineer's systems mindset to a creative product. [Refine with what Atelier Vintage actually makes/does.]

## VOLUNTEER & LEADERSHIP

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### Kiwanis Ambulance Service of Boonton

*Youth EMT Squad Member*

Boonton, NJ

*Mar 2018 — Mar 2020*

- Volunteered 250+ hours providing patient care in crews of 3–5 — handling equipment, rig checks, and vital-sign recording — and trained new youth members.

### incrAmath

*Co-Founder*

New Jersey

*Mar 2019 — Aug 2020*

- Co-founded a free volunteer tutoring organization pairing high schoolers with low-income middle schoolers; built the website, recruited tutors, and designed a sustainable organizational structure.

### Girl Scouts of Northern New Jersey

*Gold Award Recipient*

New Jersey

*Sep 2007 — Jun 2020*

- Dedicated 80+ hours to a Gold Award project on reducing sports-related injuries, partnering with a physical therapist to research common injuries and build prevention-education resources.