Michael Chen

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EDUCATION

Northwestern University — Evanston, IL **Expected June 2028**
Bachelor of Science, **Mechanical Engineering** | GPA: 3.50 / 4.00

TECHNICAL SKILLS

CAD & Design: Onshape, SolidWorks, NX, GD&T, Tolerance Analysis, Technical Drawings
Programming: C++, Python, MATLAB, Embedded Serial / I^2C
Test & Analysis: FEA, Metrology, Load Testing, Force Gauges, Accelerometers, Oscilloscopes, Calipers
Fabrication: 3D Printing (FDM / PLA), CNC Milling, Bandsaw, Soldering

ENGINEERING EXPERIENCE

Undergraduate Researcher — Sub-Micron Metrology Rig, HAND ERC **July 2026 – Present**
- Designed a **3-axis calibration rig** for 100 µm sensors: **0.2 µm positional resolution**, **20 N** force capacity at **5 mN resolution**, on a **$3,000** budget.
- Programmed a **Teensy 4.1 USB Host** controller to drive **Thorlabs servo-actuators** via **low-level hex commands**, bypassing PC-link latency.
- Developed a **Series Elastic Actuator (SEA)** assembly filtering **mechanical noise and stiction** from the sensing path for laboratory-grade data.
- Sourced **high-precision optical hardware** on a 12-week deadline, negotiating spec and lead-time tradeoffs across **8 research vendors**.

Plucking & Strumming Subsystem Lead — Robotics Club, Robotic Band **Sept 2025 – Present**
- Delivered 2 of 4 subsystems on a 6-string **automated robotic guitar**, integrating with a teammate's **solenoid fretting system**.
- Engineered a **servo-driven rotational plucking mechanism** on **ball bearings** with custom **PLA** mounts, achieving repeatable single-string plucks.
- Owned a **dual-solenoid bidirectional strummer** end to end — concept, **Onshape** modeling, and working hardware sweeping all six strings.
- Eliminated rod deflection and vibration via tight **geometric tolerances** on base-plate mounts sized for **press-fit bearings**.
- Expanding dynamic range to **3 articulations** with a **linear-solenoid selective string-muting mechanism**, currently in test.

Undergraduate Researcher — Northwestern Haptics Lab **July 2025 – Sept 2025**
- Built an **acceleration and position tracking system** on an **Optical Touch Bar**, capturing motion data for **texture simulation** studies.
- Integrated results into a **VR environment**, aligning **electro-adhesive feedback** with human tactile perception.

Engineering Lead — QuickLift Accessibility Device, Design for Disability (D4D) **Mar – June 2025**
- Designed and prototyped a **mechanical lift mechanism** enabling independent seat-height adjustment for manual wheelchair users.
- Verified a **2× safety factor** at **300 lb** with zero failures, validating **structural FEA** against **physical load testing**.
- Drove **5 design refinements** by authoring a formal research report on empirical user-testing and load-testing results.
- Delivered a functional prototype on schedule by coordinating subsystem integration across a **3-person team**.

Accumulator Design Engineer — Northwestern Formula Racing (FSAE) **Nov 2024**
- Engineered a structural **mounting system** for a **high-voltage accumulator** meeting **FSAE longitudinal and vertical impact standards**.
- Built **3D CAD assemblies** and ran **stress simulations** in **SolidWorks**, resolving packaging constraints while cutting weight and improving chassis stiffness.

Designer & Developer — Expressive Helmet System, Independent Project **Mar – June 2024**
- Wrote **control software** translating raw **motion-sensor data** into real-time visuals on a front-facing display.
- Fabricated the enclosure and wired **sensor and display hardware** into one wearable build (end-to-end **system integration**).

ADDITIONAL

Freelance Soundtrack Composer & Producer — Independent **Dec 2024 – Present**
- Producing videogame soundtracks for **Fishy Studios** and **Headup Games**; 20 released tracks with 37K+ streams.