

PRERAK MAHAJAN

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SKILLS

CAD & Mechanical Design: SolidWorks (assemblies, motion constraints), AutoCAD, ergonomic form-factor optimization, iterative prototyping, structural redesigns, introductory FEA coursework (SolidWorks Simulation).

Fabrication & Hardware: 3D printing (PLA/PETG), aluminum housings, machining (drill press, bandsaw, grinder, planer, Dremel, table saw), jig design, soldering stations, board level soldering, multimeter diagnostics.

Product Development & Testing: Acoustic/thermal/duration testing, SPL and frequency analysis, outdoor trials, oscilloscopes (Rigol/Siglent), OnoSokki FFT analyzers, signal generators, precision amplifiers.

Software & Data: Microsoft Office Suite, Python (Pandas, NumPy, Matplotlib, Scikit-learn), C++, HTML/CSS.

EXPERIENCE

Robotics Engineering Intern

Jun 2025 – Present

Prandtl Dynamics

Richmond Hill, ON

- Co-invented a **patent-pending counter-UAS system** (63/886,270), leading CAD prototypes of **4 device iterations** in SolidWorks and optimizing for **ergonomic military maneuverability** with operational realism.
- Conducted **500+ acoustic validation tests** with Rigol/Siglent oscilloscopes and OnoSokki FFT analyzers, measuring SPL decay and frequency response from **30 cm–15 m**, logging 5 min–3 hr trials, and identifying overheating failures that led to housing redesigns and upgraded outdoor components for **extended field deployment reliability**.
- Designed and fabricated **3D-printed sliding jigs**, standardizing transducer alignment and integrating aluminum assemblies with shop tools (drill press, bandsaw, grinder, planer, Dremel, table saw), significantly improving repeatability with **25% tighter acoustic groupings achieved through calibrated mechanical fixtures**.
- Completed a **drone-calibration jig** from aluminum and wood, integrating custom camera and microphone mounts to standardize counter-UAS alignment across drone platforms with **precision multi-axis mechanical adjustment**.
- Presented technical results with graphs to officials from **Top 15 aerospace companies** and government representatives, defending methodology and mechanical validation outcomes in professional review sessions.

Machine Learning Engineering Intern

Jun 2024 – Aug 2024

Amazon Web Services

Toronto, ON

- Collaborated in a small **engineering team** to build and optimize **Python models** in **AWS SageMaker**, testing multiple algorithms on a large dataset and achieving strong predictive performance while developing advanced **leadership, teamwork, and technical communication** skills through structured workflow organization.

Cell Phone Engineer

Jun 2022 – Present

PrerakPhones

Brampton, ON

- Performed **board-level soldering, micro-assembly, and diagnostics** to restore **50+ mobile devices**, including logic board trace repair, FaceID sensor alignment, and lithium-ion battery calibration under **thermal load**.
- Utilized precision tools (multimeters, soldering stations, heat guns, microscopes) to repair assemblies with consistent **1–3 day turnaround**, addressing challenges of **high-density boards and heat-sensitive components**.

PROJECTS

Machined Keychain | *SolidWorks, machining*

Sept 2025

- Modeled a fully detailed **mechanical keychain assembly** in **SolidWorks** using the full **engineering design cycle**, incorporating moving components, clearance analysis, and manufacturing constraints.
- Applied **Hole Wizard, tolerancing, datums, and mates** to create manufacturable **parametric components** and produced concise, **professional technical drawings** with section views, GD&T, and standard dimensioning.
- Machined the keychain using the **lathe, mill, tap and die set, drill press, and finishing tools**, validating tolerances between CAD and the part and refining geometry through **iterative design-cycle feedback**.

AidAssist | *Raspberry Pi, CAD, Breadboarding, Soldering, 3D Printing*

Mar 2023 – May 2023

- Created a **handheld medical assistance device** designed for first aid kits, providing injury specific guidance.
- Designed **ventilated CAD enclosures** with sliding panels. **Integrated Raspberry Pi** breadboarded circuits to **soldered permanent connections** and validated functional checks under operating loads.

EDUCATION

University of Waterloo

Sept. 2025 – Present

BASc. Honours Mechatronics (Mechanical, Electronics, Computer) Engineering

Waterloo, ON