VIBHAS TALLAPALLI

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EDUCATION

University of Waterloo   Waterloo, ON
Candidate for BASc in Nanotechnology Engineering   *Sep 2025 – Present*
Expected Graduation: May 2030

TECHNICAL SKILLS

Microcontrollers: Arduino, ARM, AVR, embedded sensors, serial communication, hardware wiring debugging, and circuit prototyping.
Mechanical & Manufacturing: SolidWorks, Onshape, CAD Modeling, Tolerances, GD&T, DFM, DFA, Carbon-Fiber Fabrication, 3D Printing, Machining (Mill, Bandsaw, Lathe), Assembly, tolerance analysis.
Software: C++, Python, C, Arduino (C++), MATLAB, Git, Java, PID

EXPERIENCE

Waterloop Design Team (University of Waterloo)   Waterloo, ON
Mechanical Engineering Trainee   *Sep 2025 – Present*

- Owned and maintained a **100+ part Onshape assembly** integrating brakes, suspension, and battery packaging, used by the mechanical team as the **primary reference**.
- Designed brake mounting plates and pads using **GD&T**, achieving **first-pass manufacturing** and installation by a **20** member manufacturing team.
- Defined braking system interfaces (dimensions, clearances, hole locations) used across a **30+** member mechanical team.

Electrium Design Team (University of Waterloo)   Waterloo, ON
Mechanical Engineering Trainee   *Sep 2025 – Present*

- Created the **first SolidWorks CAD** of the e-bike frame, enabling battery enclosure and firmware packaging for a **35** member mechanical team.
- Led battery enclosure material selection, replacing aluminum with tempered glass and **saving $300+** across multiple builds.

Biomechatronics Design Team (University of Waterloo)   Waterloo, ON
Mechanical Engineering Trainee   *Sep 2025 – Present*

- Prototyped and tested thigh and shin strap systems for a first-generation lower body exoskeleton, stabilizing **4 human–device attachment points** during early system development.
- Tested strap routing and material feasibility through **2 prototype iterations**, identifying fabric constraints required for secure fit and functional movement.

PROJECTS

Smart Study Focus Timer
Python, SolidWorks, Arduino   *Winter 2026*

- Designed and built an embedded sensor device using **3 optical distance sensors** and an Arduino Uno, achieving **95% reliable presence detection** after **25+** hardware and logic iterations.
- Expanded detection range **45% beyond a laptop webcam**, enabling single-user and group use (**20+ users**) through sensor tuning, timing logic, and a custom enclosure.
- Implemented embedded control logic in **Arduino (C++)**, managing sensor polling, timing thresholds, and LED states to support **95% reliable** operation.

E-Bike Speed Control Simulation
C++, Python   *Fall 2025*

- Tuned **PID** speed control for an e-bike under load and terrain changes, improving simulated energy efficiency by **33%** and stability.
- Optimized a PID controller to reduce speed overshoot by **15%**, settling time by **20%**, and improve simulated energy efficiency by **40%** under changing load conditions.

Energy Collecting Turbine
CAD, Mechanical, Electrical   *Fall 2025*

- Built and CAD-modeled a rotating turbine component, increasing measured **DC output voltage by 32%** through iterative design and testing.
- Fabricated rotor components, validating mechanical fits to ensure smooth rotation with minimal friction.