Willis Wu

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Education

University of Toronto Sept 2024 – June 2029 (Expected)
BASc in Mechanical Engineering, PEY Co-op *Toronto, ON*

Honours: Dean's Honour List
Scholarships: Wallace G. Chalmers (2026); Engineering Alumni Network (2026); Hugh M. Brock National Entrance Scholarship (2024)

Technical Skills & Certifications

Mechanical Design: CATIA V5, SolidWorks, GD&T, Engineering Drawings
Structural Analysis: Abaqus, ANSA, ANSYS, FEMFAT, HyperWorks, Nonlinear FEA, Fatigue & Durability
Manufacturing & Test: Machining, 3D Printing, Mechanical Assembly, Sensor Integration, Test Fixtures
Programming: Python, C++, MATLAB, Linux, Swift
Certifications: CSWP, CSWA, Machining Certificate

Relevant Experience

Mechanical Design Engineer Intern May 2026 – Sept 2026
Volkswagen (China) Technology Co., Ltd. *Hefei, China*

- Reconstructed and modified production-intent **CATIA V5 models** of **five-link rear-axle components**, including control arms and a wheel carrier, supporting mounting-feature and geometry design iterations.
- Built and debugged **nonlinear structural FEA** models in **ANSA and Abaqus**, defining meshes, material models, coordinate systems, couplings, loads, constraints, and boundary conditions; **resolved convergence issues** and validated results against reference analyses.
- Performed **FEMFAT fatigue and durability analysis** using **multi-axis vehicle load spectra**, identified critical stress and fatigue locations, and supported design reviews, physical validation, and supplier-driven component iterations.

Mechanical Design Engineer June 2025 – Present
University of Toronto Supermileage *Toronto, ON*

- Led the **structural redesign** of a full-scale **chassis dynamometer test rig** from load-case development through CAD, FEA, fabrication, and vehicle testing.
- Derived **640 N operating and 1000 N overload** cases and built full-assembly **SolidWorks/ANSYS** models to evaluate frame stress, deformation, and structural margins.
- Achieved **0.1 mm maximum deformation** and **$> 2\times$ factor of safety**; supported engineering drawings, fabrication, assembly, and final hardware validation.

Research Assistant May 2025 – Aug 2025
UTIAS – Turbulence Research Laboratory *Toronto, ON*

- Designed, fabricated, and assembled **wind-tunnel hardware**, including a pivoting **NACA 0018 airfoil**, instrumentation mounts, and custom mechanical components.
- Integrated **pressure sensors and pressure-tap systems** for **angle-of-attack aerodynamic testing** and experimental data collection.
- Designed a **hot-wire probe repair and calibration fixture** and CAD-modeled custom brackets for instrumentation integration.

Structural / FEA Engineer Jan 2025 – Present
University of Toronto Aerospace Team *Toronto, ON*

- Prepared simulation-ready **CubeSat payload CAD** by **defeaturing assemblies** and simplifying non-critical geometry for structural analysis.
- Performed **ANSYS structural analyses** for **$\sim 13g$ quasi-static launch loading**, vibration, shock, and buckling conditions.
- Evaluated **stress, deformation, and interface behavior** to identify structural risks and support **payload design validation**.

Software & AI Engineer Intern Nov 2025 – Sept 2026
Careviv (Stealth Health-Tech Startup) *Vancouver, BC (Remote)*

- Developed an **AI healthcare navigation assistant** for clinic discovery, coverage questions, and booking workflows, incorporating user preferences, location, clinic data, reviews, affordability signals, and internal ranking logic.
- Built and refined **recommendation and decision logic** for patient-facing healthcare workflows, including data preprocessing, **model validation**, and LLM-assisted functionality.
- Adapted Careviv's existing web platform and backend workflows into **mobile-facing features**, supporting patient onboarding, GP access, family-doctor waitlists, and clinic discovery.

Projects

Engine Dynamometer | *SolidWorks, ANSYS FEA, Machining* Sept 2025 – April 2026

- Redesigned a drivetrain dynamometer structure in SolidWorks to improve **frame stiffness, shaft alignment, and measurement repeatability**.
- Performed **ANSYS structural analysis** of the frame and mounting interfaces to validate rigidity under operating loads.
- **Machined components, 3D-printed fixtures**, assembled the system, and validated the completed hardware through **physical testing**.

5-DoF Cinematography Robotic Arm | *SolidWorks* Sept 2025 – April 2026

- Designed a **261-component, 5-DoF robotic arm** in SolidWorks, developing the mechanical architecture, assemblies, interfaces, and transmission systems.
- Designed bearing supports, pulleys, **belt/gear reductions**, shafts, and structural members for stiffness, alignment, and smooth joint motion.
- Performed **joint torque and structural load calculations** to **size actuators and transmission ratios** and validate mechanical performance.

OverlayBD – Open-Source Contributor | *C++, Linux, Git/GitHub* July 2026 – Present

- Implemented **C++ validation and error-handling** improvements for **LSMT and ZFile index processing**, including safeguards for oversized index files and merged indexes.
- **Debugged unfamiliar systems code** across storage and indexing paths, traced edge cases through existing logic, and refined implementations based on **maintainer code review**.
- Built and ran **targeted regression tests** for index-size validation and merge behavior using Linux, Git, and the project's existing C++ test infrastructure.

Traffic Sign Recognition – Deep Learning | *Python, Docker, Google Colab* May 2025 – Aug 2025

- Developed a two-stage traffic sign recognition pipeline using **YOLOv11** for detection and a custom **PyTorch CNN** for classification, trained on **50k+** real-world Mapillary Traffic Sign Dataset images.
- Cleaned and organized labels, applied **targeted data augmentation** for class imbalance, and used **Docker/CUDA** workflows for reproducible model training and validation.
- Achieved approximately **83% detection accuracy** and **87% classification accuracy**, with end-to-end testing on webcam and vehicle-captured video under day/night conditions.