Wilson (Haoyang) Deng, EIT

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HIGHLIGHTS OF QUALIFICATIONS

- **EV & Battery System Design:** Experience with large-scale Li-ion battery testing, internal resistance matching, C-rating evaluation, and module assembly; improved potential cost effectiveness by 30%+ while ensuring safe, high-performance energy storage.
- **CAD & Product Design:** 5+ years using SolidWorks and AutoCAD. Created 50+ 2D/3D CAD models, performed material selection, stress analysis, and manufacturability reviews; reduced product weight by 15% and accelerated design iterations.
- **Automation & Control Systems:** 3+ years designing self-driving lab platforms integrating microfluidics, sensors, and control software; implemented PID control and signal processing achieving sub-100 ms response and >90% signal accuracy.
- **Prototyping & Technical Leadership:** Led fabrication using 3D printing, CNC, and PCB assembly; managed procurement, workflows, and team coordination to improve development efficiency and system reliability.

EDUCATION

Master of Applied Science - Mechanical and Industrial Engineering 2024 - 2026 June (Expected)

University of Toronto | Sinton Lab Toronto, Canada

Supervisor: David Sinton

Bachelor of Applied Science with Honor – Mechatronics and Solid Mechanical Design 2019 - 2024

University of Toronto Toronto, Canada

EXPERIENCE

Research Assistant – Self-Driving Lab Design March 2022 - Present

Sinton Lab (Fluidics and Energy) - University of Toronto Toronto, Canada

- **Autonomous System Design:** Designed and deployed three autonomous laboratory platforms integrating microfluidics, electrochemical instruments, sensors, and control software, increasing throughput by 40% and reducing manual work by 60%.
- **Microfluidic Device Engineering:** Fabricated 20+ microfluidic sensing devices using MEMS, CNC, and additive manufacturing, improving measurement accuracy by up to 25%.
- **Instrumentation Automation:** Developed Python-based control systems using RS232/RS485/UART, enabling reliable real-time data acquisition and closed-loop control while reducing data errors by 30%.
- **System Validation:** Executed 150+ structured experiments to verify reliability and electrochemical performance, achieving a 15% improvement in electrolyte efficiency.

Teaching Assistant – Electric Vehicle Design Sep 2024 - Dec 2025

Mechanical and Industrial Engineering – University of Toronto Toronto, Canada

- **Battery Testing:** Supervised large-scale Li-ion 18650 testing and internal resistance measurements for cell binning and matching with C-rating.
- **EV Dynamometer Testing:** Supported EV dynamometer testing, enforcing safety standards and guiding regenerative braking data collection.
- **Battery Module Design & Optimization:** Led battery module assembly/disassembly and provided suggestions on thermal management, recyclability, and BMS integration, improving 30% cost effectiveness by 30%+.

Product Designer   April 2024 - Dec 2024
Rangeview Sports Canada   Newmarket, Canada

- **CAD Design Optimization:** Created 50+ 2D/3D CAD models for optic mounts and sporting accessories, improving design iteration efficiency by 20% and ensuring manufacturability.
- **Material Selection Analysis:** Selected stainless steel, 7075/6061 aluminum, and titanium, reducing product weight by 15% while maintaining structural integrity and standards compliance.
- **Cost Reduction Strategy:** Conducted cost analysis on 10+ components, identifying efficiencies that saved ~$5,000 per product line.

Research Assistant - Control System   Sept 2023 - April 2024
Bionic Lab - University of Toronto, Toronto Rehabilitation Institute   Toronto, Canada

- **Prosthetic Development:** Designed an above-knee robotic prosthetic leg integrating actuators, electronics, and sensors with 3 DOF for natural gait replication.
- **Control System Design:** Developed PID controllers in Python and C++ using EMG and motion data, improving response accuracy by 25% and reducing overshoot by 15%.
- **Testing & Validation:** Conducted 100+ bench and preliminary human-subject tests, achieving repeatable motion at ~0.5 m/s and improving user comfort by 20%.

PROJECT EXPERIENCE

Automated Material Handling System Using PLC Programming   2025

- **PLC System Design:** Designed a simulated PLC-controlled conveyor sorting system using photoelectric and proximity sensors to detect part presence, size, and position, enabling automated routing and material handling.
- **PLC Programming & I/O:** Developed ladder logic in Allen-Bradley ControlLogix (RSLogix 5000), configuring digital I/O for sensors, motors, and actuators, and implementing interlocks, start/stop sequences, and fault handling for safe operation.
- **Testing & Simulation:** Tested and debugged control logic using PLC simulation tools, correcting logic errors, optimizing scan cycles, and achieving stable performance with sub-100 ms response times.

EV Charging Infrastructure Design Project   2024

- **Charging System Design:** Designed Level 2 and DC fast-charging concepts, defining power requirements, topology, and grid constraints.
- **Electrical & Safety Analysis:** Evaluated cable sizing, protection devices, grounding, and fault scenarios to meet safety standards.
- **Performance & Cost Evaluation:** Analyzed efficiency, installation, and operating costs to optimize charging time, reliability, and cost effectiveness.

TECHNICAL SKILLS

- **Engineering Fabrication:** SolidWorks (Certified Professional-CSWP), AutoCAD, Bambu Studio, Eagle PCB; hands-on experience with FDM/SLA 3D printing, CNC machining, GD&T, PCB design, SPICE, and soldering.
- **Instrumentation:** NI MAX, DAQ, and Thermal couple; Potentialstat, EIS, Cyclic voltammetry, and Internal resistant; Oscilloscope, Strain gauge, and Analog circuits.
- **Automation:** Ladder logic, HMI, Allen-Bradley, Siemens, PLC programming; PID control, Sensor selection, Actuator selection, and Digital filters.
- **Microcontrollers:** Arduino, ESP32, STM32; RS232/485, I2C, SPI, UART, CAN; DMA, Interrupt, Masking, and Sensor integration.
- **Programming Skills:** Visual Studio Code, GitHub; Python, C, C++, Assembly, and SQL.
- **Analytical Skills:** MATLAB/Simulink, ANSYS FEA, ANSYS Multiphysics, and Minitab; Robotic kinematics, Stress analysis, Failure mode; Thermodynamics, Fluid dynamics, and Material analysis.