

2022 - 2025

ENGINEERING PORTFOLIO

Edward Hong

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Academic Experience

September: 2022 - Present

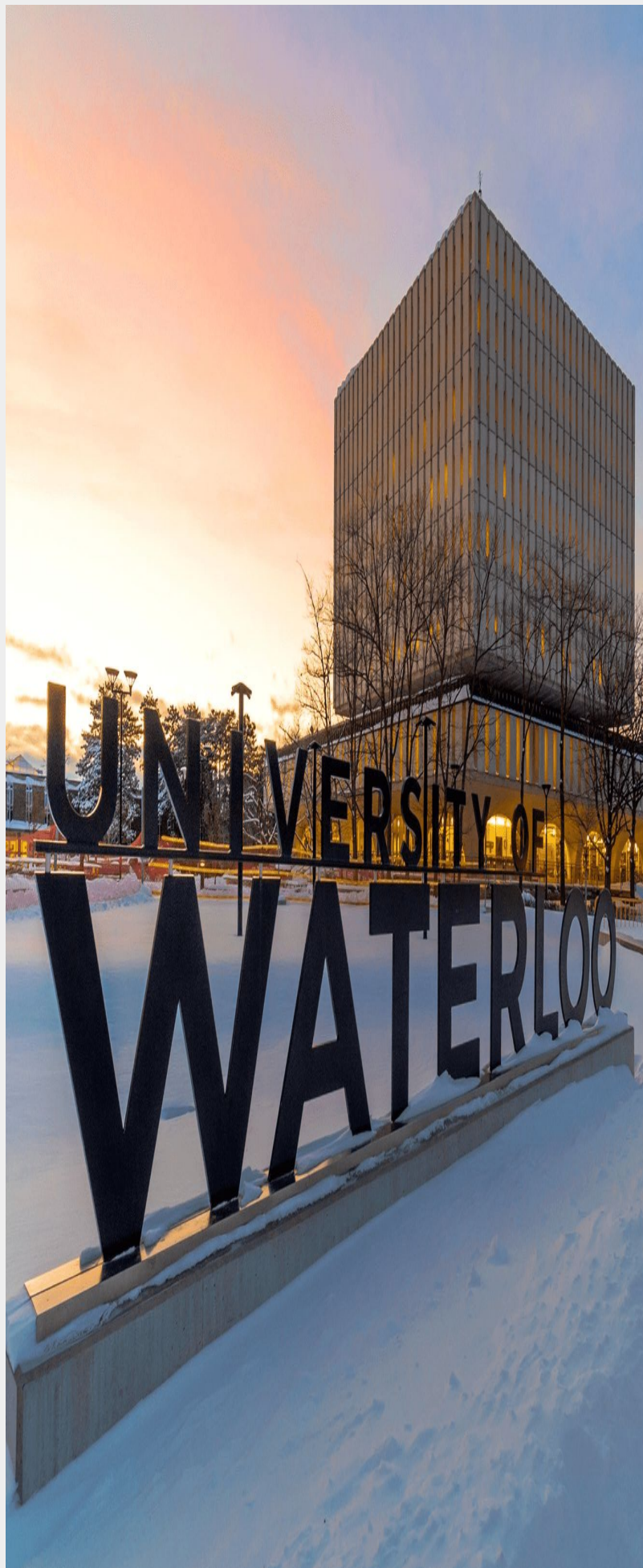
University of Waterloo

As a 3B Nanotechnology student at the University of Waterloo, I had the privilege of learning, and working with lab equipments that would otherwise be difficult to access from other universities.

The program offers a wide range of subjects, such as molecular biology, advanced calculus 2, computational methods, quantum mechanics, nanochemistry, and instrumentation.

The lab equipments allowed me to gain further insight of material characterization, lithography, and synthesis of nanoparticles (SEM, XRD, UV - Vis, COMSOL simulation, Oscilloscope, DC Sputtering System, MJB Mask Aligner).

With involvement in multiple clubs, most notably the UW Midnight Sun, aerobody team, I not only learned technical skills (CAD modeling, body assembly, mold injection), but soft skills as well (teamwork, critical thinking, time management, communication, DOE).



Work Experience



H2nanO

09/2024 - 04/2025

Led synthesis and characterization of hydrophilic coatings for photocatalysts, creating reproducible datasets and experimental plans that informed weekly technical decisions. Designed and 3D-printed CAD instrumentation (contact-angle goniometer) models, and built Python model to process weather data.



SMART - Lab (UW)

01/2024 - 04/2024

Contributed to the design, synthesis, and characterization of nanocomposite hydrogels for soft-body robotics, work that resulted in a co-authored publication. Developed and iterated extrusion and DLP 3D-printed fixtures, implemented 3D shape-programming methods to improve experimental reproducibility, and ran inventory/supplier comparisons.



Avanade

06/2023 - 08/2023

Built prototype AI/ML solutions on Azure to detect and prevent financial fraud, turning cloud services into testable proofs-of-concept for stakeholders. Earned Azure-related certifications and implemented data pipelines,.



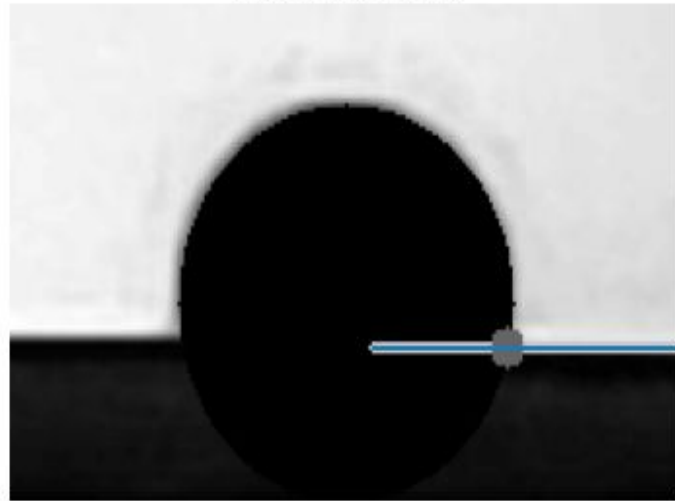
Amazon

05/2022 - 09/2022

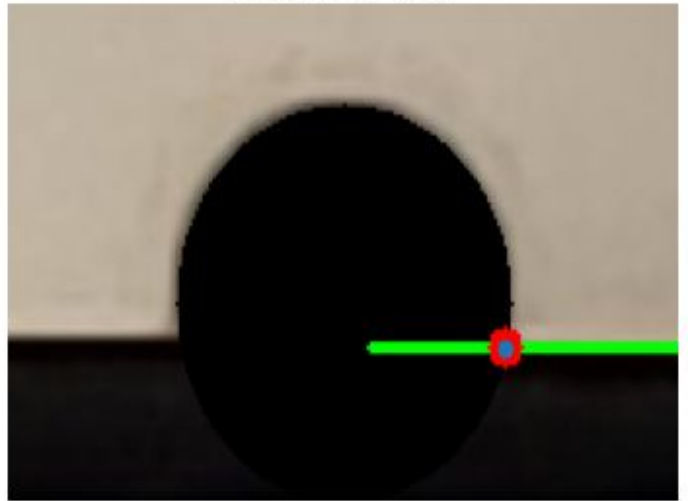
Executed high-throughput order fulfillment, consistently processing 150+ items per hour while maintaining accuracy and on-time delivery. The role sharpened my operational discipline, time management, and teamwork under pressure—transferable skills for fast-paced lab and prototyping environments.

Sample Image from the Goniometer

Gray crop, contrast



Annotated, $\theta=77.3^\circ$



Prototype: Optical Contact Angle Goniometer

Taking inspiration from my previous co-ops, I have extended the idea of an optical contact angle goniometer - an instrument that measures the contact angle between a sample's surface and a droplet.

The specific method used is the Sessile drop method, where an image of the sample and droplet is taken in front of a contrasting background, allowing the visual measurement of the contact angle. After the hardware takes the photo, a Python program automatically processes and measures the contact angle.

With a variety of obstacles, such as a tight budget constraint and limited resources, it enabled me to be more creative and utilize what I already have. This includes using alternative parts from commercial products and taking advantage of on-campus services.



Original Image



Edward Hong

Edward Hong is a 3B Nanotechnology Engineering student at the University of Waterloo with hands-on materials R&D and prototyping experience.

At H2nano he led synthesis and characterization of hydrophilic coatings for photocatalysts and designed 3D-printed instrumentation, while at the SMART Lab he helped develop and characterize nanocomposite hydrogels for soft-body robotics and was co-author on a published paper. He is comfortable with bench and thin-film tools (SEM, AFM, DSC, TGA, DC sputtering, mask aligner), simulation and data analysis (COMSOL, Python, MATLAB), and rapid CAD-driven prototyping. Edward brings a practical, adaptable mindset and a record of moving projects from formulation and design through testing and documentation.

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