

Alyssa Sanden

Engineering Physics, University of British Columbia

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Experience

Part-time Researcher

2026–Present

NEWS-G collaboration

- Analyze spherical proportional counter data, comparing pulse amplitude, rise time, and decay signatures across detector settings.
- Working on a paper about alpha counting in a spherical proportional detector, at the intersection of engineering physics and chemistry.

Undergraduate Research Assistant

Spring–Summer 2026

SNOLAB, underground laboratory for low-background physics and dark matter research

- Supported radon emanation measurements and spherical proportional counter operation; acquired data using a Red Pitaya and Samba and processed it with ROOT and QUADIS.
- Performed maintenance on the NEWS-G dark matter detector and designed circuitry for a heater used in the experimental setup.
- Won first place at the SNOLAB student talk symposium for a presentation on the research.

Autonomous Robotics Project

Summer 2026

Engineering Physics robot

- Developed ESP32-S3 control software for a mecanum-drive robot that followed tape, detected and collected rocks, and navigated to a tower using a coordinated state machine.
- Integrated IR and metal sensors, optical-flow odometry, and a multi-servo arm; implemented PID control and a Wi-Fi interface.

AI Analytics and Integration Intern

Summer 2025

Maxwell Canyon Creek / Venture for Canada

- Built a full-stack application for AI-assisted real-estate workflows, contributing to web and mobile frontend, backend, and interface design.

Avionics Software and Thrust Vectoring Simulation

Fall 2024–Fall 2026

UBC Rocket

- Integrated GPS and simulation testing into competition rocket avionics; designed and launched a personal Level 1 certification rocket using CAD and fabrication tools.

Near-Earth Asteroid Researcher

Summer 2023

University of Colorado Boulder

- Developed software converting asteroid observations into orbital solutions with error propagation; contributed observations to the Minor Planet Center.

Selected Project and Award

Vancouver Regional Winner and Global Nominee

2024

NASA Space Apps Hackathon

- Founded a team that built a real-time web application to visualize near-Earth asteroids.

Technical Skills

Programming: Python, C++, C, Java, JavaScript, SQL, MATLAB, Git, Linux

Scientific computing: ROOT, QUADIS, data acquisition, signal processing, numerical analysis, PyTorch, JPL Horizons, FITS image analysis

Hardware and design: ESP32, Arduino, SPI, UART, PID control, sensor integration, SolidWorks, Onshape, PCB design, instrumentation