

Sarthak Sahai

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WORK EXPERIENCE

Canadian Space Agency • Longueuil, QC

May 2026 - Present

Student Systems Engineering Intern • Internship

- Developed pushbroom LiDAR technology by designing and evaluating sensing approaches for planetary surface mapping to enable accurate terrain characterization of extraterrestrial bodies for future exploration missions.
- Improved terrain mapping accuracy by processing and analyzing LiDAR point cloud data using Python-based analysis tools to support the validation of off-world navigation and landing systems.
- Accelerated sensor verification activities by automating LiDAR data processing and performance assessment workflows to provide timely insights for systems engineering and mission planning teams.

Canada's Wonderland • North York, ON

Apr 2023 - Jan 2024

Rides Mechanical Intern • Internship

- Conducted structural integrity assessments on ride assemblies and implemented corrective mechanical solutions to improve operational safety and reliability.
- Diagnosed mechanical failures across ride subsystems using tolerance analysis, schematics, and manufacturer specifications.
- Supported integration of sensor-based condition monitoring systems to enable predictive maintenance and reduce unplanned downtime.
- Built and iterated physical prototypes using power tools and shop equipment to validate design improvements under operational constraints.

Wassertek LTD. • Dubai, UAE

Apr 2021 - Sep 2021

Mechanical Engineering Intern • Internship

- Repaired and serviced industrial machinery using schematics, exploded diagrams, and digital part drawings.
- Performed structured Root Cause Analysis (Fishbone, 5 Whys) to diagnose recurring component failures and recommend corrective actions.
- Communicated repair status, timelines, and findings with supervisors and technicians in a fast-paced maintenance environment.

PROJECTS

Hospital Medicinal Dispensing Robot

Jan 2026 - Apr 2026

ESSE 3380 - Mechatronics

- Part of a multidisciplinary team tasked with the creation of an autonomous medicinal dispensing robot under a strict budget of \$300
- Led mechanical design and electro-mechanical integration, including component mounting, enclosure design, and interface definition with circuit and microcontroller subsystems
- Developed and executed functional test plans to validate navigation, dispensing accuracy, and system robustness.
- Supported final system validation and handoff through documentation, test results, and integration readiness reviews

Reconnaissance Orbital Utility for Terrain Exploration(ROUTE-M)

Jan 2026 - Apr 2026

ESSE 4361 - Space Mission Design

- Served as Systems and Payload Lead for Mars orbiting high definition imaging mission developed using the NASA project lifecycle up to Critical Design Review (CDR)
- Led mission architecture and payload selection for a sub-meter class optical imaging system operating from a 300 km Sun Synchronous Orbit (SSO) around Mars.
- Defined payload level requirements including spatial resolution, surface coverage and data rates to ensure science objectives were met.
- Supported mission-level mass (45 kg payload), power (120 W peak), cost and risk assessments within a \$750M USD theoretical mission budget.

Night-Optical and Visibility Assessment (NOVA)

Sep 2024 - Aug 2025

Canadian Space Agency (CSA)

- Developed a secondary payload for the Canadian Space Agency to measure night sky brightness at an altitude of ~40km
- Led hardware design, integration, and documentation for flight-ready subsystems
- Executed environmental qualification testing including vibration, thermal-vacuum, and cold-chamber tests to validate mission readiness

VOLUNTEERING & LEADERSHIP

York University Steel Bridge

Sep 2024 - May 2026

President • Moncton, NB

- Led a multidisciplinary engineering team through design, fabrication, integration, and testing phases.
- Managed a \$7,000 project budget, overseeing procurement, manufacturing resources, and transportation.
- Coordinated subsystem integration, fabrication schedules, and design reviews to meet strict competition timelines.
- Ensured structural designs and assemblies met competition rules, safety standards, and performance requirements.
- Supported on-site assembly, troubleshooting, and verification during competition operations.

Great Northern Concrete Toboggan Race

Sep 2024 - Feb 2025

Steering and Braking Lead • Ottawa, ON

- Designed and Integrated steering and braking systems for the GNCTR toboggan to optimize control under dynamic load conditions using CAD Simulations
- Fabricated parts using machines and processes like Lathes, Mills, Laser and water cutting
- Featured in news article published by CP24 and won awards for engineering performance and design

PUBLICATIONS

Observing the HAT-P-18 b Transit and Calculating Planetary Radius through Light Curves

Nov 2024

Research Project

- Conducted ground-based observation and analysis of the exoplanet HAT-P-18 b using CCD imaging data from the Allan I. Carswell Observatory
- Performed full image and flux data reduction including bias and flat correction, background subtraction and star alignment
- Developed Python-based data reduction and analysis workflows using Astropy, CCDPROC, Photutils, and Astrowalign
- Generated and analyzed transit light curves to compute planetary radius, ingress/egress durations, and transit depth, achieving close agreement with published values

EDUCATION

Bachelors of Engineering in Space Engineering

York University • North York, ON

Aug 2021 - Dec 2026

Certificates Earned:

- Bergeron Entrepreneurs in Science and Technology
- Cross-Disciplinary Mechatronics Certificate

SKILLS

- **CAD and Simulations:** Abaqus, Fusion 360, SAP2000, SolidWorks
- **Mechanical:** 3D Printing, DFM and DFA Modelling, Laser Cutting, Machine Shop Trained
- **Software:** ARM Assembly, C++ Micro-controller Integration, MATLAB, Open Rocket, Python, STK
- **Project Management:** Gantt charts, Google and Microsoft Workspace, NASA Project Cycle, Systems Engineering, Traceability Matrices