

Atilla Saadat

Toronto, Ontario, Canada

✉ atilla.saadat@mail.utoronto.ca <https://atillasaadat.me> [researchgate.net/profile/atilla-saadat](https://www.researchgate.net/profile/atilla-saadat)
[linkedin.com/in/atillasaadat](https://www.linkedin.com/in/atillasaadat) github.com/not-cosmo devpost.com/not-cosmo

🎓 Education

M.A.Sc. - Aerospace Science & Engineering

Sept 2020 – expected Aug 2022

University of Toronto

Toronto, Ontario, Canada

- 3.8/4.0 GPA; Spacecraft Systems Engineering and Attitude Determination & Control Systems (ADCS) research and development at the [Institute for Aerospace Studies \(UTIAS\) Space Flight Laboratory \(SFL\)](#)
- Awarded Research Fellowship & Internal Student Fellowship

B.A.Sc. - Honour's Mechanical Engineering (Aerospace Option)

Sept 2015 – Aug 2020

University of Windsor

Windsor, Ontario, Canada

- Dean's List (2016, 2017, 2020), Awarded \$16k+ in Scholarships & Bursaries

👜 Industry Experience

Graduate Researcher - Spacecraft Dynamics and Control

Sept 2020 – present

UTIAS Space Flight Laboratory

University of Toronto

- Conducted and automated spacecraft ADCS hardware testing (Rate Sensors, Magnetometers, Magnetorquers, Fine Sun Sensors, Reaction Wheels), creating procedural optimizations for sensor functional tests, thermal acceptance, and data analysis. The developed Python software, networking features, PSU APIs, and novel hardware decreased overall testing time by over 80% on 13+ satellites for the [HawkEye 360 constellation missions](#), whilst simultaneously standardizing tests, increasing collected test data quality, and performing Verification and Validation (V&V) of the ADCS hardware
- Developed a novel model-based Solar Power Generation Analysis software with Python & STK for the [NASA StarBurst mission](#), accounting for photo-voltaic shadowing effects using the SolidEdge CAD model of the satellite. The software produces an accurate, higher-fidelity power generation analysis report for the spacecraft's power budget with shadowed string thresholding, automating the analysis of over 135 attitude/orbital cases
- Researched and developed a novel Earth Horizon Sensor from a repurposed spacecraft inspection camera. Custom python algorithms were created for nadir vector estimation with w/ OpenCV image preprocessing. The software has been validated through simulation with STK Electro-Optical & Infrared (EOIR) images and in-orbit [NorSat-2](#) images, resulting in a simulation Nadir vector estimate with a 1° RSME. Conference paper accepted as Finalist to [2022 SmallSat Conference Frank J. Redd Student Competition](#)
- Researched and developed a novel in-situ inertia tensor estimation method for in-orbit satellites and validated through attitude MATLAB/Simulink simulation software. Constructed novel reaction-wheel C++ attitude commands in flight code for the HawkEye 360 constellation mission

Hardware Functional Safety Tools Engineering Intern

May 2022 – present

NVIDIA Corporation

Santa Clara, CA

- Developed a Python software tool to create, scale, and automate Fault Tree Analysis (FTA) in Isograph's Reliability Workbench from Failure Mode, Effects, and Diagnostic Analysis (FMEDA). Designed for FTA on the world's most complex Systems on a Chip (SoC), eg. Jetson AGX Orin, used for Mercedes-Benz × NVIDIA autonomous vehicle computer functional safety
- Ensured functional safety engineering standards are maintained via FTA for autonomous vehicles at NVIDIA, following ISO 26262 Road Vehicles Functional Safety standards

Robotic Systems Engineering Intern I & II

May 2017 – May 2018, Sept 2019 – Jan 2020

Mujin Inc.

Tokyo, Japan

- Developed a novel dynamics identification method for the Mujin Controller to calculate Friction, Center of Mass, and Inertia tensor coefficients. The results are used to improve the robot's torque model
- Designed a novel torque model validation algorithm with custom metrics and fault detection for torque coefficient estimates, improving estimate confidence by over 70%

- Validated experimental test results and developed production code for the feature, currently shipped on Mujin controllers for use by industry, improving robot performance during high accelerations by over 85%
- Integrated robot armature trajectory generation, data analysis tools, and localized UX/UI data visualization
- Collaborated with Mujin patent lawyers to submit 2 software patent applications, pending in USA [Patent Apps. [20210347049](#), [20210347054](#)], Japan, & China

Space Systems Engineering Intern (Lunar Exploration)

May 2016 – Sept 2016

Canadensys Aerospace Corp.

Toronto, Ontario

- Developed a remotely-controlled lunar rover prototype with various camera modules (3D, stereo camera, fisheye) and interactive software features, managing a budget of >\$10k
- Designed the concept of the rover, with a successful build and test campaign to completion
- Constructed a companion ground station GUI with vehicle controls and live camera feed

Technical Skills

Languages: Python, MATLAB, Java, C/C++, JavaScript, PHP, HTML/CSS, MySQL, PostgreSQL

Engineering Tools: AGI STK, SolidEdge, Siemens NX including Space Systems Thermal, SolidWorks, Catia V5, Simulink, KiCad, Altium

Frameworks/Packages: Numpy, Scipy, Matplotlib, Scikit-learn, OpenCV, Node.js, TensorFlow, Keras, TSfresh, Hyperopt, Django

Developer Tools/APIs: Google Cloud Platform, AWS, Docker, Twilio, Wit.ai, DigitalOcean, MongoDB, VS Code, Eclipse, Android Studio, SublimeText

Technologies/Other: Linux, Windows, Mac OSX, Git, Bash, Raspi/Arduino/BBB, Office Suite, Latex

Projects

President / Founder / Lead Systems Engineer

2018 – 2020

University of Windsor Space & Aeronautics Team (WinSAT)

- Founded and managed a university engineering design team competing in the [Canadian Satellite Design Challenge \(CSDC\)](#) against 15+ top university teams across Canada. [WinSAT achieved 1st place in the CSDC-5 Critical Design Review \(CDR\)](#)
- Led the project management and systems engineering of WinSAT's Space Systems division to design a 3U Cube Satellite for Low Earth Orbit, encompassing over 20 recruited interdisciplinary graduate & undergraduate students, with a total awarded funding of over \$40,000
- Coordinated the development and engineering of all satellite subsystem teams: Attitude Determination & Control Systems, Radio Communications, Structural & Thermal, Command & Data Handling, Electrical Power Systems, Payload, Business, & Earth Observation analysis
- Hosted multiple satellite engineering and Amateur Radio Operator (ARO) certificate workshops to over 30+ students to teach satellite engineering practices and ARO exam preparation

Undergraduate Machine Learning Researcher

Mar 2019 – Oct 2020

Intelligent Control, Analysis, and Modeling (iCAM) Laboratory

University of Windsor

- [Researched and developed](#) a novel ensemble-based machine learning (ML) algorithm for fault detection and isolation of fault states for reaction wheels on in-orbit satellites
- Determined optimal time-series machine learning classification techniques and feature-extraction methods from Scikit-learn, TensorFlow, and Keras, utilizing Hyperopt for ML hyperparameter optimization and cross-validation techniques

Lead Avionics Engineering (Sounding Rocket)

2015 – 2019

WinSAT Rocketry Payload Division for UWindsor Rocketry Team

- Designed a [custom aerodynamics data acquisition module](#), using a Raspberry Pi and various sensors, for aerodynamic analysis and performance verification
- Designed the circuit board, programmed the software, and parsed large data volumes with software fail-safe modes for: rocket acceleration, angular rates, barometric pressure, temperature, and altitude data