ADYN MILES

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Education

Delft University of Technology **(September 2022 - June 2024 Expected)**

- M.Sc. in Aerospace Engineering specializing in Space Engineering 8.4/10 Average

University of Toronto **(September 2017 - April 2022)**

- B.A.Sc in Engineering Science specializing in Aerospace Engineering (Fourth Year) 3.82/4.00 GPA
- Dean's Honour List (average above 80%): Fall 2017, Winter 2018, Fall 2018, Fall 2019, Winter 2020.

Publications

- A. Miles, D. Maranto, S. Xu, et al. "FINCH: A Blueprint for Accessible and Scientifically Valuable Remote Sensing Satellite Missions", 2022.
- A. Miles, M. S. Hosseini, S. Tang, Z. Wang, S. Damaskinos, K. N. Plataniotis. "Transferability of Deep Learning Models for Focus Quality Assessment in Digital Pathology," 2021.
- D. Vogel, A. Mukkala, K. Ren, L. Lan, Y. Da Li, E. van Velzen, B. Almeida, C. Chanen, A. Miles, et al., "HERON: Demonstrating a Novel Biological Platform for Small Satellite Missions," 2021.
- C. Chanen, A. Nair, A. Miles, A. Cognigni, B. Nero, B. Almeida, B. Richards, C. Rodriguez, C. Guo, D. Maranto, et al., "Inspiring the next generation: Challenges and strategies for onboarding and retention in an undergraduate cubesat design team," 2021
- Z. Wang, M. S. Hosseini, A. Miles, K. N. Plataniotis, and Z. Wang, "FocusliteNN: High efficiency focus quality assessment for digital pathology," in International Conference on Medical Image Computing and Computer-Assisted Intervention, pp. 403–413, Springer, 2020.

Industry and Research Experience

Undergraduate Thesis **(September 2021-April 2022)**
Supervisor: Professor Christopher Damaren
Authoring a thesis that investigates the controllability of hybrid magnetic and impulsive attitude control for Earth-observing spacecraft.

- Developing Linear Quadratic Regulator and Proportional Derivative control systems in MATLAB.
- Directing my own research project by performing a literature review, generating a proposal, and scheduling regular meetings with my research supervisor.

University of Toronto Aerospace Team - Nanosatellite Launch **(September 2018-March 2022)**
Payload system chief engineer on a large team of aerospace students and enthusiasts. Currently in the early design phase of a small satellite project carrying a hyperspectral imaging platform for imaging atmospheric greenhouse gas emissions for climate change research. This team has another satellite with a microbiology payload scheduled for launch in spring 2022 that I have also contributed to extensively as a systems engineer.

- Leading a team of 20 students to build the optical track and the imaging electronics, as well as defining a feasible and impactful research mission for the satellite.
- Performed detailed requirements formulation and tradeoff analyses on a system wide level to ensure feasibility of the optical payload across the entire satellite design.
- Organized promotional materials and a proposal to obtain a sponsorship from Synopsys worth more than $30,000 for the team.

- Designing the ground station software architecture and operations procedure for a microbiology satellite using GNURadio and Python.
- Planned, designed, and performed 10+ major tests in collaboration with other team subsystems to verify the structural, thermal, and electrical capabilities of the satellite, including thermal bakeout, thermal vacuum chamber, and vibrational testing.
- Used SolidWorks CAD software to create mechanical interface drawings for some of the electrical components housed in the payload bay, and designed an interface plate that can be used to mate the satellite to the conductive plate used in the MDA Space thermal vacuum chamber testing facility.
- Developed a C++ library for testing humidity sensors, then used this library to verify with a Raspberry Pi that the satellite's payload bay could achieve 100% relative humidity, a condition crucial for the biological experiment it housed.
- Verified the electrical performance of the power distribution board under significant thermal stress using thermal camera images, then created an average heat profile of the board using MATLAB to determine the hotspots.
- Produced formal test procedure documentation in collaboration with MDA Space in order to organize future tests in their thermal vacuum chamber, and to create a strong knowledge base for future launches.

Systems Lead - Space Systems Design Capstone **(September 2021-December 2021)**
Performing Operations, Systems, Mechanical, Electrical, and Controls design for a system of pods designed to mine water from an asteroid.

- Placed first in the design competition based on design reviews presented to MDA Space.
- Developed system and subsystem requirements for the mission, and identified key mission trade studies and design drivers.
- Performed full heat transfer analysis and link budget analysis for the system.

Research Assistant - Digital Pathology Multimedia Lab **(May 2019-December 2021)**
Employer: University of Toronto
Authoring a scientific journal entry and co-authored a conference entry in computer vision for focus quality assessment applications in digital pathology, working under Dr. Mahdi Hosseini.

- Improved the speed and usability of an industry-bound MATLAB program that is now used at Huron Digital Pathology in Waterloo, Ontario. The software produces a focus quality heatmap of a scan of biological tissue to facilitate the production of biopsy reports.
- Built a Python and PyTorch implementation of this program, which added the feature of using neural networks to create the heatmap.
- Curated a public database of over 1000 whole slide images that can be used for testing data-driven models.
- Co-authored a conference entry which introduces a lightweight convolutional neural network for focus quality assessment applications.
- Authored a scientific journal entry on the transferability of different convolutional neural networks to datasets with diverse characteristics, and submitted it to Nature Scientific Reports.
- Designed an automatically searched architecture in Python for focus quality assessment.

Satellite Operations and Innovation Intern **(May 2021-August 2021)**
Employer: Canadian Space Agency
Supported the ground operations of the CSA's NEOSSat mission through development of the satellite simulator.

- Developed a C++ based simulator for NEOSSat that accurately simulates satellite processes, including payload processes, on the ground.
- Modified simulator program for smooth portability between 32 and 64 bit architectures.
- Applied knowledge of Real Time Operating Systems to add critical payload functionalities to the simulator.

Stability and Control Intern **(August 2020-April 2021)**
Employer: Bombardier Aerospace
Supporting aircraft production and ensuring that the company's aircraft adhere to industry standards.

- Built a VBA-based tool that automates the process of evaluating drag characteristics. This tool both reduces error and improves the process speed, and is used by multiple teams in the department to ensure that all aircraft meet customer expectations despite production deviations.
- Simulating aircraft stability and performance under uncontrolled high thrust conditions to develop procedures for unexpected flight conditions and to meet aviation industry requirements.
- Built a historical database of production aircraft performance to ensure that the aircraft processes are improving over time, and to look for areas where we can improve our efficiency and build quality practices.

Research Assistant and Lab Technician - Chemistry Lab **(May-August 2019)**
Employer: University of Toronto
Under Professor Al-Amin Dhirani, conducted experiments to produce an electrochemical transistor and test the effects of reversible reduction-oxidation reactions on the conductance of a metal film.

- Performed electrochemical experiments such as cyclic voltammetry to ensure the presence of reduction-oxidation, gaining experience conducting physical experiments at a high scientific standard.
- Deposited gold electrodes using vacuum deposition techniques in order to produce the samples.
- Produced circuitry using an Arduino to measure the resistivity across the film at very low temperatures. Improved the accuracy to within 1% of the expected resistivity using a low pass filter.
- Created detailed documentation of all the work accomplished over the course of the project for the benefit of future contributors.

Skills and Qualifications

- **Software:** Experienced with Python, PyTorch, Satellite Tool Kit (STK), MATLAB, GNURadio, Linux, C and Embedded C, VBA, Verilog, and Assembly.
- **Communication and Writing:** Proficient in Microsoft Office, LaTeXtypesetting, and the Adobe Creative Suite.
- **Mechanical:** Experience with engineering drawings, CAD software, assembling circuitry from schematics, and using hand and power tools for construction.
- **Hardware:** Experience programming the Arduino, PIC Microcontroller, Raspberry Pi, and FPGAs.
- **Languages:** Fluent in English with intermediate French knowledge and limited Dutch knowledge.

Relevant Coursework

- **Microsatellite Engineering:** Designed a software package to estimate the pose of an uncooperative satellite target from monocular camera images, using convolutional neural networks.
- **Collaborative Space Design Project:** Developing a solar orbiter mission to image the Sun's poles to provide space weather insights.
- **Planetary Sciences:** Developed a mission proposal for a Triton lander to investigate the moon's origin and potential astrobiological insights.
- **Space Systems Design:** Operations, Systems, Mechanical, Electrical, and Controls and Command Design for an asteroid mining mission up to a Preliminary Design Review.
- **Spacecraft Attitude Dynamics and Control:** Orbital mechanics, spacecraft attitude determination and control.
- **Computational Structural Mechanics:** Introduction to finite element analysis and structural optimization.
- **Space Optical Sensors:** The theory and design of space instrumentation
- **Thermal Rocket Propulsion Exercise:** Designing and conducting a test plan for a solid rocket motor.

Awards

- **1st Place Space Systems Design Capstone (2021)** Won the best asteroid mining space systems design as decided by engineers at MDA Space and professors.
- **University of Toronto Entrance Scholarship (2017)** Awarded $7500 for excellent academic standing and extracurricular achievements.
- **Anthony A. Haasz Scholarship (2019)** Awards $3600 to a student entering Aerospace Engineering with excellent academic standing.
- **Donald C. Leigh Memorial Scholarship (2017)** Awards $3500 to a student entering the Engineering Science program with excellent academic standing.