

Atilla Saadat

Los Angeles, CA, USA

U.S. Permanent Resident (Green Card via EB1A Extraordinary Ability Visa)

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 [ResearchGate](#)  [Google Scholar](#)  [Github](#)  [Devpost](#)

Industry Experience

Spacecraft Guidance, Navigation, & Control (GNC) Engineer II

Nov 2025 – Present

Varda Space Industries

Los Angeles, CA

- Led Monte Carlo analysis, trajectory design optimization, post-flight reconstruction, and on-orbit GNC operations for W-Series 4 and post-flight analysis for the [successful launch and reentry of W-Series 5](#), connecting simulation, flight data, and operational decision-making for reentry vehicle missions
- Serving as GNC Responsible Engineer for Bus Block 2 (W-Series 8 and W-Series 9), architecting next-generation reentry vehicle GNC capabilities for multi-vehicle operations, increased mission cadence, and more autonomous flight operations

Spacecraft Guidance, Navigation, & Control (GNC) Engineer

Oct 2022 – Nov 2025

Turion Space Corp.

Irvine, CA

- Led GNC engineering for [Droid.001](#) and [Droid.002](#) from concept through launch, commissioning, and on-orbit operations on SpaceX [Transporter-8](#) and [Transporter-13](#). Developed V&V methods spanning pointing budgets, power generation analysis, on-orbit diagnostics, and flight-data validation, achieving $<0.05^\circ$ (2σ) and $<6''$ (2σ) pointing accuracy for Space Situational Awareness (SSA) and Non-Earth Imaging (NEI) missions, respectively.
- Designed and implemented a Python-based autonomous NEI target tracking and mission-planning algorithm for inter-satellite imaging, optimizing attitude profiles while enforcing Sun/Earth exclusion constraints and enabling more than [1,022 successful tasking collects and 26,467 high-precision images](#) across Droid.001 and Droid.002.
- Built high-fidelity spacecraft simulations with Hardware/Software-in-the-Loop (HITL/SITL) capabilities to validate autonomous inter-satellite imaging operations, evaluate mission design trades, and prototype novel concepts of operations. Conducted Monte Carlo success analyses and calibrated body-frame imagers in orbit using star field imagery to ensure sub-arcminute NEI pointing alignment.
- Implemented batch least squares orbit determination from on-orbit MEKF state estimates, uploading refined ephemeris to Space-Track for conjunction analysis and maneuver planning. Verified LEO ADCS torque/momentum authority and executed power-compliant pointing campaigns, advancing GNC autonomy across Turion's SSA and NEI mission portfolio.

Hardware Functional Safety Engineering Intern

May 2022 – Sept 2022

NVIDIA Corp.

Santa Clara, CA

- Developed Python software to automate Fault Tree Analysis (FTA) for over 100,000 failure modes, significantly improving failure analysis efficiency. Applied in production for [Mercedes-Benz × NVIDIA's Jetson AGX Orin SoC](#) for autonomous vehicles functional safety engineering
- Ensured functional safety engineering standards were maintained via FTA for autonomous vehicle development at NVIDIA, following [ISO 26262](#) Road Vehicles Functional Safety standards

Robotic Controls Engineering Intern II

Sept 2019 – Jan 2020

Mujin Inc.

Tokyo, Japan

- Developed a torque model validation algorithm with tailored metrics and fault detection, improving torque coefficient estimate confidence by over 70%
- Engineered a dynamics identification technique for the Mujin Controller, optimizing torque model coefficient calculations for production robots across Mujin's industrial fleet
- Collaborated with Mujin's legal department to file [2 proprietary software patents](#), now active in the USA and Japan with pending approval in China

Robotic Controls Engineering Intern I

May 2017 – May 2018

Mujin Inc.

Tokyo, Japan

- Designed a dynamics identification technique for the Mujin Controller, computing Friction, Center of Mass, and Inertia tensor coefficients to enhance robot torque modeling accuracy
- Developed and deployed production-grade code validated against experimental results, improving robot performance under high acceleration scenarios by over 85%
- Integrated robot armature trajectory generation with data analytics and custom UX/UI visualizations, streamlining operator workflows and improving system observability

Space Systems Engineering Intern (Lunar Exploration)

May 2016 – Sept 2016

Canadensys Aerospace Corp.

Toronto, Ontario

- Led development of a remotely-operated lunar rover prototype integrating multiple camera modalities (3D, stereo, and fisheye) within a \$10k+ budget, supporting lunar surface exploration objectives
- Designed and integrated a ground station GUI combining real-time camera feed visualization with vehicle command and control, improving operational efficiency for remote rover operations

Education

M.S. - Computer Science

Jan 2025 - Present

Georgia Institute of Technology

Atlanta, Georgia

- Specialization: Artificial Intelligence; coursework and projects emphasize deep learning, reinforcement learning, robotics AI, and space computing for autonomous aerospace systems

M.A.Sc. - Aerospace Science & Engineering

Sept 2020 – Aug 2022

University of Toronto

Toronto, Ontario

- Spacecraft Systems Engineering and Attitude Determination & Control Systems (ADCS) research and development at the [UTIAS Space Flight Laboratory \(SFL\)](#)
- Thesis: [Design and Test Optimizations for Spacecraft Attitude Determination and Control Subsystems](#)
- Research Advisor: Dr. Robert E. Zee
- Awarded Research Fellowship & Internal Student Fellowship. Graduated with “High Distinction”

B.A.Sc. - Honour's Mechanical Engineering w/ Aerospace Option

Sept 2015 - Aug 2020

University of Windsor

Windsor, Ontario

- Aerospace ML Researcher at the [Intelligent Control, Analysis, and Modeling \(iCAM\) Lab](#)
- Research Advisor: [Dr. Afshin Rahimi](#)
- 3x Dean's List

Technical Skills

Research Areas: Spacecraft GNC, ADCS, state estimation, numerical optimization, trajectory optimization, orbit determination, autonomous mission planning, embedded spacecraft systems, CubeSats, distributed space systems, robotics, machine learning

Languages: Python, MATLAB/Simulink, C/C++, Java, JavaScript, PHP, HTML/CSS, NASA JPL F Prime

Engineering Tools: AGI STK, FreeFlyer, GMAT, Basilisk, OpenC3 COSMOS, SolidEdge, Siemens NX w/ Space Systems Thermal, SolidWorks, Catia V5, KiCad, Altium

ML/Scientific Computing: NumPy, SciPy, Matplotlib, Plotly, Scikit-learn, OpenCV, TensorFlow, Keras, TSfresh, Hyperopt, pandas, PyTorch

Developer Tools: Linux, Git, Bash, Docker, PyTest, Google Cloud Platform, AWS, MongoDB, MySQL, PostgreSQL, VS Code, Eclipse, Android Studio, \LaTeX

Fabrication and Lab: 3D printing, MIG/TIG/Stick welding, wire harnessing, multimeters, oscilloscopes, ESD compliance, SMT soldering, Raspberry Pi/Arduino/BBB

🔍 Research Experience

Graduate Researcher

Sept 2020 – Sept 2022

UTIAS Space Flight Laboratory

University of Toronto

- Automated ADCS hardware testing (rate sensors, magnetometers, magnetorquers, fine sun sensors, reaction wheels) across 16 satellites in the [HawkEye 360 constellation](#), reducing test time by 63% through Python software, hardware workflow redesign, and repeatable V&V methods that improved data quality and flight-readiness evidence
- Developed a novel Earth horizon sensor using a repurposed spacecraft inspection camera, achieving 1° RMSE nadir vector estimation via Python/OpenCV image processing and validating the method against STK EOIR simulation and on-orbit NorSat-2 imagery. Presented at the [2022 Small Satellite Conference](#), winning **1st place** in the student competition
- Developed an in-situ inertia tensor estimation method for on-orbit satellites, validated through MATLAB/Simulink ADCS simulation, and implemented novel reaction-wheel attitude commands in C++ flight code for the HawkEye 360 mission. Related conference paper selected by the Canadian Space Agency (CSA) as one of two Canadian delegate submissions to the [IAC 2022 E2 Student Conference](#)
- Built a model-based solar power generation analysis tool in Python and STK for [NASA MSFC's StarBurst mission](#), incorporating photovoltaic self-shadowing effects from the SolidEdge CAD model. Automated analysis across 135+ attitude and orbital cases with shadowed string thresholding, producing high-fidelity power budget reports

Undergraduate Researcher

Mar 2019 – Oct 2020

Intelligent Control, Analysis, and Modeling (iCAM) Laboratory

University of Windsor

- Developed a novel ensemble-based ML algorithm for fault detection in satellite reaction wheels, leveraging scikit-learn, TensorFlow, and Keras for fault case classification and feature extraction
- Conducted time-series data analysis research, optimizing dataset generation and establishing best practices for feature extraction in ML-based fault diagnosis applications
- Co-authored published papers and conference presentations advancing the field of intelligent control and fault diagnosis for spacecraft systems

🏆 Awards

4th Place in MIT STORM-AI Challenge | *Massachusetts Institute of Technology (MIT) ARClab* **Jul 2025**

- Built a metric-aligned BiGRU-Attention model for real-time 72-hour thermospheric density forecasts, exceeding transformer baselines at millisecond latency and demonstrating ML-enabled autonomy for space situational awareness and onboard planning

Payload Pioneer 30 under 30 Award | *Payload Space* **Oct 2024**

- Recognized by Payload's "30 under 30" for achievements across the space industry, including innovation, advocacy, and leadership

SSPI 20 under 35 Award | *Space & Satellite Professionals International (SSPI)* **Sept 2024**

- Recognized by SSPI's "20 under 35" for outstanding contributions and leadership in the space industry

1st place in Frank J. Redd Student Competition | *Small Satellite Conference* **Aug 2022**

- Awarded \$10k for [best paper](#) and presentation in an international student competition

Canadian Delegate in IAC Student Conference | *Canadian Space Agency (CSA)* **Aug 2022**

- Selected as 1 of 2 students across Canada to attend the IAC 2022 50th Student Conference by the CSA

Research Fellowship & Internal Student Fellowship | *University of Toronto* **Sept 2020**

- Awarded fully-funded tuition and stipend for admittance into [UTIAS Space Flight Laboratory](#)

1st place team in CSDC Critical Design Review | *Canadian Satellite Design Challenge (CSDC)* **Oct 2019**

- Presented CDR-level designs for a 3U Cube Satellite to CSA, MDA, and ABB spacecraft engineers

Ontario Aerospace Council Scholarship | *Ontario Aerospace Council* **May 2019**

- Awarded 1 of 4 awards to Ontario aerospace engineering students for academic and extra-curricular achievements related to aerospace studies

ESA CryoSat-2 Science Meeting Student Award | *Canadian Space Agency (CSA)* **Mar 2017**

- Awarded to select students across Canada to attend ESA CryoSat-2 meeting as student representatives for the CSA, used for research and resources for [CryoRoute](#)

P.E.O. Windsor-Essex Chapter Bursary | *Professional Engineers of Ontario (P.E.O)* **Mar 2016**

- Awarded to 1st year engineering students who have demonstrated excellent academic achievement

Dean of Engineering Conference Grant | *University of Windsor* **Jan 2019**

- Awarded directly by the Dean of Engineering to attend the ESA Atlantic from Space Workshop

University of Windsor Scholarships & Bursaries

\$16k total - Awarded for undergraduate academic achievement and extra-curricular activities, unless otherwise stated:

- Student Access Bursary | Jun 2020 & Jun 2019
- Ontario First Generation Bursary | Jun 2019 & Sept 2018
- UWindsor In-Course Bursary | Jun 2019
- Student Life Enhancement Fund | Jan 2019 | Awarded to attend ESA Atlantic from Space Workshop
- Helen Norma Laframboise Scholarship | Sept 2018
- Faculty Retirees' Scholarship | Sept 2018
- Ontario Student Opportunity Trust Fund (OSOTF) Scholarship | Sept 2018
- Marian McLean Campus Spirit Scholarship | Sept 2018 | Awarded for WinSAT events held on campus
- International COOP Bursary | Jan 2018 | Awarded for Mujin Inc. internship in Japan
- Duronio Family Scholarship | Jan 2017
- Golden Key International Honour Society (Nomination) | Sept 2016
- University of Windsor Entrance Scholarship | Sept 2015

Master's Thesis

Saadat, A. (2022). *Design and Test Optimizations for Spacecraft Attitude Determination and Control Subsystems*. Master's thesis, University of Toronto Institute for Aerospace Studies, Space Flight Laboratory. [doi:10.1807/125667](https://doi.org/10.1807/125667)

Peer-Reviewed Journal Articles

Rahimi, A., & **Saadat, A.** (March, 2020). Fault isolation of reaction wheels onboard three-axis controlled in-orbit satellite using ensemble machine learning. *Aerospace Systems*, 3(2), 119-126. doi.org/10.1007/s42401-020-00046-x

Conference Proceedings & Presentations

Saadat, A., V. Bhosale, K. Bhardwaj, A. Gavrilovska (January, 2027). An Adaptive Telemetry Probe for Resource-Constrained Spacecraft Using F Prime. *AIAA SciTech Forum 2027*, Orlando, FL. (Submitted)

Saadat, A., V. Chen, J. Austin (September, 2025). End-to-End Autonomous Mission Planning and Spacecraft Attitude Optimization for Resident Space Object Imaging. *Advanced Maui Optical and Space Surveillance Technologies (AMOS) Conference 2025*, Maui, HI. [PDF]

Saadat, A. Attitude Determination with Self-Inspection Cameras Repurposed as Earth Horizon Sensors. *Frank J. Redd Student Competition - Small Satellite Conference 2022*, Utah State University, Logan, Utah. (1st Place Paper and Presentation) [PDF]

Saadat, A. On-orbit Spacecraft Inertia Tensor Estimation. *International Astronautical Congress 2022*, Paris, France. [PDF]

Folami, F.O., Rahimi, A. & **Saadat, A.** (March, 2020). Fault Isolation of Reaction Wheels on-board 3-axis Controlled in-orbit Satellite Using Machine Learning Techniques. IAC-20.B4.9-GTS.5.10, *International Astronautical Congress 2020*, Dubai (Online), United Arab Emirates. [PDF]

Rahimi, A., & **Saadat, A.** (July, 2019). Fault isolation of reaction wheels on-board 3-axis controlled in-orbit satellite using ensemble machine learning techniques *The International Conference on Aerospace System Science and Engineering*, Toronto, ON. [PDF]

Technical Reports

Saadat, A., Weeratunga, M., Hasan, M., & Mehroke, A. Reconstructing ESA Time-Series Trojans via Fourier-Regularized Deep Learning. Technical Report, CS7643 Deep Learning Final Report, Georgia Institute of Technology, July 2025. DOI: [10.13140/RG.2.2.17228.68480](https://doi.org/10.13140/RG.2.2.17228.68480). [\[PDF\]](#)

Saadat, A. Real-Time Thermospheric Density Forecasting with a Metric-Aligned BiGRU-Attention Network for Space Situational Awareness. Technical Report, MIT ARCLab AI Competition, May 2025. [\[PDF\]](#)

Patents

Saadat, A., & Usui, K. (May, 2020). Method And Computing System For Estimating Parameter For Robot Operation. Patent applications in USA ([Active](#)), Japan ([Active](#)), and China ([Pending](#))

Saadat, A., & Usui, K. (May, 2020). Method And Computing System For Determining A Value Of An Error Parameter Indicative Of Quality Of Robot Calibration. Patent applications in USA ([Active](#)), Japan ([Active](#)), and China ([Pending](#))

Poster Presentations

Saadat, A., V. Chen, J. Austin (September, 2025). [End-to-End Autonomous Mission Planning and Spacecraft Attitude Optimization for Resident Space Object Imaging](#). *Advanced Maui Optical and Space Surveillance Technologies (AMOS) Conference 2025*, Maui, HI

Saadat, A. (March, 2019). [CryoRoute - Generating Globally-Optimized Naval Routes in Arctic Ocean](#). *UWillDiscover Conference*, University of Windsor, Windsor, ON

Saadat, A. (January, 2019). [CryoRoute - Generating Globally-Optimized Naval Routes in the Arctic Ocean](#). *ESA's Atlantic from Space Workshop*, National Oceanographic Centre, South Hampton, UK

Academic Reviews

Judge for [AIAA Region VI Student Conference 2025](#)

Completed Graduate-level Courses

- | | | |
|---------------------------------|---|---|
| • Microsatellite Design I & II | • Aerospace Structures | • CS-7638 Robotics: AI Techniques |
| • Spacecraft Dynamics & Control | • Aerodynamics & Performance | • CS-7641 Machine Learning |
| • Computational Optimization | • Aerospace Propulsion | • CS-7644 Reinforcement Learning |
| • Control Theory | • Aerospace Materials & Mfg. | • CS-8903 Space Computing |
| • Flight Dynamics & Control | • CS-7643 Deep Learning | |

Co-Curricular Experience and Projects

Real-Time Spacecraft Thermospheric Density Forecasting **May 2025**
MIT Astrodynamics, Space, Robotics, and Controls Laboratory (ARCLab)

- Developed and open-sourced a PyTorch BiGRU-Attention model that converts 60 days of solar-wind and orbital data into 72-hour, 10-minute-step thermospheric density forecasts in milliseconds, training in ≤ 4 h on a single RTX 3090 Ti
- Ranked **4th out of 159 participants** (0.709 normalized skill score, exceeding the transformer baseline) and achieved the highest paper score in the MIT ARCLab STORM-AI Competition, delivering a deployable real-time solution for drag prediction and collision-risk screening

President / Founder / Lead Space Systems Engineer **2018 – 2020**
University of Windsor Space & Aeronautics Team (WinSAT)

- Founded WinSAT and led the team to **1st place** in the [Canadian Satellite Design Challenge \(CSDC\)](#) Critical Design Review, directing design and development of a 3U CubeSat for LEO while managing 20+ students and securing over \$40k in funding
- Led end-to-end development of all satellite subsystems including Attitude Determination & Control, RF Communications, and Structural & Thermal, driving cross-disciplinary integration across a multidisciplinary team

- Organized and led educational workshops on satellite engineering and Amateur Radio Operator certification for 30+ students, expanding hands-on technical capacity within the university community

Lead Avionics Engineering - Sounding Rocket **2015 – 2019**

WinSAT Rocketry Payload Division for UWindsor Rocketry Team

- Designed and built a [custom aerodynamics data acquisition module](#) using Raspberry Pi and a multi-sensor array, enabling precise in-flight aerodynamic analysis and performance validation
- Integrated custom PCB design with embedded software and redundancy handling to reliably capture and process high-rate rocket telemetry including acceleration, angular velocity, and atmospheric conditions

CryoRoute - Globally Optimized Naval Routes in North Arctic Ocean **Nov 2019**

Independent Research Project

- Developed a [novel route optimization tool](#) for Arctic naval navigation, leveraging CryoSat-2 SAR sea ice freeboard data from the [Center for Polar Observation and Modelling \(CPOM\)](#) to improve safety and transit efficiency
- Implemented a tailored A* pathfinding algorithm minimizing sea ice thickness, distance, and transit duration to produce optimized Arctic shipping routes
- Presented findings at NASA Space Apps Waterloo, UWILLDiscover Conference, and ESA's Atlantic from Space Workshop

Demo. Inertial Electrostatic Confinement (IEC) Nuclear Fusion Reactor **Aug 2015**

Independent Research Project

- [Designed and built a vacuum chamber](#) to simulate atmospheric gas ionization and plasma generation, replicating core processes of a deuterium-powered IEC nuclear fusion reaction
- Operated a 15kV high-voltage power supply under strict safety protocols to maintain stable plasma conditions throughout experimentation
- Characterized the relationship between internal grid geometry and plasma synthesis rates using visual luminescence techniques, laying groundwork for future neutron radiation simulations and fusion validation

✿ **Professional Training & Certification**

Advanced and Intro Fprime Workshop Certification **Feb 2026**

NASA Jet Propulsion Laboratory

Pasadena, CA

Nationally Registered Emergency Medical Technician **Sept 2025**

National Registry of Emergency Medical Technicians (NREMT) — EMS ID: 0538-7044-6794

United States

PADI Rescue Diver w/ Emergency First Response (EFR) **Oct 2024**

Professional Association of Diving Instructors (PADI) — PADI#24100Z7563

Laguna Beach, CA

Basic Life Support (CPR & AED) **Sept 2024**

American Heart Association — HeartCode: qxnt7ou98it5egnskkbzmiku

United States

PADI Advanced Open Water Diver **Apr 2024**

Professional Association of Diving Instructors (PADI) — PADI#24040J7449

Laguna Beach, CA

- Specialties: Deep Dive, Search & Recovery, Peak Performance Buoyancy, U/W Navigation, U/W Naturalist

PADI Enriched Air Nitrox Diver **Apr 2024**

Professional Association of Diving Instructors (PADI) — PADI#24040I9443

Laguna Beach, CA

Wilderness Medicine - First Aid / Epinephrine Auto-injector **Apr 2024**

NOLS Wilderness Medicine

Los Angeles, CA

PADI Open Water Diver **Feb 2024**

Professional Association of Diving Instructors (PADI) — PADI#24020Q5071

Laguna Beach, CA

Canadian Amateur Radio Operator Certificate - Callsign: **VA3UWS** **Jan 2019**

Innovation, Science and Economic Development Canada

Government of Canada

- Basic with Honours - Access to all amateur radio frequency bands

Siemens NX Space Systems Thermal Training **Feb 2019**

CSDC Structural & Thermal Analysis Workshop

Magellan Aerospace, Winnipeg, Manitoba

- Learned spacecraft structural and thermal analysis techniques for small satellites in Siemens NX

Hackathon Projects & Awards

Gateway 2.0

2015

Facebook Global Hackathon

Facebook HQ, Menlo Park, CA

- Improved developments on an iOS Messaging App with embedded API search query responses and natural language processing

Gateway

2015

MHacks 6

University of Michigan, Ann Arbor, MI

- Developed an iOS Messaging App with embedded API search query responses and natural language processing
- **Awards: Best Use of Facebook Parse API (Invitation to Facebook Global Hackathon), Best iOS App (sponsored by Apple Inc.), Best Use of Expedia API**

Lubdub

2017

SpartaHacks III

Michigan State University, East Lansing, MI

- Developed a web application that records and detects heart defects using audio wave analysis and a stethoscope, achieving real-time diagnostic capabilities
- **Awards: SpartaHacks 2nd Place Winner, ThoughtWorks Honorable Mention**

GeoRisk

2017

Winter Hackathon

University of Windsor, Windsor, Ontario

- Developed a Google Maps web-based application to analyze client data for a sponsoring insurance company
- **Awards: UWindsor EpiCentre Startup Series-A Funding (\$6000) – Funds to WinSAT**

Professional Affiliations & Community Engagement

Aerospace Education Officer, 2d Lt

Apr 2024 - Present

Civil Air Patrol (CAP) - Squadron 232

Mission Viejo, CA

- CAP ID#727326. Deliver engaging STEM education through lectures, hands-on activities, and rocketry/Arduino projects to inspire cadets in aerospace and engineering fundamentals.

Programs Chair

June 2024 - Present

American Institute of Aeronautics and Astronautics (AIAA) - Orange County Chapter

Orange County, CA

- ID: #1702953. Coordinate and host distinguished guest speakers to advance aerospace dialogue and professional development within the local AIAA community.

Media Coverage

[STARFIRE: FLEET COMMAND](#) | *Turion Space Corp.*

Sept 2024

[Droid.001 Alpha Centauri Imaging](#) | *Turion Space Corp.*

Jun 2024

[Droid.001 Moon Image Results](#) | *Turion Space Corp.*

Apr 2024

[Droid.001 Mission and Simulation Highlights](#) | *Turion Space Corp.*

Sept 2023

[Small Satellite Student Competition Award](#) | *University of Toronto Engineering Dept.*

Aug 2022

[UWindsor satellite design leading student competition](#) | *University of Windsor Engineering Dept.*

Nov 2019

[WinSAT wins critical satellite design review](#) | *Windsor Star – News Outlet*

Nov 2019

[Aerospace engineering student aiming high](#) | *University of Windsor Engineering Dept.*

Aug 2019

[Mujin Inc. Internship - Student Spotlight](#) | *University of Windsor Co-operative Education Dept.*

Oct 2018