Scott Nguyen

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EDUCATION

Master of Science in Electrical Engineering | Space Systems Engineering — **Expected Summer 2026**
University of New Mexico — GPA: 3.94/4.00

Master of Science in Aerospace Engineering — **Fall 2024**
University of Illinois Urbana–Champaign

Bachelor of Science in Aerospace Engineering — **Spring 2022**
Iowa State University

RELEVANT COURSEWORK

Orbital Mechanics I/II/III
Spacecraft Attitude Dynamics and Control
Nonlinear Programming
Spacecraft Systems
Satellite Communications
Optimization Theory
Space Situational Awareness
Electronic Space Propulsion

SKILLS

Programming Languages: MATLAB, Python, C/C++, Ruby
Frameworks / Libraries / Tools: NumPy, SciPy, Matplotlib, Astropy, Poliastro, bpy, git
Applications: Simulink, Blender

WORK EXPERIENCE

Student Co-Op, Electronics for Contested Space Group — **September 2025 – Present**
MIT Lincoln Laboratory

- Implemented an ***Unscented Kalman Filter (UKF)*** for precise radio frequency measurements and state estimation
- Built a probabilistic detection tool to compute observation likelihoods based on resident space object properties and optical sensor performance

Guidance, Navigation & Controls Engineer Intern — **May 2025 – August 2025**
Blue Canyon Technologies

- Verified functionality and polarity of IMU, Nano Star Tracker, Reaction Wheels, Torque Rods, and Sun Sensors via hardware testing and data checks
- Performed regression analysis of two-axis ***Solar Array Drive Assembly (SADA)*** momentum management and validated command interfaces for precise control and reliability
- Automated ***SADA*** validation by developing ***Ruby*** test scripts and mapping telemetry channels to ***COSMOS***

Guidance, Navigation & Controls Engineer Intern — **January 2025 – April 2025**
Blue Origin

- Integrated ***Active Disturbance Rejection Control (ADRC)*** and ***Sliding Mode Control (SMC)*** to develop a robust algorithm for stabilizing nonlinear MIMO dynamics of the BE-7 engine
- Evaluated control performance by injecting disturbances and demonstrated improved accuracy in setpoint tracking
- Integrated flight software into ***Simulink*** using ***S-functions*** in ***C*** to enable testing and verification

Guidance, Navigation & Controls Engineer Intern — **May 2024 – August 2024**
Varda Space Industries

- Conducted trade studies to optimize gravity models for mission requirements and select optimal filter type (***EKF*** vs. ***UKF***)
- Built Monte Carlo simulations to quantify reentry uncertainty, generating latitude/longitude covariance ellipsoids and a reentry dispersion cloud for flight safety analysis and capsule recovery planning
- Implemented an ***EKF*** for state estimation, optimizing ground station timing for minimal residuals and precise delta-v planning
- Added unit tests and CI/CD pipelines using Bamboo for continuous integration

Guidance, Navigation & Controls Engineer Intern — **May 2023 – August 2023**
Space Dynamics Laboratory

- Implemented a UKF with range iteration and least-squares orbit determination methods using optical navigation
- Performed Monte Carlo analysis on relative orbits to identify challenging scenarios and refine estimation algorithms
- Developed unit tests for ***Lambert Solver*** integrated with ***Initial Orbit Determination (IOD)*** pipeline

RESEARCH PROJECTS

Global Trajectory Optimization Competition (GTOC 6 & 11) – Modeling & Simulation

- Developed high-fidelity simulations for interplanetary trajectory design and optimization problems under nonlinear dynamics
- Contributed to solution verification and analysis workflows; maintained analysis notebooks and documentation for team reproducibility

Delta-V Minimization from Geostationary Orbit to Mars

- Applied trajectory optimization techniques to minimize delta-v for an Earth-to-Mars transfer, improving fuel efficiency
- Generated pork-chop plots using Lambert solutions and validated optimizer results against global minima
- Visualized optimized trajectories and planetary motion via Blender's Python API

TEACHING & MENTORING EXPERIENCE

Youth Development Professional **October 2024 – January 2025**

Boys & Girls Club

- Designed and taught an after-school **computer literacy** curriculum for grades 3–6 (typing, file systems, internet safety).
- Introduced **beginner coding** using Scratch and Python through project-based lessons.
- Differentiated supports to meet diverse learning needs and sustain engagement.

Math Teacher (Algebra I, Algebra II, Precalculus, Calculus) **October 2024 – January 2025**

North Star School

- Developed **unit plans, assignments, and assessments** aligned with course objectives and STEM applications.
- Integrated **Desmos/GeoGebra** to strengthen conceptual understanding.
- Provided individualized feedback and academic support to improve performance.

Research Assistant, AE 298 National Defense Education Program **January 2023 – May 2024**

Aerospace Engineering, University of Illinois Urbana–Champaign

- Co-taught an introductory **rocketry** course with hands-on labs and launch activities.
- Collected and analyzed assessment data to evaluate learning outcomes and program impact.
- Contributed to course redesign and rubric updates to boost engagement and retention.

Research Assistant, Grants for Advancement of Teaching in Engineering **November 2023 – May 2024**

Mechanical Engineering, University of Illinois Urbana–Champaign

- Developed a comprehensive **final project framework** using interdisciplinary pedagogy and clear assessment criteria.
- Researched and authored a **literature review**; contributed to a conference manuscript and instructional materials.