1. Describe your short term and long term academic and professional intentions.\*  (250 word limit)

On Earth, GPS answers these questions: where am I going, where am I, and how do I get there? Spacecraft solves these problems with guidance, navigation, and control (GNC). My goal is to build scalable open-source flight autonomy that does this from low Earth orbit to deep space, so missions are safer, cheaper, and accessible. Using my research and industry background, I’ll develop open-source GNC tools anyone can build on to lower costs and widen access to space.

Short term, my PhD will focus on three areas for flight-ready autonomy: online trajectory optimization for real-time replanning; adaptive model-compensation state estimation across orbit regimes; and robust model-free disturbance control for jitter and flexible modes. I’ll begin with high-fidelity modeling and simulation, move through software testing, then on to hardware verification, with systematic validation throughout. Culminating in 2–3 first-author papers and a CubeSat-class demo validated in simulation, software-in-the-loop, and hardware-in-the-loop against a defined navigation-error target.

Long term, I want to build infrastructure in space: software, standards, and on-orbit operations that make moving from launch to low Earth orbit, to cislunar space, and into deep space as predictable as an interstate. I will develop an open-source GNC stack for trajectory planning, model-free navigation, and robust control, along with shared, standardized protocols for rendezvous, deorbit, and traffic management. I will take it from lab to flight and work with industry on verification, certification, and adoption so universities, startups, and agencies can extend it. The goal is reliable, affordable deep-space operations that open access worldwide.

1. Please tell us when you:\* (*All fields required*)

* Engaged with someone with a different perspective

During office hours, a regular student said, “I don’t belong—I don’t have the background.” We explicitly acknowledged our differing perspectives: she saw her lack of background as a barrier; I saw her interest despite it as a strength. I named the fear and asked what drew her to rocketry. We set weekly goals with check-ins. Her questions sharpened; she shared interim results. By semester’s end, she confidently presented her build, launch, and analysis and validated her results. We left with a shared understanding: I became better at meeting self-doubt head-on; she left confident in her growing skills.

* Acted with courage

When an instructor accused me of giving students an unfair advantage, I requested a face-to-face meeting. Many were in their first STEM course, and I had organized peer-led sessions where they chose topics, wrote questions, and taught each other. In the meeting, I listened, restated his concerns, and explained how the structure built independent study skills, standing by the approach. That difficult conversation fostered understanding and improved the learning experience for our students.

* Fell short of expectations

In my first graduate semester, I prioritized haste and money over depth and balance. This led to academic probation(2.78). I took accountability, secured funding, reduced load, and rebuilt disciplined study habits. The next term, I earned a 3.66 and returned to good standing; in my graduate program, I maintained a 3.94. The lesson stuck: choose depth over haste, build sustainable routines, and own your results. That experience helps me support students through similar setbacks because I’ve faced—and overcome—the same adversity.

1. Please tell us eight improbable facts about you. These could include facts that people wouldn’t expect to be true and/or facts that others are surprised to learn about you.\* (*All fields required*) Combined Word Count (out of 150 words maximum)
   1. At eight years old, my first job was fixing houses with my uncle.
   2. My first career choice was to become a magician.
   3. I’m the first in my family to study beyond eighth grade through college and graduate school.
   4. During my first semester of graduate school, I ended up on academic probation.
   5. I taught computer literacy to 3rd–6th graders and algebra through calculus in high schools.
   6. Over 300 students built and launched rockets from an introductory course that I taught.
   7. There is spacecraft in orbit operating with flight software and hardware I designed and implemented.
   8. I’ve logged 10,000+ miles driving across the U.S. in pursuit of career opportunities
2. Connect the dots. How have the influences in your life shaped you? \* (Limit: 550 words)

Saturday mornings, my uncle picked me up to renovate houses, and we bonded over space documentaries. He told me how he dreamed of studying space in Vietnam. But due to the war, politics blocked his education, so he worked in a window factory to support his family. He kept learning anyway and said, “I had to use my hands; you have the chance to use your mind.” Watching him persist through limitations taught me resilience and gratitude for opportunities I have.

Growing up in Section 8 housing on government assistance taught me resourcefulness. I used it to learn space through library books and online courses because my school lacked a space curriculum. Without a father, teachers became mentors and guided me to become the first in my family to graduate high school and college. That experience planted the seed to mentor others—and showed me education can be both empowerment and possibility.

My passion for space led me to astrodynamics. My first research project—modeling a deep-space mission to the Jovian moons—drew me into guidance, navigation, and control(GNC) and a larger question: how can these tools expand access to space? I’ve held onto that question. My long-term goal is twofold: to build open-source GNC infrastructure that lowers barriers to space exploration and to lead as an educator, mentoring the next generation through a lab that links research with hands-on outreach.

To grow as an astrodynamics engineer, I built depth across guidance, navigation, and control—and breadth in software and hardware testing and verification. That work has impact across the space sector: I developed state-estimation and maneuver-prediction software for autonomous satellites, created optical algorithms to catalog resident space objects and improve tracking accuracy, and designed a model-free disturbance-rejection controller for lunar lander engines. I’ve also verified flight software and hardware for private, commercial, and government missions, learning firsthand what mission-critical reliability means. Today, at MIT Lincoln Laboratory, I’m characterizing the probability of detection of resident space objects from electro-optical data to strengthen national space-domain awareness. Together, these experiences sharpened my technical foundation and confirmed that open, reliable, scalable tools can make space safer and more accessible.

To grow as an educator, I worked across every level of learning—from teaching computer literacy to 3rd–6th graders, to algebra and calculus in high schools, to building grading standards and capstone projects for university courses. My master’s thesis redesigned assessments in an introductory rocketry course, doubling student engagement and boosting exam performance by more than 10%. Those experiences taught me that belief, paired with intentional structure, unlocks confidence and makes learning accessible. I now carry that into outreach, presenting my work as a GNC engineer in classrooms to help students see themselves in STEM.

Across research, industry, and teaching, my values stayed constant: curiosity, service, discipline, humility, and inclusion. From my uncle—who kept learning when school was out of reach—to students finding confidence in STEM, to flight software and hardware I built operating in orbit, I’ve learned that progress endures only when it’s shared. My goal is to build open-source GNC software that anyone can use to lower cost and expand access to space—paired with classroom-ready tools so every student can see a path into it. From installing windows with my uncle to building windows into space, I want every student to have the chance to look through.