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

On the road, GPS estimates your position, checks traffic, and reroutes; you still steer and brake. In space it is different: spacecraft rely on GNC, where guidance picks the path, navigation estimates position, and control fires thrusters to stay on track. I’ve worked on spacecraft at startups, major aerospace, a university affiliated research center, and a federally funded research and development center, modeling and simulating missions from low Earth orbit to deep space, building orbit estimation, lunar lander engine control, integrating space grade hardware, and electro optical tracking. My goal is to use that breadth and depth to build open source flight autonomy and GNC infrastructure from low Earth orbit to deep space, improving safety, lowering cost, and opening access worldwide for the next generation of missions and space travel.

In the short term, my PhD research will focus on three areas to build flight ready autonomy: online trajectory optimization so a spacecraft can compute the best route in real time, adaptive model compensation state estimation that holds across orbit regimes for deep space missions, and robust model free disturbance control to reject jitter and flexible modes. I will start with extensive modeling and simulation and rigorous software testing, then move to hardware testing and verification. Deliverables include two to three first author papers and a demo validated in high fidelity simulation, software in the loop, and hardware in the loop, targeting a CubeSat class experiment with a clear navigation error goal.

Long term, I want to build a space highway—the software and standards that make moving from launch to low Earth orbit, to cislunar space, and into deep space as predictable as an interstate. I will build an open source GNC stack for trajectory planning, model-light navigation, and robust control, with shared 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 plug in and 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
  1. Many of my students disagreed with me that they would be successful in my intro rocketry class. They saw “I don’t belong.” I saw they could learn and succeed. I started by listening and naming the fear, then asked what drew them to rocketry. We matched interests to roles, set a first build, paired students, I checked in weekly. I kept boundaries clear and framed progress as practice, not pedigree. By the end, every team designed, built, launched, and analyzed a rocket.
* Acted with courage
  1. After my instructor accused me of giving students an unfair advantage, saying I was doing the work for them, I asked for a one on one and stood up for myself and my students. Many were first term and not from STEM; in office hours they said they didn’t know how to study. I set up peer led sessions where students chose topics, wrote their own questions, taught them back, and we compiled a student made guide; I coached process, not answers. In the meeting I listened, restated his concern, and showed how the structure-built study skills without handing out solutions. We came to an understanding and continued the sessions.
* Fell short of expectations
  1. I chose to overload five classes while working two jobs to limit debt, and I ended the term on academic probation (2.78). I took responsibility and reset: secured TA/RA funding, right sized my load, used office hours, built study groups, and time blocked my week. The next term I earned 3.66 (cumulative back above 3.0) and finished at 3.28. My guardrails now are to cap credits, ask early, and build repeatable routines, and I coach my students to do the same.

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. I started working with my uncle at 8 years old fixing houses
   2. All my friends growing up were South Sudanese Refugees from the Dinka tribe
   3. I wanted to be a magician when I was younger
   4. I am the first in my family to study beyond eighth grade through college and graduate school.
   5. In my first grad semester I was on probation and nearly dismissed.
   6. I helped develop, test, and implement software and hardware now flying on spacecraft in orbit.
   7. I’ve crossed the country three times to pursue 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 for renovation shifts and gas-station breakfast. He told me how war and politics blocked his schooling and he worked in a window factory: “I had to use my hands; you have the chance to use your mind.” We talked orbits while hanging drywall. Our block was a mix of immigrants, refugees, and working-class families who taught us W-2s, fixing cars, and finding work. I learned to value different perspectives. Home was unstable and we relied on assistance; school was where I felt safe, seen, and fed, and where space first hooked me. Education became my way to use my mind and leave things better.

All of this brought me here. I want a graduate community that is wide in discipline and background and serious about service. I want peers who will challenge my ideas, let me challenge theirs, and still show up for each other the next day. That is why I am applying to Knight-Hennessy at Stanford. The King Global Leadership Program will help me practice the skills I need as a technical leader who serves people: listening across cultures, giving and receiving feedback, telling a clear story about complex work, and building teams that trust each other. I want to learn in that setting and contribute to it.

At Stanford I plan to mentor first-generation and low-income undergraduates through AIM and the Honors Thesis Mentorship Program. I will match students with graduate mentors on real projects, set clear goals and deliverables, and pay students for their time so money is not a barrier. I will run open study halls before major exams and host resume and mock-interview nights with the career center. I have seen how small structures change outcomes. I will bring that habit to campus.

For a Keystone project I want to connect open-source space tools to local classrooms. With a small team of scholars from education, policy, and engineering, we will build simple modules that let K–12 and community college students plan a basic trajectory, estimate state from noisy data, and tune a controller in a browser. We will co-design with teachers, share materials freely, and train student volunteers so the work continues after we graduate. The goal is to make advanced topics feel possible and to offer a path toward paid research roles in our labs.

My PhD focus will be flight autonomy for guidance, navigation, and control. In the short term I will publish on online trajectory optimization, adaptive model compensation for state estimation across orbit regimes, and robust model-free disturbance rejection. I will validate results in high-fidelity simulation, software-in-the-loop, and hardware-in-the-loop, and aim for a small on-orbit demo. I will contribute code and documentation to an open repository so others can build on it.

Long term I want to run a lab for flight autonomy that produces open tools and trained people. The lab will pair undergraduates and graduate students on funded work, build partnerships with schools for outreach, and collaborate with industry to move research into operations. I want to help build the software and standards that make moving from launch to low Earth orbit, to cislunar space, to deep space more reliable and more affordable.

My uncle told me I have the chance to use my mind. Knight-Hennessy is where I will learn to use it well, with others, for the next generation.