

# Alex Key

[linkedin.com/in/alex-r-key](https://www.linkedin.com/in/alex-r-key) | alexkeyhere@gmail.com | Clayton, NC | (919) 622-1734 | [AlexRSKey.github.io/AlexKeyPortfolio/](https://AlexRSKey.github.io/AlexKeyPortfolio/)

## Education, Certifications, & Honors:

**North Carolina State University, Raleigh, NC**

*Anticipated May 2027*

Bachelor of Science in Aerospace Engineering | Minor in Computer Programming | GPA: 4.0

**Relevant Coursework:** Foundations of Graphics, Thermal-Fluid Sciences, Aerodynamics I, Fundamentals of Vibrations, Applied Finite Element Analysis, Aerospace Structures I & II, C & Software Tools, Software Development Fundamentals, Data Structures

**2025 Brooke Owens Fellow**

The Brooke Owens Fellowship is a program that matches students in aerospace with executive mentors, pairs them with companies for hands-on experience, and provides professional development opportunities

**Certifications:** Level 2 Certification for the Tripoli Rocket Association, Level 1 FreeFlyer Certification

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## Skills

- **CAD:** Solidworks (Associate Certification), Fusion360, Onshape, Meshgrid, and Aspire
  - **CAM:** Glowforge/ULS Laser Cutters, Shopbot CNC Machines, Waterjet Cutters
  - **Finite Element Analysis:** ANSYS APDL, ANSYS Workbench, Solidworks Simulation Tool
  - **Coding Languages:** Java, MATLAB, Python, C, C++, JavaScript, HTML/CSS
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## Projects

**Experimental Solid-Propellant Rocket Motor**

*March 2025 -*

- Investigated the effects of grain/nozzle geometry and molecular composition on specific impulse and thrust
- Designed a composite motor configuration targeting a specified thrust & burn time using BurnSim
- Manufactured a small composite motor with a local expert using a homemade propellant recipe

**First-Year Engineering Design Day Arcade Machine**

*January 2024 to April 2024*

- Constructed a small arcade machine with a spring-loaded launcher and holes to launch metal balls into; Each hole added points to the machine's screen. The machine won first place in the category
- Used SolidWorks, 3D printing, and CNC Machines to create the parts; Assembled with power tools

**Sundial Furniture Project**

*October 2022 to May 2023*

- Designed and created tables and chairs for the sundial in the center of campus. Utilizing Fusion360 and Onshape for the design, we then cut the PVC pieces out on a CNC machine
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## Experience:

**NCSU High Powered Rocketry Club | Member, Vice President (2025)**

*April 2025 -*

- Designed experimental rockets and subsystem components using CAD software and FEA simulations
- Led a team of approximately 30 people in manufacturing, teaching new members how to operate power tools, design pathing for CNC machines, and program avionics
- Designed and manufactured lightweight composites, optimizing strength-to-weight ratio for supersonic flight
- Tested in-house manufactured composites for structural strength and laminate integrity
- Reengineered system architecture to meet evolving cross-team requirements for electronic subsystems
- Organized launch events and drafted checklists for thorough launch day preparations
- Drafted formal documentation regarding rocket design and structure for NASA's Student Launch Competition

**NCSSM High Powered Rocketry Club | *Member***

*September 2021 - April 2025*

- Manufactured bulkheads, housings, and other various parts using CNC machining, 3D printing, power tools, and a variety of composite layup techniques

**NCSU Additive Manufacturing Lab | *Research Assistant***

*October 2024 -*

- Assisted graduate students in designing and manufacturing modification parts for a gas atomizer
- Performed material analysis and structural testing on various in-house manufactured powdered metals
- Analyzed system characteristics for new designs, optimizing particle size distribution in a gas atomizer

**a.i. Solutions | *2025 Summer Software Engineering Intern***

*May 2025 - August 2025*

- Developed supplemental programs to read CCSDS orbital data messages using Python and FreeFlyer
- Debugged FreeFlyer scripting language and implemented solutions to reduce technical debt using C++