

My name is Abraham Castaneda and I am a graduate student at UNLV pursuing a Master of Science in Electrical Engineering and currently hold a Bachelor of Science in Electrical Engineering. Throughout my time at UNLV I have been fortunate to partake in research involving the benchmarking of RISC-V processors, the testing of tiled silicon photomultiplier array read-out integrated circuits, and avalanche photodiode integrated circuits. My primary focus within my major is electronics and my long-term goal is to one day work as an electronics design engineer or similar. In particular I would like to find a role where I can contribute to projects that can have an impact and/or advance our understanding of science.

Over the course of this fellowship I will be working on the development, testing, and integration of space-grade power electronics in support of the Black and Diffuse Aurora Science Surveyor (BADASS) sounding rocket experiment planned to be launched in early 2025 at Poker Flat Research Range. The deliverables will consist of a 28V to ± 28 V converter, 28V to 12V converter, and a low-dropout (LDO) regulator circuit to split the ± 28 V voltages into ± 18 V and ± 8 V. The power converters will also feature on-board EMI filters to prevent excessive interference. All of the designs will use automotive grade commercial-off-the-shelf components that are rated above the conditions they will be exposed to for the duration of the flight. In addition, all three PCBs must be size PC104 (3.550×3.775 inches). Specifically, the proposed power supplies will be part of the CCD (charge-coupled device) instrument that will be used to measure auroral particles. This is a novel idea and the instrument will be a technology demonstration on this sounding rocket experiment.