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	Clarkson University	
May 2024	BS in Aerospace and Mechanical Engineering Minor in Mathematics	GPA: 3.3/4.0

Professional Experiences

May 2023 – Aug 2023 **Blue Origin, New Shepard Avionics Mechanical Engineering Internship**

During my time at Blue Origin, I had the privilege of working on New Shepard, Blue's Sub-Orbital Rocket pathfinder. I collaborated closely with the Avionics Mechanical team, which was responsible for developing the mounting and housing solutions for all the avionics systems and payloads aboard New Shepard. One of the exciting challenges I undertook was leading the complete design and testing cycle for a new isolation system that required qualification for flight readiness.

To accomplish this task, I initiated the prototyping and design of test fixtures, utilizing Creo, to facilitate vibratory, shock, and material characterization testing of the isolation system. These tests involved the use of vibration (shaker) tables, shock beams, and tensile test frames to evaluate the physical properties and performance of the system.

The design of the isolation system was modeled after the actual flight conditions experienced by the escape module on New Shepard. This decision was driven by the rigorous vibratory loading that the module encounters during emergency escape sequences when separating from the booster. Once the system configuration, which included a mass simulator and attachment plates, was finalized, I assumed the role of the Responsible Engineer. In this capacity, I oversaw all testing activities conducted in the Environmental and Mechanical systems lab, addressing troubleshooting needs and obtaining official signoffs for the project.

As the Responsible Engineer, I also took the lead in characterizing the damping system for internal avionics and payload structures. My responsibilities extended to supervising and troubleshooting testing procedures in the Environmental and Mechanical systems lab.

Following the completion of testing, I conducted a comprehensive analysis of the transmissibility data, aiming to assess the performance of two competing isolation systems: the existing system currently in use and the newly acquired one. Utilizing decibel comparison graphs, I was able to draw conclusions from the data. While the new system displayed greater elastic properties that might pose challenges in future missions with tight clearances, it demonstrated a significantly more effective attenuation rate for vibrations beyond 100Hz.

Oct 2022 – May 2023 **KULR Technology, Mechanical Design Engineering Co-Op [Part-Time/Remote]**

During my time at KULR, I applied my previously acquired knowledge from my experience at Tesla to assist a small engineering team in the development of new battery

technology. My role involved contributing to the research and development of thermal runaway containment systems, which deepened my understanding of sourcing and the use of foreign materials. Another critical aspect of this system was the development of a battery seal that adhered to NASA's Crewed Space Vehicle Battery Safety Standards regarding heat exhaust while maintaining waterproof properties. This design allowed for effective battery thermal cycling while ensuring the cells remained in a dry and secure environment.

My most substantial project was focused on creating a battery wall charging system for in-house designed lithium-ion battery packs. This wall-mounted system was designed to accommodate and charge up to 24 packs simultaneously. The battery management systems of these packs were interconnected through an in-house developed app, enabling users to monitor each pack's status. I, in collaboration with another intern, was responsible for the entire design process, including CAD, sourcing, and working with external vendors for prototyping. This charging wall was showcased at KULR's exhibition at CES, in Las Vegas! This event provided a prestigious platform to present our innovative solution to a wide audience, demonstrating how KULR was at the forefront of cutting-edge battery technology.

Additionally, I collaborated with my lead engineer on the development of a housing for a data acquisition (DAQ) system for a bomb calorimetry test cell. This DAQ system comprised a 24-input/output system, all contained within a desk-sized package. The DAQ was designed to collect thermocouple data and assist in analyzing controlled thermal runaway events.

May 2022 – Aug 2022 **GE Aerospace, Commercial Aeromechanics Engineering Internship**

During my internship at GE Aerospace with the Commercial Aeromechanics team, I sought to gain a fresh perspective on the discipline after my experience with the military-based Aeromechanics team.

My first project involved collaborating with my lead engineer on a Low-Pressure Region (LPR) study, necessitated by crosswinds, for the RISE program's demonstrator fan blade and forward compressor stages. This study encompassed an initial axisymmetric analysis of the forward rotors, stators, and a newly designed unducted fan using ANSYS APDL. The simulation assessed the expected modal effects of a generated LPR within the system. To validate the study, we meticulously designed and prepared rigs specifically for wind tunnel testing at NASA. Calibration efforts were meticulously undertaken to replicate results from previous 9X fan and compressor rigs, ensuring that RISE test results could be directly compared to known data. This meticulous approach was essential for result accuracy and fidelity.

I was also involved in an analytical "sprint" for the CFM56-5B/7B fleet. This fleet used an HPC configuration that had not been analyzed before installation in maintenance shops. To ensure the fleet's safety, I participated in a fleet case study that involved reviewing previous engine performance tests with parts of the used configuration. After tabulating test results from records, a vibratory probabilistic model was created to simulate effects on the engine's staging. The study concluded with the team issuing a "no issue" document, stating that there were no significant issues arising from this configuration.

My last project centered on researching and developing a machine learning-based tool to evaluate mode shapes of the complex geometry of compressor blades. Working with

an internal team, we created a dataset of previous mode naming conventions and their corresponding mode shapes. Using this dataset, we achieved an accuracy rating of approximately 80%, significantly reducing the evaluation time to just 20 minutes compared to the previous 2-3 days' worth of analytical evaluation. The team is currently working on further development and aiming to increase the accuracy rating.

Jan 2022 – May 2022 **Tesla, Global Battery Manufacturing Engineering Co-Op: Concept and Build**

During my co-op at Tesla with the Concept and Build team (C&B), my primary project involved enhancing two leak test stations for different modules within the Model S and X battery pack line. These leak test stations utilized a mechanically latched vacuum test method that relied on particle count once a vacuum seal was established with the corresponding module. If the particle count exceeded the specified threshold, the system triggered a failed message, resulting in full retests of packs and line disruptions. To address this issue, the team decided to switch to a pneumatic-based latch system due to suspected seal problems with the previous mechanical connector. I designed a multi-connection pneumatically actuated station, which was seamlessly integrated into the live production line after coordinating with the production team. Following initial trials, the line's yield increased by 10%, and false failure rates decreased by over 60%.

In parallel with my main project, I oversaw the installation of a new manifold install tool on the same production line, serving as the liaison for C&B. Coordinating with the production team, we safely relocated the tool from Reno, NV to Fremont, CA, where it was installed. Through extensive Factory Acceptance Testing, the installation tool demonstrated a 26% decrease in cycle time compared to the previous manual process.

May 2021 – Aug 2021 **GE Aviation, Systems Engineering Intern: Operations and Testing**

Caveat: The Revolutionary Innovation for Sustainable Engines (RISE) program is owned by CFM, a joint venture between GE Aviation and Safran Aircraft Engines. My primary objective, while working with the Operations and Testing team, was to collaborate with the main engine owner to formulate a demonstrator test engine for the RISE program.

My first project involved developing multiple tools to organize projected test equipment for each engine module. This process required working closely with each module leader to understand their specific needs, leading to compromises in equipment usage to align with the test facility guidelines. Developing these tools involved creating weighted needs and decision matrices to ensure consistent and systematic decision-making, prioritizing one team's needs over others. In addition, I tracked technology maturation (Tech Mat) investments at the module level, providing these tabulated investments to the engine owner to ensure all required module Tech Mat needs were met while staying within budget.

Simultaneously, I collaborated with the previous testing lead of the GE9X to initiate the development of weight tracking systems. Leveraging lessons learned from the GE9X project, we created an organizational tool to monitor module weights at the component level.

Aug 2019 – June 2020 **GE Aviation, Military Engine Dynamics & Aeromechanics Engineering Intern**

In collaboration with the Engine Test team, I served as a liaison for the Engine Dynamics Team with the shared goal of reducing engine test time. Alongside a Performance Engineer, I developed a real-time Python script to assess GE-T408 engine accelerometer inputs for production testing. This live data would pass through a

dynamics algorithm agreed upon by both the performance and dynamics teams to evaluate the flight readiness of the engine. After successfully navigating the Technical Readiness Assessments (TRA), the script evolved into a fully functional test addition. This integrated system is expected to save the test team $3 million over the entire test life of a single engine family. Currently, the team is in the process of adopting this test and adapting it for other engine test campaigns, potentially reducing test time for each engine by up to 2 days.

My second project involved simulating and enhancing the rotor dynamics model of the F404-GE-103 military turbofan engine. This engine primarily serves the Boeing-Saab T-X Air Force trainer program. To improve the model, I created multiple Multi-Ended Spring (MEK) representations for the front and mid frames of the engine using Hyper Mesh and MSC NASTRAN.

For my final project, I debugged and released an airfoil notch fatigue evaluation tool that utilizes MATLAB, VBA, and ANSYS. This tool was initially developed by a previous intern but remained unfinished due to time constraints. After making necessary adjustments, the script now reduces computational time by 30% compared to the current analytical process.

Professional Service

Fall 2018 – Present

Society of Hispanic Professional Engineers (SHPE)

Co-Founder and President *Fall 2018 - Spring 2019*

I, along with an amazing team, revived a nationally recognized SHPE chapter at Clarkson that had been dormant for nearly a decade. Despite being a Predominantly White Institution (PWI), our goal was to create a supportive community that we felt was lacking on campus. Initially established in the early 1990s, the chapter had flourished until the early 2000s before falling dormant. After extensive restructuring and revitalization efforts, we successfully attracted approximately 20 members in our first semester, and within two semesters, our membership grew to around 30. Remarkably, we achieved official chapter recognition in just 1.5 years, enabling us to participate in three national conferences and one regional conference to date.

Alumni and Industry Relations Lead *Fall 2023 – Present*

After my first year, I transitioned from the role of president to becoming an advisor for the team, a position I held until the present year. Subsequently, the team approached me and invited me to rejoin the executive board (e-board) as an alumni and industry relations lead. Currently, my primary focus involves orchestrating corporate-sponsored events and organizing alumni-related gatherings. I am thrilled to be working alongside my team as we look forward to further advancing our growth and making strides towards this year's conference!

Fall 2022 – Present

Clarkson University Rocketry (CUR)

Co-Founder and Avionics Lead *Fall 2022 – Spring 2023*

Clarkson University Rocketry began as a model rocket club in 2015. Unfortunately, it then died off just after a year of being a club. However, through the efforts of myself

and an amazing team we were able to revive the club, but this time take it to the next level and push to be a collegiate high-powered competitive rocketry team.
After navigating a year's worth of bureaucratic procedures to ensure safety and organize the club, we swiftly secured a position as the newest addition to Clarkson University's Student Projects for Engineering Experience and Design (SPEED) program, a collection of high-performing engineering teams at Clarkson. With our inclusion, we made the decision to participate in Clarkson's inaugural rocketry competition. In my role as the Avionics and Recovery team lead, I oversaw a team of approximately eight members, guiding them through the design and manufacturing process for the internal payload and avionics housing. Additionally, I took charge of the ground test design and development, ensuring the safe deployment of our chosen main parachute, which had been selected based on group-calculated descent rate considerations for a secure recovery.

Overall, the team came in 4th place in our first ever competition and are looking to expand quickly.

Vice-President and Lead Analyst *Fall 2023 – Present*

After a successful first year, I was elected to co-lead the team as Vice President. In collaboration with our President, we serve as technical advisors for all sub-teams, including Avionics and Recovery, Payload, and Structures and Propulsion. Together, we conduct technology reviews and conduct weekly meetings with each sub-team lead to assess the technical maturity of their respective areas. Currently, I primarily oversee the Payload and Avionics sub-teams, actively engaging in the design phase. My responsibilities include offering guidance for structural, vibratory, and thermal analysis for both teams, as well as organizing the Master Schedule in coordination with our team manager.

Research Project(s) and Teaching Experience

Fall Semester 2021 **Teaching Assistant – AE212: Introduction to Aerospace Engineering Design**

Assisted in the teaching of engineering first principles through the lens of aerospace engineering, primarily through technical writing and design projects. These projects UAV design, cube satellite design and orbital mechanics, and technical design decision reports.

Fall Semester 2022 **Undergraduate Research Assistant - US National Team Luge Sled Drag Analysis**

Assisting a graduate researcher, the testing of undercarriage drag cones for use on US gold medalists' hand-crafted sleds was conducted to explore drag minimization. These cones were optimized in ANSYS Fluent and in-house software to decrease a drag pocket located on the underside of the luge rider's head. Flow visualization has proved that this pocket is decreasing the maximum velocity of the rider during straightaways. Testing 16 cones of various aerodesigns offered experience in adjusting and configuring load cells, running and maintaining a wind tunnel, as well as processing and analyzing live test data.

Three of the sixteen cones showed promise of decreasing drag at lower Reynolds numbers, and through extrapolation, it was shown that there is a promise that drag is

being reduced at higher Reynolds numbers, which represents race conditions. These race conditions needed to be extrapolated due to limitations in the maximum speed of our wind tunnel.

Professional Memberships

- Society of Professional Engineers (SHPE)
- Lunar Surface Innovation Consortium (LSIC)

References

Contact	*Source of Connection*
Derek Kamemoto Dkamemoto@blueorigin.com 425-503-0555	Sr. Manager, Lunar Transportation Interned on Avionics Mechanical Team with Derek
Dr. C. Merrett cmerrett@clarkson.edu 315-268-6580	Courses Taken with Dr. Merrett: - Aircraft Structural Analysis - Design of Aerospace Structures
Dr. B. Helenbrook bhelenbr@clarkson.edu 315-268-2204	Chair of the Aerospace and Engineering Department Courses Taken with Dr. Helenbrook: - Into to Numerical Methods - Gas Dynamics