**GRIFFIN MACRAE**

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**EDUCATION**

**M.S. Astronautical Engineering (GPA: 3.50)**  **Los Angeles, CA**

University of Southern California January 2023 – May 2024

**B.S. Astronautical Engineering (GPA: 3.42)**  **Los Angeles, CA**

University of Southern California August 2020 – May 2024

**Honors:**  W.V.T. Rusch Engineering Honors Program, Dean’s List,2nd Place Boeing Freshman Design Challenge

**Relevant Coursework:** Mechoptronics, Computational Programming and Numerical Methods, Aeromechanical Design, Spacecraft SE, Gas Dynamics, Spacecraft Dynamics, EDL, Human Spaceflight, Space Environment, Making Smart Devices, Propulsion

**SKILLS**

* **Software:** Matlab, Simulink, STK, Python, Git, Adobe InDesign, LabVIEW, KiCad, Thermal Desktop, C++, ParaView, LaTeX, HTML
* **Hardware/CAD:** Siemens NX, SolidWorks, FEA, Fusion 360, 3D Printing, Raspberry Pi, Arduino, Argon, Microcontrollers
* **Soft:** Leadership, Problem Solving, Communication, Decision Making, Agile, Resilience

**WORK EXPERIENCE**

**Space Engineering Research Center, USC** March 2022-Present

**Design Engineer** Genderless Docking System (CLINGERS)

* Refined the design including adding bumpers in **SolidWorks** to meet safety requirements for testing on the International Space Station
* Designed/manufactured fixtures to test CLINGERS on an air bearing table evaluating docking scenarios in microgravity conditions
* Created and maintained a Master Equipment List and Bill of Materials for a 450+ part assembly
* Reduced mass of the system by 20% to meet mass budget provided by NASA
* **Successfully launched to the ISS and was tested inside the International Space Station in December 2023**

**Lead Design Engineer** Soft Translatable Advanced Robot for in Space Handling (STARFISH)

* Assembled soft robotic limbs integrating a unique combination of SMA wire, silicon exoskeleton, and 3D printed parts
* Researched and developed novel designs for increased locomotion of soft robotic limbs in **NX**
* **3D printed** newly designed limbs using PLA and TPU filaments evaluating performance
* **Publication: “Mobility of a Soft Conformable Multi-Limbed Robot Actuated by Shape Memory Alloy Wires” at IEEE Aero 2024**

**Robotics Engineer** Bioinspired tentacle orbital degree retrieval robot (REACCH)

* Created electronic schematic in **KiCad** and created **Simulink** controls algorithm for stepper motors to drive claw-like mechanism
* Designed and machined gantry for test table to hang claw like structure for debris pick up scenarios

**Lockheed Martin, Aeronautics – Advanced Development Program** Summer 2023

**Aeronautical Engineer Intern (DoD Secret Clearance active summer 2023)**

* Constructed Guidance, Navigation, and Control (GNC) test harness in **Simulink** and **Matlab** to compare aerodynamic models
* Developed algorithms for GNC tools and utilized **Gitlab** to work in collaborative environment with daily scrum sessions
* Conducted and analyzed research optimizing bioinspired materials for enhanced aircraft performance and sustainability
* **Liaised** for chief engineers on joint aeronautics/space project effectively **communicating** GNC system to customers

**CS@SC Teacher’s Aid University of Southern California** May 2022-August 2022

* Taught **Python** programming to five international students through Newegg Education Program over the summer
* Created 10 lesson plans covering functions, loops, conditionals, structures, arrays, and libraries

**ACADEMIC PROJECTS**

**Underground Mapping Rover** Fall 2022

* Lead a team of four to implement sensor fusion interfacing LiDAR and IMU sensor with a **Raspberry Pi** for mapping lunar caves
* Designed and manufactured an enclosure around Raspberry Pi, LiDAR, IMU sensor, and power source
* Implemented a SLAM algorithm using an IMU/LiDAR and processed data using Kalman filter and low pass filter reducing noise