DUNCAN MCGOUGH

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EXPERIENCE

Space Exploration Technologies Corporation (SpaceX) May 2018 - August 2018
Satellite Development Intern *Seattle, WA*

- Produced and data-correlated a multiphysics ANSYS model of the hall-effect thruster used in the "Tintin" and potential Starlink constellation. Model determined thermal expansion, temperatures, stress/strain, and vibration modes to inform the propulsion team on design choices for materials, sizing, and power as well as operation modes in orbit. Tested thruster coils in thermal vacuum chambers.
- Developed a Python script that utilizes a machine learning clustering algorithm to simplify phased-array antennas for input into Thermal Desktop. Reduced necessary modeling and computational time in Thermal Desktop as a result.
- Designed and constructed a test bed for determining performance of thermally-cycled heat pipes. Determined the initial performance of various heat pipe geometries and provided feedback for antenna thermal design.
- Produced a multiphysics thermal-structural ANSYS model of phased array antennas and their beamformer chips to provide design feedback for structural and antenna team on power, structure, and placement of components.

Roccor LLC May 2017 - August 2017
Thermal Engineering Intern *Longmont, CO*

- Engineered thermal vacuum chamber for deployable composite CubeSat radiators. Met NASA and Roccor project requirements and worked with machinists and welders to manufacture the chamber. Operated within project budgets and deadlines. Designed and simulated in SolidWorks and validated results by hand. Worked with FLIR instrumentation for chamber with IR optics. Developed Thermal Desktop model for system. Calibrated and tested chamber. Assisted thermal team with next-generation heat pipe development. Tested thermal solutions with high-vacuum systems.

Aerospace Corporation: Senior Design Project August 2018 - Present
Test and Integration Lead *Boulder, CO*

- Modeled entire optical space object tracker in Solidworks and created assemblies and drawings for production. Selected CPU hardware and performed thermal analysis for CPU and power supply. Developed Python models for orbit tracking speed and required field of view.

NASA Space Grant, 2017 Solar Eclipse Ballooning Project May 2016 - July 2016
Colorado Space Grant Consortium Workshop Contractor *Boulder, CO; Bozeman, MT*

- Provided individualized instruction to teams of university faculty and students with construction of high altitude solar live video, imaging payloads, and auto-tracking ground stations. Performed troubleshooting on radio still image and video transfer systems, Iridium Satellite communication payloads, and ground station payload tracking software.

COBRA "Spaceshot" Suborbital Rocket Development Team March 2016 - January 2018
Propulsion Lead *Boulder, CO*

- Manage propulsion subteam. Modeled oxidizer injector assembly and used CFD and FEA to validate designs. Calculated nozzle geometry and flow rates. Designed liquid oxidizer storage and delivery/injection systems for a hybrid rocket.

Gridded Electrostatic Ion Thruster Research BalloonSat Project January 2016 - May 2016
Team Lead *Boulder, CO*

- Led a team of CU Boulder students in an engineering projects class to design, test, and fly a high-altitude BalloonSat payload. Developed, researched, and constructed a low-cost gridded electrostatic ion thruster to test at altitude for deployment upon CubeSats. Designed and soldered power distribution for environmental sensor data collection and thruster. Analyzed data retrieved.

EDUCATION

University of Colorado, Boulder *August 2015 - Present*
Engineering Honors Program, Chancellor's Scholarship
Masters of Science, Aerospace Engineering Sciences with focus on Fluids and Propulsion *Expected Graduation: May 2020*
Bachelor of Science, Aerospace Engineering Sciences *Expected Graduation:* May 2019
Bachelor of Music, Violin Performance (College of Music Scholarship Award) *Dates:* August 2015 - May 2016

STRENGTHS AND SKILLS

Programming	Python, MATLAB, Bash, C++, LABVIEW, LaTeX
Software	ANSYS, OpenFOAM, CAD (SolidWorks), Thermal Desktop, OpenRocket, Mathematica, Microsoft Office Suite
Equipment	Microcontrollers, 3D printers, high-vacuum systems, shop equipment, electrical equipment (e.g. soldering)
OS	Linux, OSX, Windows, using Virtual Machines
Personal Interests	Violin, tuner car modification, freeride skiing, mountain biking, TaeKwonDo, Tai Chi, mountaineering