

JOHN (CHARLIE) FULLER

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EDUCATION

Colorado School of Mines

August 2019 - Present

Doctor of Philosophy

Department of Mechanical Engineering - ADAPT/Stebner Lab

Research: I am producing the first-ever functionally graded structures using additively manufactured shape memory alloys, through development of custom processing parameters, heat treatments, and constitutive models integrated in a machine learning platform to produce ground-breaking parts for the medical and aerospace industries.

Colorado School of Mines

August 2015 - May 2019

College of Engineering and Computational Sciences

Bachelor of Science, Mechanical Engineering

Major GPA: 3.53

WORK EXPERIENCE

Lawrence Livermore National Laboratory

May 2019 - August 2019

Additive Manufacturing R&D Intern

- Assembly of an experimental vacuum chamber/500W YAG laser powder bed fusion system.
- Installed and conducted testing for a new in-situ diagnostic system for commercial use, using a custom built LabView GUI.
- Collected and processed data using high speed cameras, thermal cameras and pyrometers.
- Processed image data for publication in Origin Pro, Matlab, and Python.

Sierra Nevada Corporation Space Systems Group

May 2018 - August 2018

Dream Chaser Structural Test Engineering Intern

- Design, analysis, and testing of metallics and composites for Dream Chaser Spacecraft.
- Programmed data analysis tool in Matlab to convert aerodynamic load data to visual failure envelope in Excel, significantly decreasing the time needed to analyze new load cases.
- Used Excel and C++ scripts to project sensor point cloud map on Dream Chaser vehicle CAD.
- Designed parts for manufacturing in Siemens NX, and conducted testing on MTS load frame.

PROJECTS

CASmart Shape Memory Alloy Design Competition Team Lead

Design competition sponsored by Boeing and Shape Change Technologies. Designed, analyzed and fabricated a system for energy harvesting from exhaust gases of air breathing engines using shape memory alloys for jet aircraft. I was responsible for all design work, electromagnetic, structural, and thermal modeling done using custom Matlab code.

Additively Manufactured 17-4 Stainless Steel Electrochemical Support Dissolution

Bulk property evaluation, surface roughness characterization, and process qualification for a new technique of removing support material from metal AM parts using electrochemical dissolution. I was responsible for sample preparation, destructive testing and data analysis.

Topology Optimization Study for Powder Bed Fusion Additive Manufacturing

Research project in collaboration with Barber-Nichols and Ball Aerospace to evaluate Topology Optimization solvers with destructive testing/FEA. TO and lattice geometries created in Solidworks, Altair Inspire, and PTC Frustum. Inconel 718 and Haynes 282 parts were built on an EOS M290, and non-destructive evaluation on as-built parts was completed with X-Ray CT Scanning. Tensile testing conducted with an MTS load frame and analyzed using DIC. Failure site analysis was conducted on ESEM to evaluate porosity, fracture surface composition, and failure modes observed.

NASA Robotic Mining Competition Team Lead

Lead a team of 12 engineers designing and fabricating a golf-cart sized autonomous Lunar excavation rover. I was responsible for design of all excavation system computational modeling (Matlab), managed full vehicle design integration (Solidworks), led the fabrication of flight parts and test fixtures, and vehicle proof testing. ROS frameworks were used to analyze point cloud data and depth measurements from 360 degree cameras and Tracking Camera. Computer vision data was used to complete full-field surface mapping for navigation and obstacle avoidance.

NASA RASC-AL Design Competition Team Lead

Designed and developed a full-scale Lunar polar sample return mission architecture. I was responsible for leading the design of our ground vehicle teams, and single-handedly completed the design of our excavation rover. Our design concepts were incorporated by Blue Origin with the release of their Blue Moon Lunar Lander Concept.

TECHNICAL STRENGTHS

Solidworks, Siemens NX, ANSYS, Altair Inspire, Microsoft Office, Latex, Matlab, Arduino, C, Python, Destructive Testing, Digital Image Correlation, X-Ray Computed Tomography, ESEM, CNC, Mill, Lathe, Welding, Water-Jet Cutting, Composite Lay-up.

PUBLICATIONS

AIAA Space 2018 Presentation and Publication

Polar Sample Extraction In-situ Drilling Operations Network (AIAA-2018-5108)

AWARDS AND ACHIEVEMENTS

First Place Overall, Best Undergrad Team, Best in Theme

2017-2018 NASA RASC-AL Design Competition

2019-2020 Mechanical Engineering Fellow

Colorado School of Mines ME Department

Innovation Award

2019 Colorado School of Mines Senior Design Showcase

Dean's List

August 2017-Present

EXTRA-CIRRICULAR

Was selected to design and fabricate 'flight parts' for an additively manufactured Ti-6Al-4V 'Iron Man' suit for Adam Savage's TV show *Being Savage*. The suit was featured on multiple social media platforms, and flown using a Gravity Industries jetpack.