

JOHN (CHARLIE) FULLER

DESIGN, INTEGRATION, TEST, AND ADDITIVE
MANUFACTURING ENGINEER



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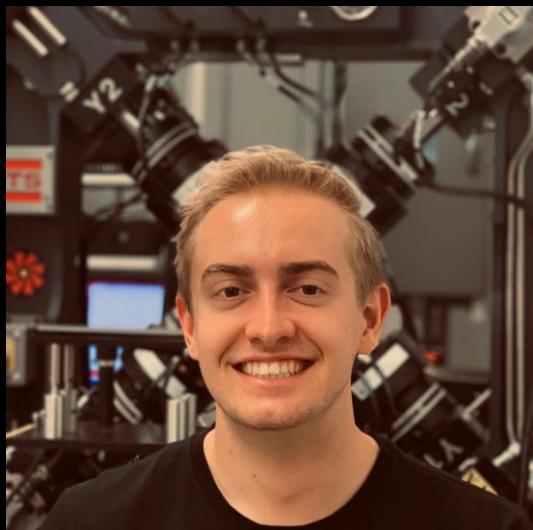
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ABOUT ME

I AM A GRADUATE STUDENT IN MECHANICAL ENGINEERING AT THE COLORADO SCHOOL OF MINES, FINISHING MY M.S. (THESIS) ON 3D PRINTING SHAPE MEMORY ALLOYS WHILE WORKING AT LOCKHEED MARTIN SPACE SYSTEMS IN ADVANCED DEVELOPMENT PROGRAMS DESIGNING, BUILDING, AND TESTING PROTOTYPE SPACECRAFT FOR LUNAR SCIENCE MISSIONS.

CURRENTLY SEEKING ADDITIVE MANUFACTURING AND INTEGRATION & TEST ENGINEERING OPPORTUNITIES STARTING JANUARY 2021.



SKILLS

DESIGN

- CERTIFIED SOLIDWORKS PROFESSIONAL (MECHANICAL DESIGN)
- PROFICIENT IN PTC CREO AND SIEMENS NX
- PROFICIENT IN COMPUTER-AIDED DESIGN (CAD), PARAMETRIC DESIGN, AND TOPOLOGY OPTIMIZATION



ANALYSIS

- PROFICIENT IN FINITE ELEMENT ANALYSIS (FEA) FOR STATIC AND DYNAMIC STRUCTURAL, FLUID, AND THERMAL ANALYSIS INCLUDING COMMERCIAL SOFTWARE SUCH AS ANSYS, SOLIDWORKS, AND ABAQUS
- HAVE WRITTEN CUSTOM STATIC STRUCTURAL FEA CODES IN MATLAB AND COMSOL



HARDWARE AND MANUFACTURING

- EXPERIENCE IN POLYMER AND METAL ADDITIVE MANUFACTURING IN PRODUCTION ENVIRONMENTS
- HAVE BUILT CUSTOM POLYMER AND METAL AM MACHINES FROM THE GROUND UP
- PROFICIENT IN TRADITIONAL MACHINING AND MANUFACTURING (CNC, MILL, LATHE, ETC.)

SOFTWARE

- PROFICIENT IN PYTHON, MATLAB, AND LABVIEW FOR DATA ACQUISITION, ANALYSIS AND POSTPROCESSING
- PROFICIENT IN PLC PROGRAMMING USING LABVIEW AND PYTHON
- PROFICIENT IN CONFIGURATION MANAGEMENT (WINDCHILL, GRABCAD WORKBENCH, GITHUB)



WORK EXPERIENCE (>1.5YRS)

ADVANCED PROGRAMS R&D INTERN
LOCKHEED MARTIN SPACE SYSTEMS
JUL. 2020 - DEC. 2020



ADDITIVE MANUFACTURING R&D INTERN
LAWRENCE LIVERMORE NATIONAL LAB
MAY 2019 - FEB. 2020



DREAM CHASER STRUCTURES TEST INTERN
SIERRA NEVADA CORPORATION
MAY 2018 - AUG. 2018



OPERATIONS AND GEAR TECHNICIAN
BENT GATE MOUNTAINEERING
SEP. 2016 - OCT. 2017

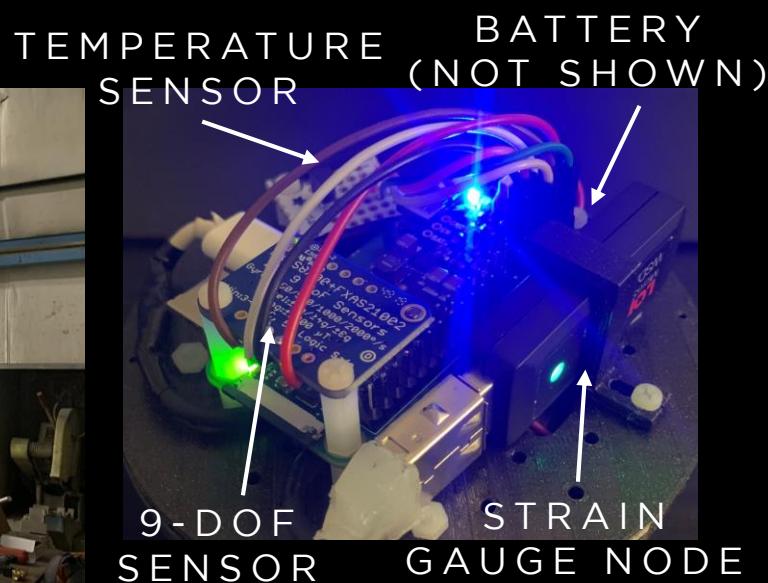
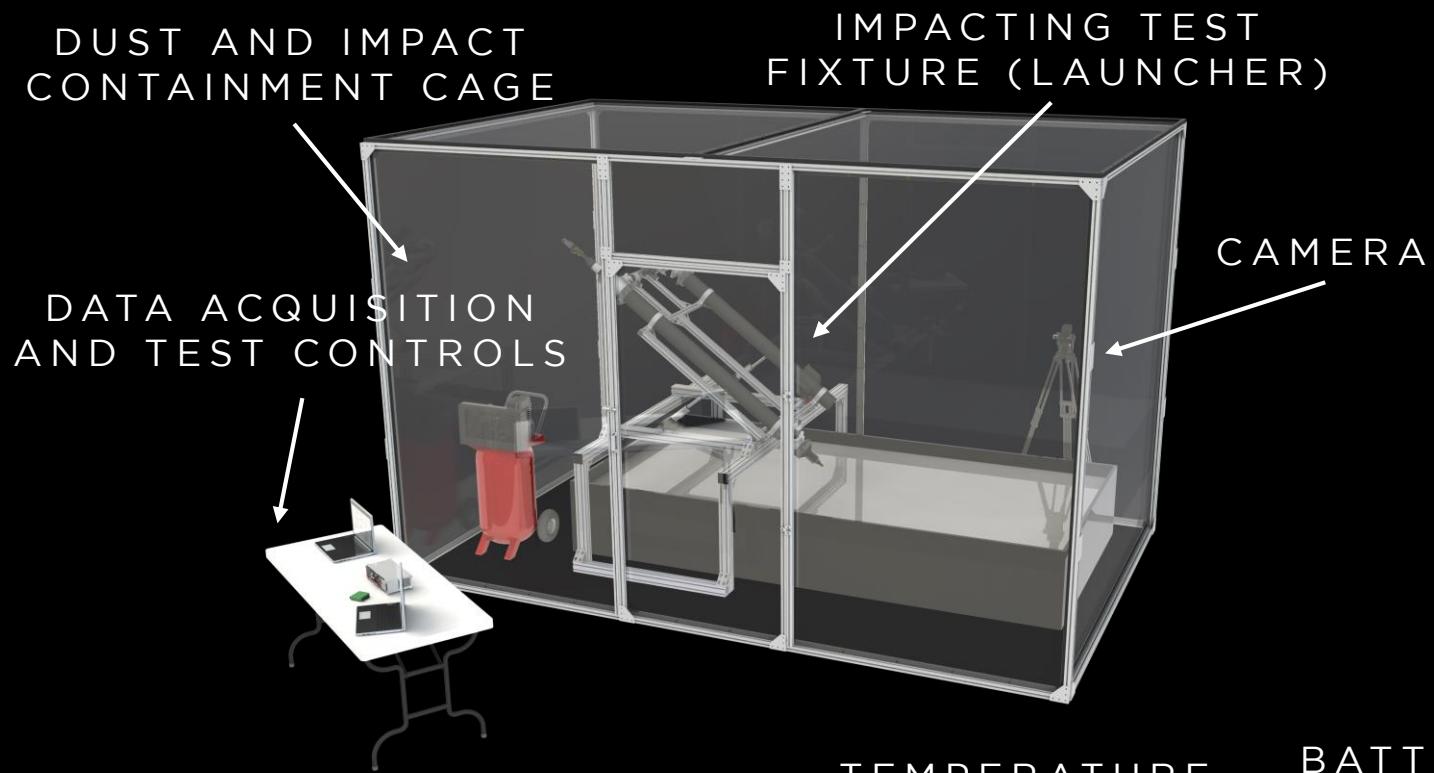


ADVANCED PROGRAMS R&D INTERN

LOCKHEED MARTIN SPACE SYSTEMS

JUL. 2020 - DEC. 2020

DESIGNED, BUILT, PROGRAMMED AND TESTED A 3D PRINTED TITANIUM PROTOTYPE SPACECRAFT ON A CUSTOM HIGH-PRESSURE GAS DRIVEN TEST FIXTURE TO SIMULATE HIGH VELOCITY LUNAR SURFACE IMPACT, WITH REMOTE OPERATION AND DATA COLLECTION.



ADDITIVE MANUFACTURING R&D INTERN

LAWRENCE LIVERMORE NATIONAL LAB

MAY 2019 - FEB. 2020

ASSEMBLED AND TESTED A CUSTOM VACUUM-CHAMBER BASED L-PBF MACHINE WITH HIGH-SPEED AND THERMAL IMAGERY AND ENVIRONMENTAL (TEMP, PRESSURE, AND O₂) MONITORING CONTROLLED WITH A CUSTOM-BUILT LABVIEW INTERFACE. EXPERIMENTS PUBLISHED IN NATURE COMMUNICATIONS ON 11/27/20.

The figure consists of three main panels. The top left panel shows the journal logo and title "COMMUNICATIONS MATERIALS". The middle left panel is a screenshot of the article page, featuring the title "Laser-metal interaction dynamics during additive manufacturing resolved by detection of thermally-induced electron emission", authors Philip J. DePond et al., and two heatmaps of electron emission signals. The bottom left panel contains two diagrams: one of the custom vacuum chamber with various ports and sensors, and another schematic of the laser-melt pool interaction and electron emission measurement system. The right side of the figure is a large image of the custom vacuum chamber's interior, showing the mounted experimental setup.

ARTICLE
<https://doi.org/10.1038/s43246-020-00094-y> OPEN

Laser-metal interaction dynamics during additive manufacturing resolved by detection of thermally-induced electron emission

Philip J. DePond^{1,2}, John C. Fuller^{1,3}, Saad A. Khairallah¹, Justin R. Angus¹, Gabe Guss¹, Manyalibo J. Matthews¹ & Aiden A. Martin¹✉

a) Laser scanning unit internal components including scan mirrors, laser focusing optics, collimator, and 500 W 1064 nm YAG fiber laser.

b) Diagram of custom vacuum chamber used to conduct testing.

c) Representation of electron emission process. Electrons are ejected from the melt pool as the laser heats the metal surface, creating a current that is measured using a data acquisition system.

Electron emission signal (μA)

Distance from focus (mm)

Time (μs)

Electron emission signal (μA)

Distance from focus (mm)

Time (μs)

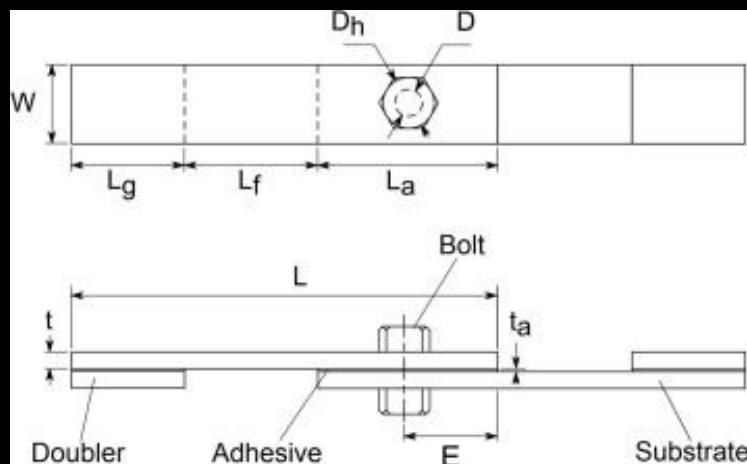
7

DREAM CHASER STRUCTURES TEST INTERN

SIERRA NEVADA CORPORATION

MAY 2018 - AUG. 2018

DESIGNED, ANALYZED, AND DESTRUCTIVELY TESTED BOLTED-BONDED COMPOSITE JOINTS USING AN MTS LOAD FRAME FOR THE DREAM CHASER SPACECRAFT TO EVALUATE SEALANTS FOR FLIGHT, IN ADDITION TO PROGRAMMING A DATA ANALYSIS TOOL FOR AERODYNAMIC STRUCTURAL ANALYSIS IN MATLAB.



3D PRINTING SHAPE MEMORY ALLOYS

M.S. THESIS RESEARCH

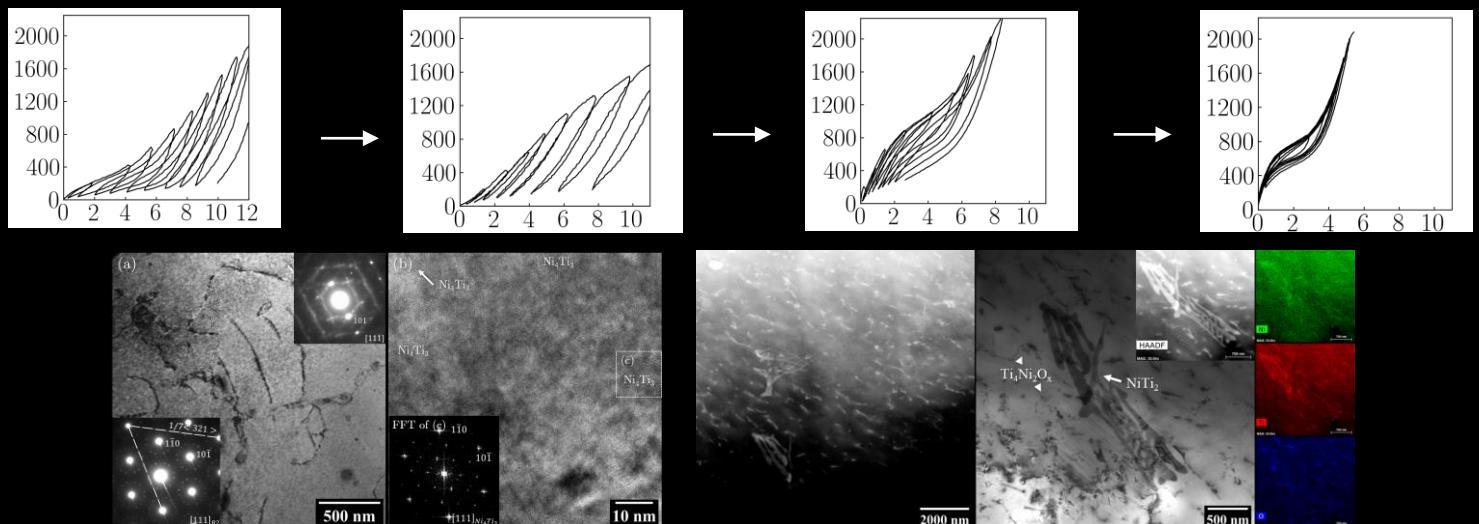
AUG. 2019 - DEC. 2020

UTILIZED DESIGN OF EXPERIMENTS (DOE) AND VARIOUS CHARACTERIZATION METHODS TO 3D PRINT CRACK-FREE NI-RICH NITI SHAPE MEMORY ALLOYS VIA LASER POWDER BED FUSION (L-PBF) ADDITIVE MANUFACTURING (AM) AND DESIGNED POST-PROCESS METHODS TO ACHIEVE FUNCTIONAL PERFORMANCE.

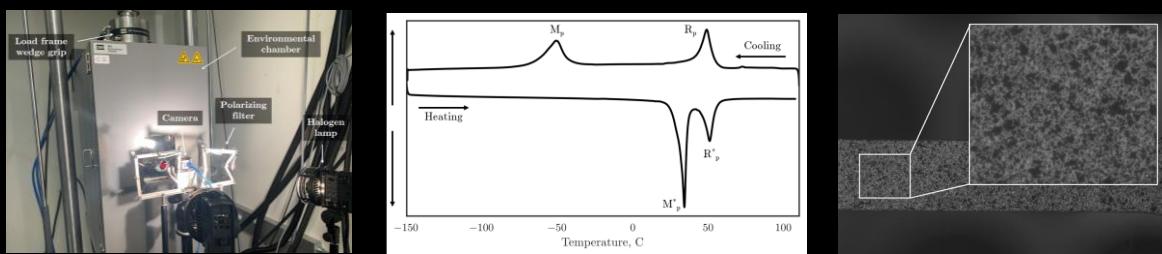
PRINTED PARTS AND FIGURED OUT HOW TO ELIMINATE CRACKING



HEAT TREATMENTS TO OPTIMIZE THERMOMECHANICAL RESPONSE WITH MICROSTRUCTURAL CHARACTERIZATION



THERMOMECHANICAL CHARACTERIZATION WITH MECHANICAL TESTING, DIC, AND DSC

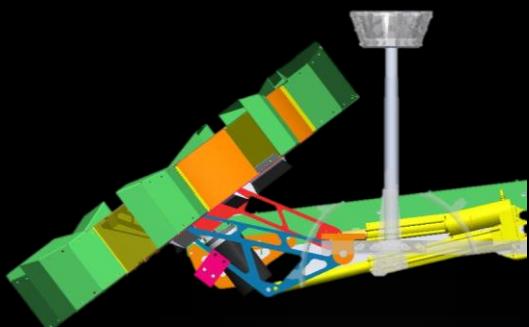


NASA ROBOTIC MINING COMPETITION

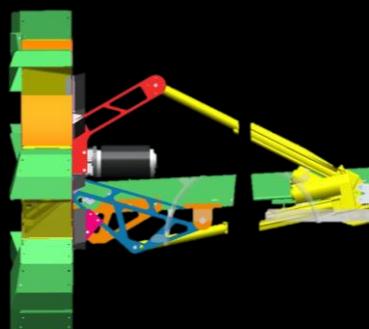
TEAM LEAD

AUG. 2018 - MAY 2019

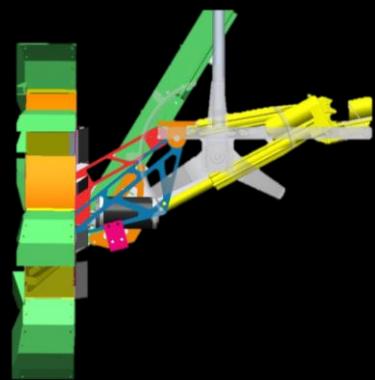
DESIGNED AND MANUFACTURED A LUNAR PROSPECTING ROBOT PROTOTYPE CAPABLE OF EXCAVATING REGOLITH AND ROCKS, MAXIMIZING PLUNGE FORCE AT LOW MASS, AND EXCAVATING UP TO 1KG/SEC AT A DEPTH OF 0.5M.



RETRACTED



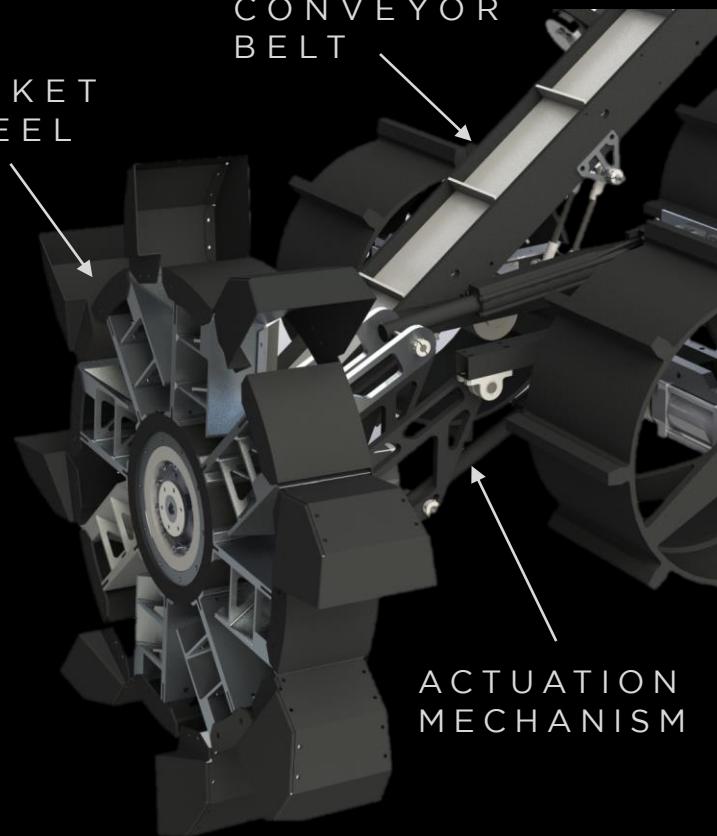
VERTICAL



LOWERED

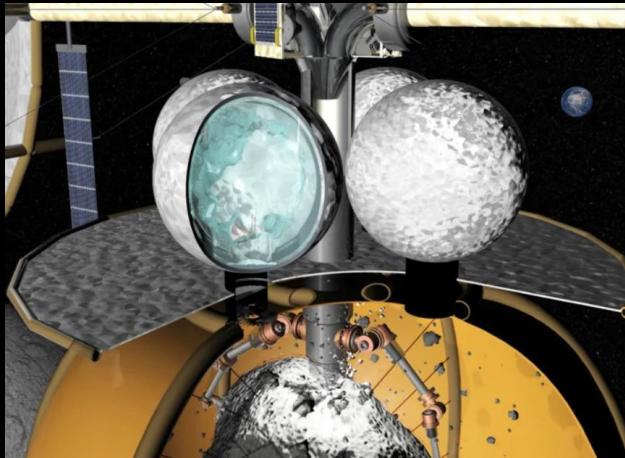


BUCKET
WHEEL

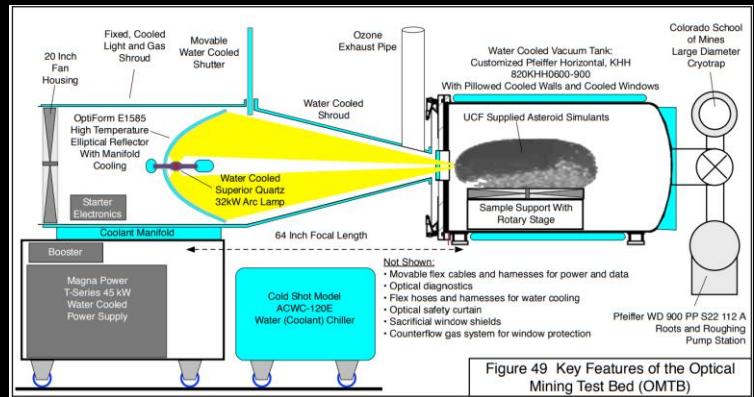


OPTICAL ASTEROID MINING RESEARCH

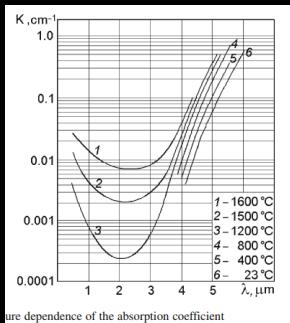
CONDUCTED THERMAL ANALYSIS IN MATLAB AND ANSYS FOR AN OPTICAL ASTEROID MINING TEST BED TO ENSURE VACUUM CHAMBER WINDOW WOULD NOT FAIL UNDER THERMAL STRESS AND SPECIFIED REQUIRED COOLING SYSTEM



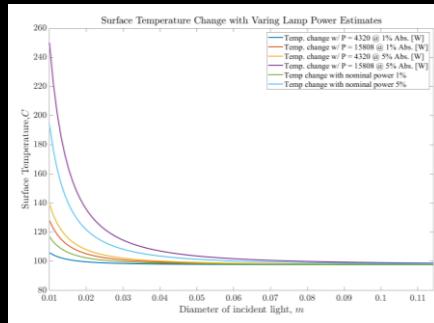
PRELIMINARY SYSTEM DESIGN



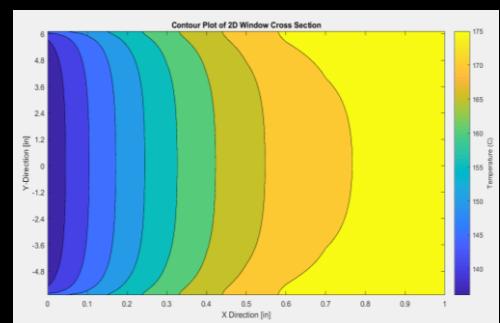
USE SPECTRAL
OUTPUT AND BEER-
LAMBERT LAW TO
CALCULATE HEAT
ABSORBED



CALCULATE
WINDOW SURFACE
TEMPERATURE
WITH DIFFERENT
BEAM PROFILES



APPROXIMATE
TEMPERATURE
PROFILE USING
CUSTOM 2D
FEA CODE



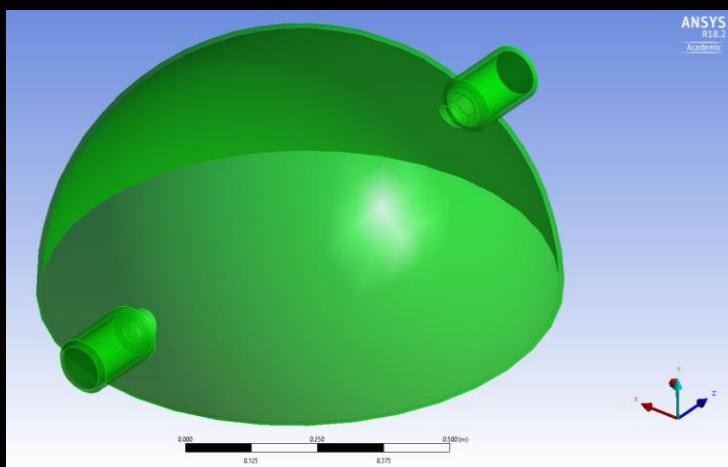
'FIRING' LAMP
IN TO VACUUM
CHAMBER



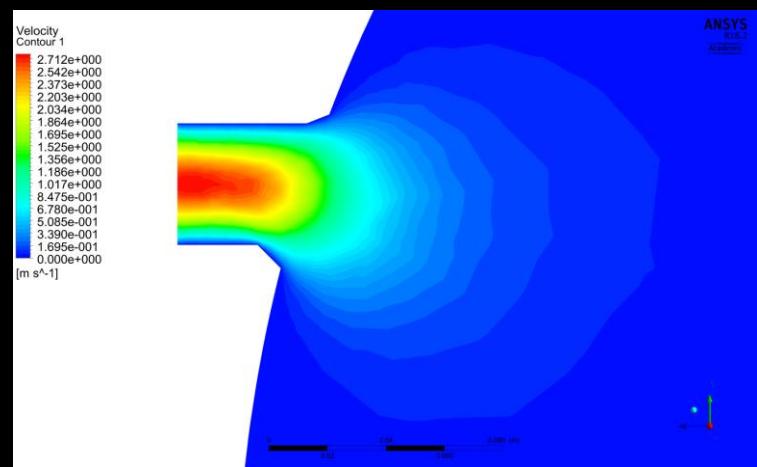
OPTICAL LUNAR MINING RESEARCH

CONDUCTED THERMAL ANALYSIS IN MATLAB AND ANSYS
FOR AN OPTICAL LUNAR MINING TEST BED TO ESTIMATE
TRAP RATES FOR SUBLIMATED WATER ICE

CONCEPT:
CONCENTRATE
SOLAR ENERGY
ON LUNAR
SURFACE TO MINE
WATER ICE



CREATE SCALE MODEL



2D AND 3D THERMAL FLUIDS
ANALYSIS

DISSOLVABLE SUPPORTS FOR METAL ADDITIVE MANUFACTURING

CONDUCTED A STUDY OF DISSOLVABLE SUPPORT MATERIAL FOR L-PBF 17-4PH STAINLESS STEEL IN COLLABORATION WITH BARBER NICHOLS AND BALL AEROSPACE INCLUDING REMOVAL PROCESS, MECHANICAL TESTING, AND SURFACE ROUGHNESS EVALUATION

PRINT PARTS



REMOVE FROM BUILD PLATE



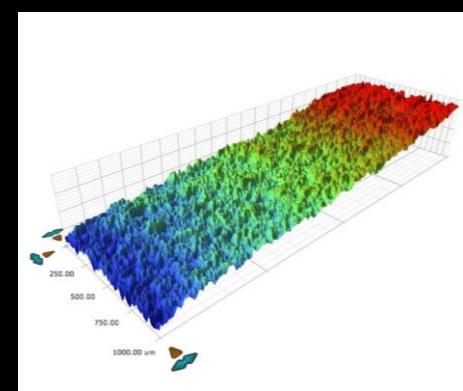
REMOVE SUPPORTS VIA SENSITIZATION



COMPARE SENSITIZED TO MACHINED PARTS



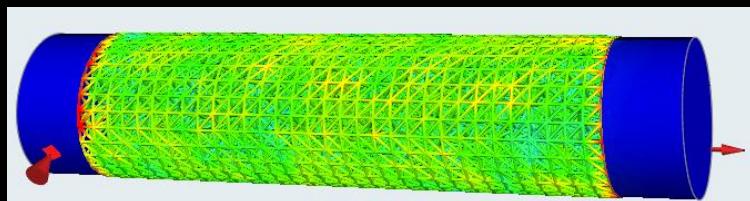
MECHANICAL TESTING AND SURFACE ROUGHNESS EVALUATION



TOPOLOGY OPTIMIZATION STUDY FOR METAL ADDITIVE MANUFACTURING

CONDUCTED A TOPOLOGY OPTIMIZATION (TO) STUDY USING L-PBF PRINTED HAYNES 282 AND IN718 IN COLLABORATION WITH BALL AEROSPACE AND BARBER NICHOLS WHICH INVOLVED DESIGNING TO PARTS USING SEVERAL COMMERCIAL SOFTWARES AND CONDUCTING MECHANICAL AND MICROSTRUCTURE EVALUATION

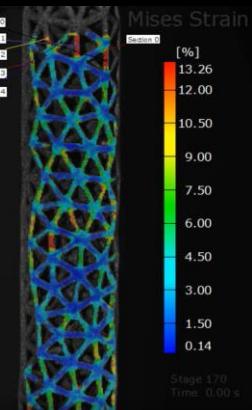
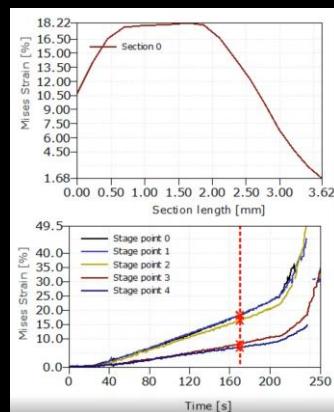
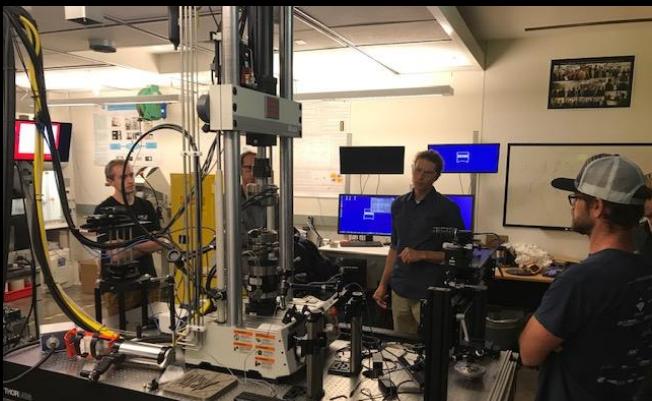
DESIGN PARTS



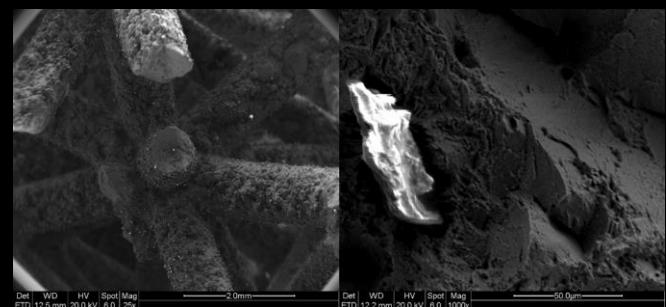
PRINT PARTS



MECHANICAL TESTING AND DIC

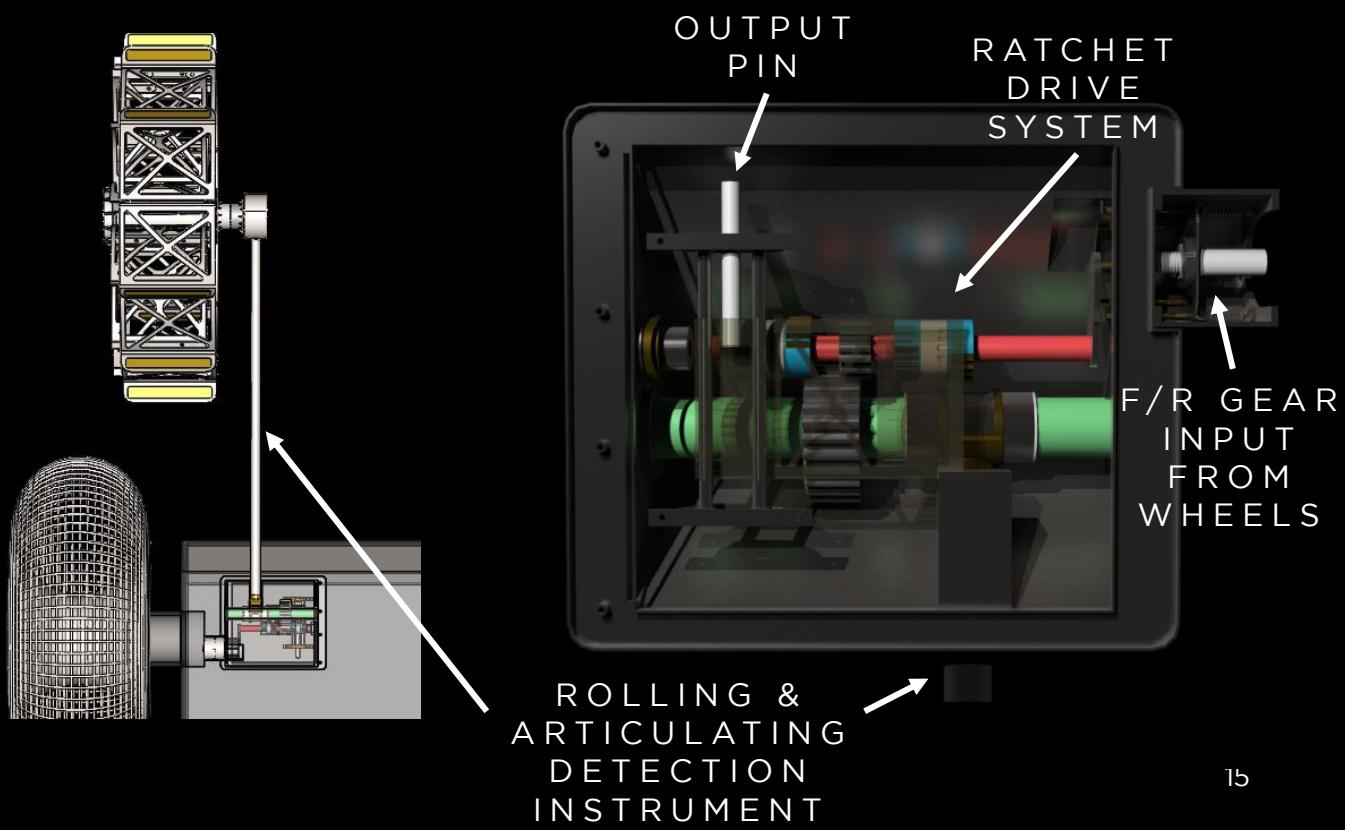
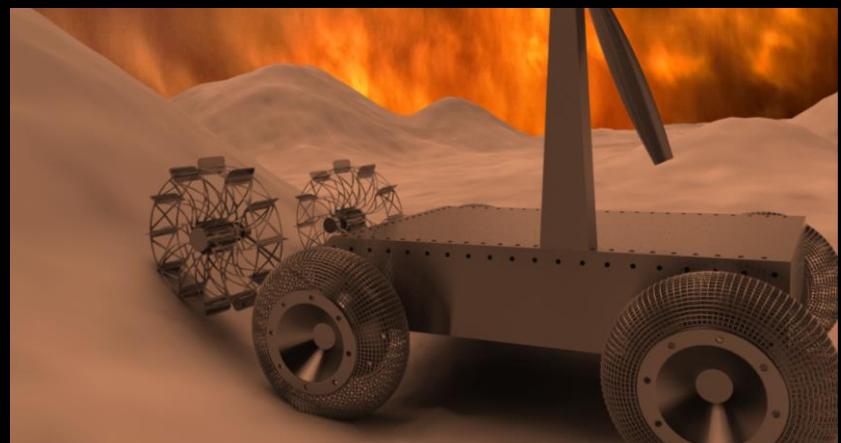


FRACTOGRAPHY USING SEM



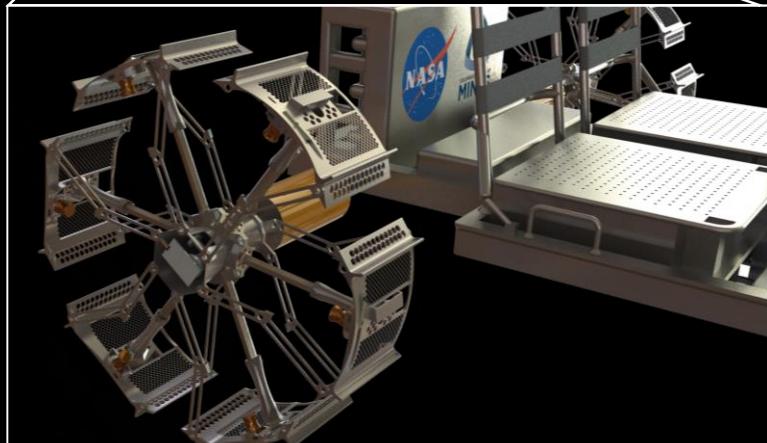
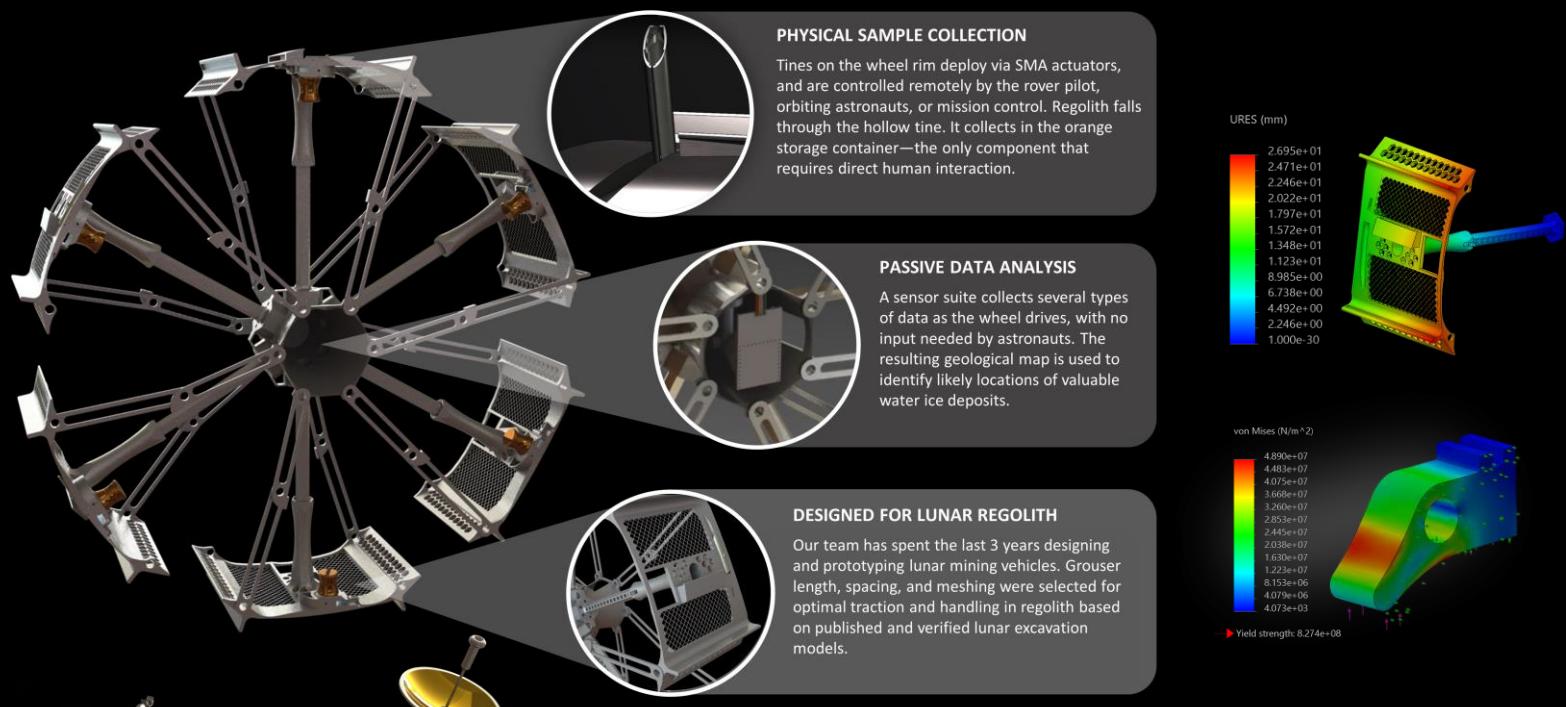
NASA EXPLORING HELL CHALLENGE

DESIGNED A RATCHET ARTICULATED PIN TOUCH-SENSOR UTILIZED FOR ROLLING EXPLORATION (RAPTURE) FOR THE 2020 NASA EXPLORING HELL CHALLENGE, WHICH IS A FULLY MECHANICAL ROBOTIC OBSTACLE DETECTION SYSTEM DESIGNED TO OPERATE ON THE SURFACE OF VENUS.



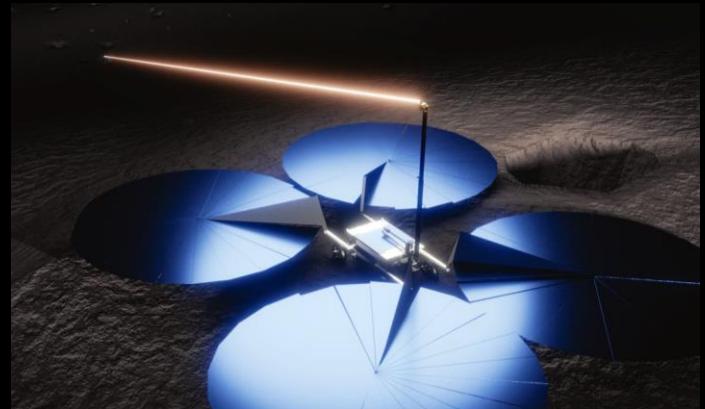
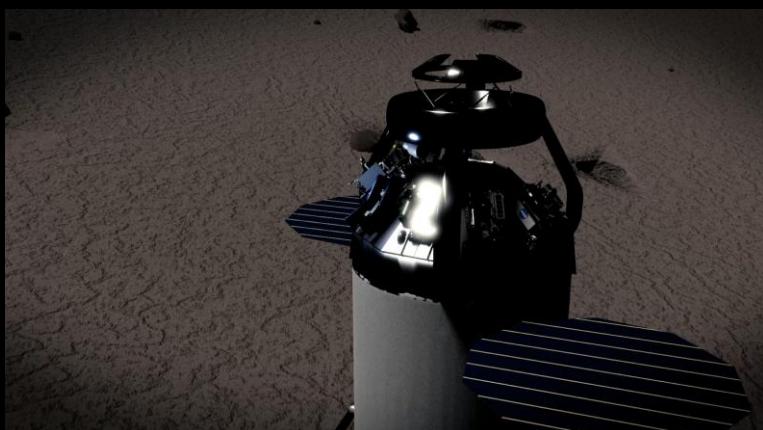
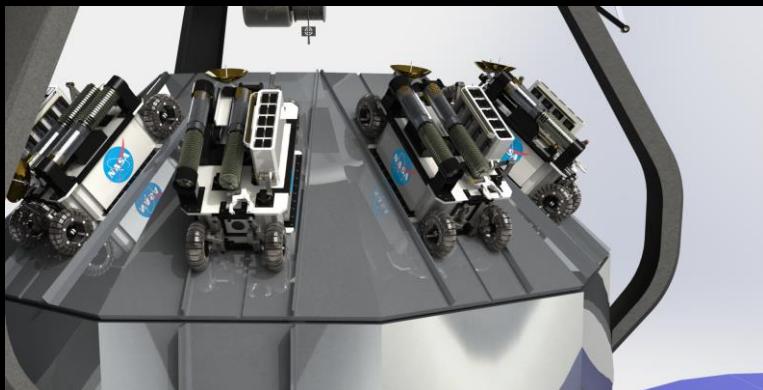
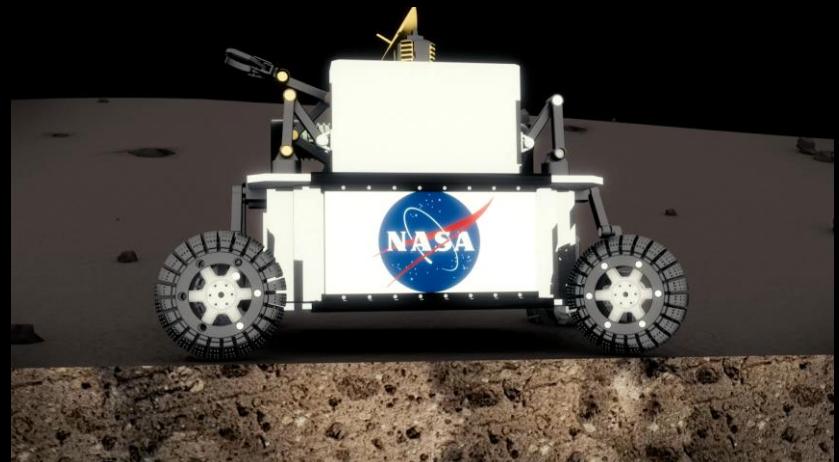
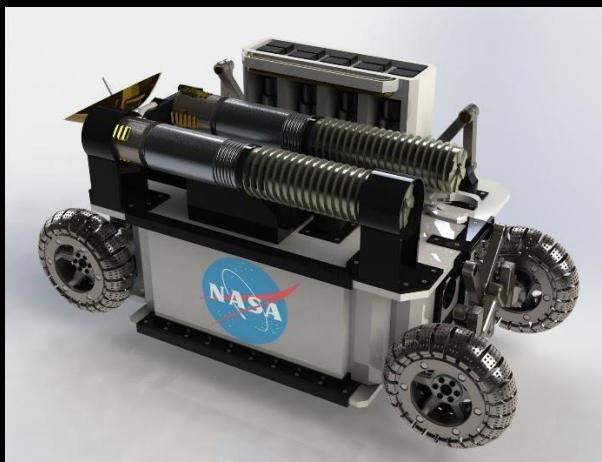
ROVER WHEEL DESIGN COMPETITION

LED THE DESIGN AND ANALYSIS FOR AN ADVANCED ROVER WHEEL CONCEPT THAT IS CAPABLE OF EXPANDING TO TWICE IT'S STOWED VOLUME AND PASSIVELY COLLECTING AND ANALYZING SAMPLES AS IT ROLLS. THIS CONCEPT WAS AWARDED SECOND PLACE ALONG WITH \$2000



NASA RASC-AL DESIGN COMPETITION

I LED THE DESIGN FOR THE GROUND VEHICLE TEAM ON THE 2018-2019 NASA RASC-AL COMPETITION WHICH WAS AWARDED FIRST PLACE OVERALL, BEST IN THEME, AND BEST UNDERGRADUATE TEAM



ADAM SAVAGE IRON MAN SUIT

DESIGNED PARTS FOR AND FABRICATED A 3D PRINTED TITANIUM IRON MAN SUIT FOR ADAM SAVAGE IN COLLABORATION WITH THE COLORADO SCHOOL OF MINES, EOS, AND DISNEY



AWARDS AND PUBLICATIONS

NATURE COMMUNICATIONS JOURNAL PUBLICATION

LASER-METAL INTERACTION DYNAMICS DURING ADDITIVE MANUFACTURING RESOLVED BY DETECTION OF THERMALLY-INDUCED ELECTRON EMISSION



FIRST PLACE OVERALL, BEST UNDERGRAD TEAM, BEST IN THEME

NASA RASC-AL COMPETITION 2018



SPACE GENERATION ADVISORY COUNCIL REPRESENTATIVE

2019 SPACE GENERATION FUSION FORUM/SPACE
SYMPOSIUM



SECOND PLACE OVERALL

ROVER WHEEL DESIGN COMPETITION



INNOVATION AWARD

COLORADO SCHOOL OF MINES 2018/2019 SENIOR
DESIGN SHOWCASE

GRADUATE ROTATION FELLOWSHIP RECIPIENT

COLORADO SCHOOL OF MINES MECHANICAL
ENGINEERING DEPARTMENT