

## ***Project 44-L: Characterization of Particulate Materials Simulating High Explosives***

***Semi-annual Fall Conference***

***October 2021***

- Student: Max Wallace (Mines)
- Faculty: Dr. Amy Clarke and Dr. Kester Clarke (Mines)

Center for Micromorphic Multiphysics Porous and Particulate Materials Simulations with Exascale Computing Workflows, US DOE National Nuclear Security Administration (DOE/NNSA) Predictive Science Academic Alliance Program (PSAAP) III, NNSA Office of Advanced Simulation and Computing (ASC), in collaboration with Lawrence Livermore National Laboratory, Los Alamos National Laboratory, and Sandia National Laboratories



# Project 44-L: Characterization of Particulate Materials Simulating High Explosives



- Students: Summer Camerlo (Mines), Max Wallace (Mines)
- Advisor(s): Amy Clarke and Kester Clarke (Mines)

## Project Duration

PhD: June 2021 -- May 2024 (Max)

- Problem: Mock high explosive (HE) deformation characteristics are relatively unknown in the pristine and recycled states.
- Objective: Perform processing and multiscale experiments on the quasi-static to dynamic mechanical response of mock HE to support a 5-year, multi-university exascale computing effort lead by CU Boulder.
- Benefit: Experimental data sets for a range of particulate material responses that will be used for model calibration, verification and validation.

## Recent Progress

- Development of manufacturing methodology for recycled Mock HE Samples and model F50 sand/resin
- Compression stress/strain curves across varying rates for recycled MHE, pristine LANL-provided MHE and F50 embedded resin
- Investigation of strength differences, recycled vs pristine

## Metrics

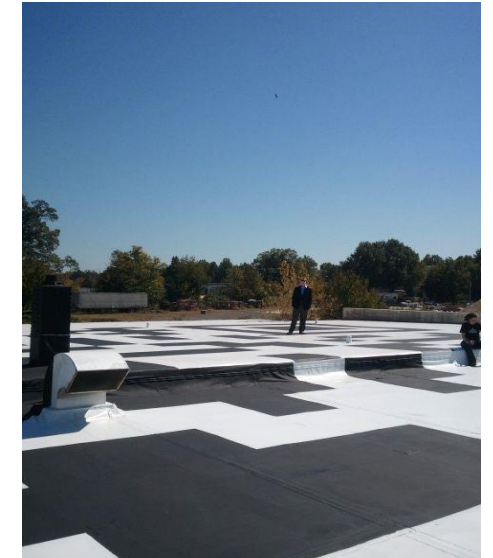
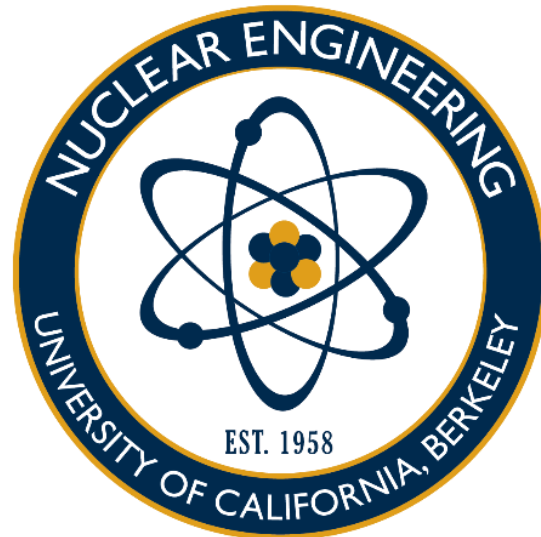
Description	% Complete	Status
1. Literature review	15%	●
3. Processing of mock HE and making samples	40%	●
4. CT imaging of mock HE and model samples	10%	●
5. Mechanical properties and characterization of mock HE, intermediate rates	40%	●
5. Mechanical properties and characterization of mock HE, high rates (APS, CHESS, TBD)	0%	●

# About Me



- B.S., Nuclear Engineering, UCB
- Started at CANFSA this May, 2021
- Returned to Academia after ~18yrs in Software and Startups, San Francisco
- Italian motorcycles, atomic tourism, and the technologic frontier

## Guinness World Record, 2011



Thank you!  
Max Wallace  
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