

### Center for Advanced Non-Ferrous Structural Alloys An Industry/University Cooperative Research Center

## Project #61-L: Casting Modeling and Quality of Metallic Alloys

# Semi-annual Fall Meeting October 2021

- Student: Nadira Surghani (Mines)
- Faculty: Dr. Amy Clarke and Dr. Kester Clarke (Mines)
- Industrial Mentors: Joe McKewon (LLNL)









## Project #61-L: Casting Modeling and Quality of Metallic Alloys



- Student: Nadira Surghani (Mines)
- Advisor(s): Amy Clarke and Kester Clarke (Mines)
- Problem: Casting modeling is a critical skill lacking across the U.S. DOE Complex
- Objective: Developing future workforce with background and experience in casting modeling. Perform casting modeling with Flow-3D of various geometries and experimental validation
- Benefit: Casting modeling will be useful to casting design and directly translatable to modeling high-density metallic alloys of interest to LLNL and more broadly to the NNSA

#### **Project Duration**

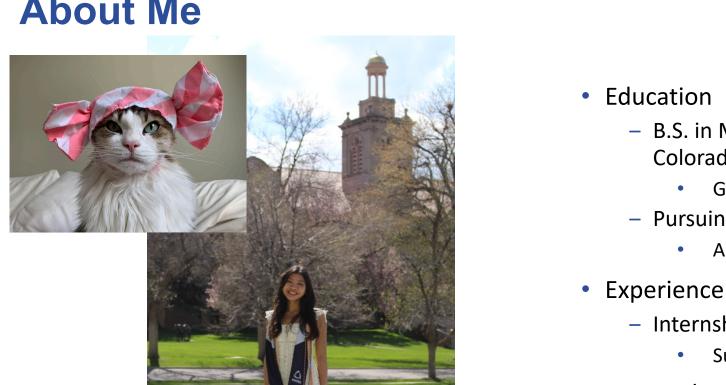
Masters: August 2021 to May 2023

#### Recent Progress

- Initiated coursework
- Electron microscopy training
- Ran basic casting modeling tutorials on FLOW-3D
- Researching existing literature on casting modeling and uranium thermophysical properties

Metrics		
Description	% Complete	Status
1. Literature review	5%	•
2. Learn and master FLOW-3D with various geometries and metallic alloys	10%	•
3. FLOW-3D modeling and analysis of casting of interest to LLNL	5%	•
4. FLOW-3D modeling of various molds with high-density metallic alloys	0%	•
5. Casting experiments to analyze microstructure and other model predictions	0%	•

### **About Me**





- B.S. in Metallurgical and Materials Engineering at Colorado School of Mines
  - **Graduated May 2021**
- Pursuing M.S. in Metallurgical and Materials Engineering
  - August 2021 to May 2023
- Internship with NIST
  - Summer 2020 and 2021
- Personal Interests
  - Hanging out with my cat, Piko
  - Skiing
  - Cooking
  - Watching basketball
  - Thrifting and selling vintage clothes ©



Thank you!
Nadira Surghani
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