

***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)

Project Duration
Masters: August 2021 to May 2023

- **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

- 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



- Education
 - 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
- Experience
 - 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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