CANFSA

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

Project 36F-L: Microstructure and Processing Links in Beta-Titanium during Additive Manufacturing

Fall Meeting

October 13th – 15th 2020

- Student: Chris Jasien (Mines)
- Faculty: Amy Clarke (Mines)
- Industrial Mentors: Adam Pilchak (AFRL), Lee Semiatin (AFRL)

Office of Naval Research — USN — ONR — Science & Technology

NSF | Colorado School of Mines | Iowa State University

About Me

- Graduated from Cal Poly Pomona with a B.S. in Manufacturing Engineering as a Science, Mathematics, and Research for Transformation (SMART) Scholar
  - Conducted undergraduate research in a variety of areas, including: metallic glasses and cold-spray of steel substrates
- Worked at Naval Surface Warfare Center (NSWC) Carderock Division in the Additive Manufacturing Branch (Code 618)
  - *Heat Source Sizing for FEA of NAB Using Wire-Fed AM*, Jasien, C. & Fisher, C., ICME 2021 (originally accepted for SFF 2020)
- Personal Interests:
  - Anything related to sports
  - Hiking and running

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- Student: Chris Jasien (Mines)
- Advisor(s): Amy Clarke (Mines)

Project Duration
PhD: August 2020 to May 2024

- Problem: Common titanium alloys for additive manufacturing (AM) undergo solid-state phase transitions during cooling that inhibit understanding of solidification.
- Objective: Subject beta-titanium alloys to conditions representative of AM and understand retention of the metastable beta phase and microstructure evolution.
- Benefit: The development of solidification models and knowledge base of titanium alloys for AM.

Recent Progress

- In-situ Advanced Photon Source (APS) data obtained with various power settings for different raster and spot melt scenarios.
- Completed initial computational fluid dynamics software training (FLOW-3D).

Metrics		
Description	**% Complete**	**Status**
1. Literature review.	20%	●
2. Analyze APS data (solidification velocities).	0%	●
3. Determination of thermal history using simulations.	0%	●
4. Supporting material characterization.	0%	●

Thank you!

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