

# 7 Project 30: Microstructural Evolution of Alloys During Rapid Solidification

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**Project Duration**  
PhD: August 2017 to May 2021

**Problem:** Rapid solidification results in novel as-solidified microstructures with lesser known effects on subsequent solid state phase transformations

**Objective:** Understand the relationship of as-solidified microstructures to subsequent solid-state transformations and final microstructures and properties of alloys

**Benefit:** Inform models, leading to better predictions of microstructural evolution achieved by specific processing conditions

## Recent Progress

- Literature review
- Alloy selection
- Sample acquisition
- Advanced Photon Source (APS) at Argonne National Laboratory user proposal submitted
- Dynamic Transmission Electron Microscopy (DTEM) collaboration with Lawrence Livermore National Laboratory

## Metrics

Description	% Complete	Status
1. Literature review	20%	●
2. Alloy selection	100%	●
2. Characterization (ex/in-situ) of samples solidified under rapid and conventional conditions	10%	●
3. In-situ solid state phase transformation experiments	0%	●
4. Evaluation of precipitation strengthening via micropillar compression	0%	●



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