# Project 34 - In-situ Observation of Phase and Texture Evolution Preceding Abnormal Grain Growth in Ni-based Aerospace Alloys

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**Project Duration**
PhD: Nov. 2017 to Dec. 2020

Problem: Abnormal grain growth in Ni-based superalloys, occurring as a result of forging parameters, significantly reduces mechanical properties.

Objective: Determine the mechanism of abnormal grain growth in Ni-based superalloys using ex-situ and in-situ characterization techniques.

Benefit: Improved mechanical properties for turbine disc alloys.

Recent Progress

- Preliminary literature review
- Initial forgings performed
- Beginning material characterization
- Recreated abnormal grain growth phenomena

| Metrics | | |
|---|---|---|
| **Description** | **% Complete** | **Status** |
| 1. Literature review | 50% | ● |
| 2. Explore abnormal grain growth forging parameters for RR1000 | 15% | ● |
| 3. Ex-situ and interrupted material characterization | 10% | ● |
| 4. Develop and test theory to explain abnormal grain growth phenomena | 5% | ● |
| 5. Perform in-situ microscopy with a synchrotron source (HEDM) to demonstrate phenomena | 0% | ● |