Image based Fatigue Prediction for SMA and AM Materials

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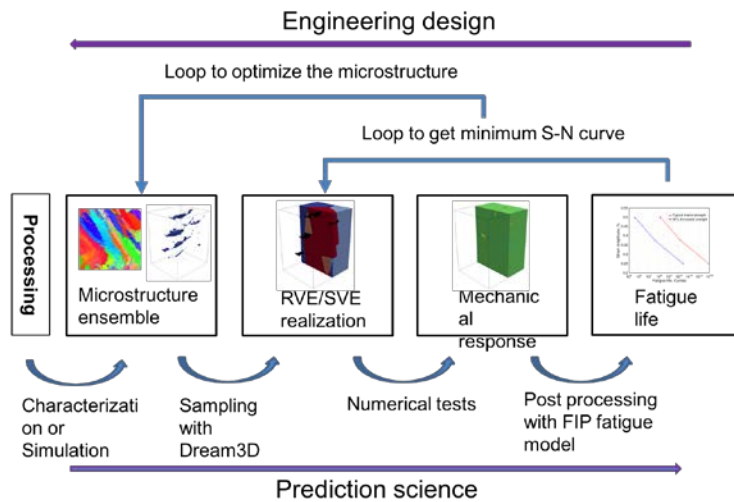**WING KAM LIU, GREGORY B. OLSON**

Academic Disciplines:
MECHANICAL ENGINEERING, MATERIALS SCIENCE
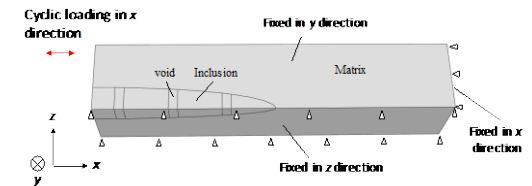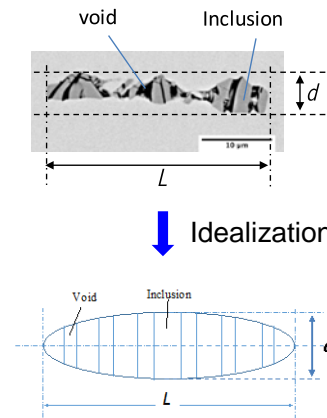
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RESEARCH OBJECTIVE

The goal of this project is to develop an **efficient fatigue life prediction method** based on microstructure from experimental characterization or processing simulation, which can be used for microstructure design and processing evaluation for **high cycle fatigue performance** of SMA and AM materials.
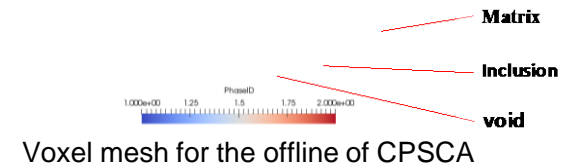
FRAMEWORK

MODELING

Idealization

1/8 model for CPFEM

Voxel mesh for the offline of CPSCA

MICROSTRUCTURE

VAR — VIM/VAR — VAR/EBR

Longitudinal Section

Transverse Section

RESULTS

CPFEM

CPSCA

High gradient region

Bigger reference — Bigger stringer

Averaging window (10% of stringer volume)

Averaging window (0.2% of stringer volume)