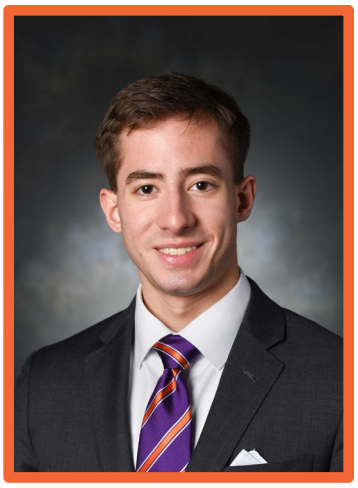
Graduate Student Research Seminar

Fall 2024

Effect of Entropy and Langevin Friction on the Dislocation Glide Mechanisms



Karel Ziminsky(PhD student)
Advisor: Cheng Sun

Monday, December 2nd
3:00 pm (EST) – 132 Fluor Daniel Building

Abstract

This research seeks to utilize machine learning-assisted methods with dislocation dynamics simulations to provide a physical basis for a mesoscale crystal plasticity model. While multiple methods exist for analyzing deformation behavior, these are limited to narrowly defined scales due to either computational expense or phenomenological constraints. This necessitates providing a means of reducing the computation cost while retaining sufficient connection to dislocation dynamics modeling. Machine learning methods will be used to predict and update parameters previously treated as constants used in a dislocation density-based formulation for calculating slip rate within a crystal plasticity finite element model. This will provide a more accurate and flexible model than a traditional empirical crystal plasticity model while being faster than having to rerun traditional dislocation dynamics simulations at identical timescales. This model will be used to help understand creep behavior in Titanium-Aluminum alloys.

Scan the QR code for more information and a schedule of upcoming speakers!

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