

MSE SEMINAR

October 27, 2017

113 McBryde Hall

3:30 – 4:30 PM

Refreshments at 3:00 PM

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“Quantifying Microscopy Data With Computer Vision”

ABSTRACT

Micrographs of materials are often used for qualitative purposes; yet they also contain quantifiable morphological information that is difficult to extract in practice. The tools of computer vision are widely used in many fields and have become very robust. The same methods that track faces in Snapchat to overlay silly animal faces and those that allow driverless cars identify pedestrians and stop signs can be applied to the quantitative analysis of micrographs. We present four examples of the use of computer vision algorithms for the quantification of microscopy data. 1. A program to quickly and automatically measure the size and size distribution of ligaments and pores in dealloyed materials. 2. A program to track and quantify the evolution of pores in a simulated nanoporous gold sample during indentation. 3. An algorithm that can significantly reduce the noise in low electron dose TEM images and videos. 4. A neural network trained to automatically count and classify reacting molecules in a TEM video dataset.

BIOSKETCH

Joshua Stuckner is a PhD candidate advised by Dr. Mitsu Murayama. In 1998, Josh was the chess champion at Emerald Hill Elementary school. In 2017, Josh was awarded a grant to participate in an NSF summer research program at the University of Tokyo. Josh’s research interests include the processing-microstructure-mechanical property relationships of nanostructured metals and applying computer vision tools to the quantification of material morphologies from micrographs.