PHYSICS COLLOQUIUM:
Shape Matters — How Wavy Crystal Grains Shrink Faster

Sharon Gerbode
Associate Professor of Physics
Harvey Mudd College

Date:
8/28/2020

Time:
10:30 AM-11:50 AM

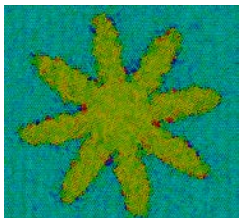
Link:
Please email snsgradstaff@ucmerced.edu for Zoom link and passcode

About The Speaker:

Sharon Gerbode, the Iris and Howard Critchell Associate Professor of Physics at Harvey Mudd College, started as a creative writing major at UC Santa Cruz and switched to physics in her third year of college. In graduate school at Cornell University she discovered her passion for tabletop soft matter experiments, where microscope images of colloidal particles made statistical mechanics tangible. Following her postdoctoral studies of plant biomechanics at Harvard, Sharon started as a physics professor at Harvey Mudd, where she loves to work with undergraduate research students on soft matter experiments. Her work has been supported by the RCSA through a Cottrell College award and as a Cottrell Scholar.

Abstract:

The growth and dissolution of individual grains within a crystalline material affects material properties ranging from conductivity to mechanical strength. In traditional metallurgy, grain evolution is successfully described by continuum theories of grain boundary motion that smooth over individual crystal defects. Yet, as technology demands ever smaller crystalline devices, the limits of such models can be called into question. In our experimental and computational studies of hard sphere colloidal crystals, we find that, contrary to the predictions of established continuum theories, colloidal crystal grains do not shrink linearly in time. Furthermore, we find that the lifetime of a crystal grain depends on its initial shape, in disagreement with predictions based on capillary - driven grain boundary motion. These discoveries suggest that the simple curvature - based models for grain evolution that work well for macroscopic materials don't capture the behavior of small hard sphere crystal grains, hinting that a new approach might be needed to more accurately predict the evolution of small crystal grains.



For more information, contact : Kinjal Dasbiswas
kdasbiswas@ucmerced.edu