# COMPUTATIONAL RESEARCH in BOSTON and BEYOND SEMINAR

# Grain Dynamics in Astrophysical Simulations


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**ABSTRACT:**

Galaxies in the universe form and grow over time in a complicated nonlinear fashion. Recent advances in supercomputing ability make it possible to numerically model the essential physics and evolve a mock universe from shortly after the Big Bang to the present day, producing a fairly realistic population of galaxies. In this talk, I will overview the key topics in physics that govern galaxy formation and display visualizations from state-of-the-art astrophysical simulations. The spectroscopic properties of real galaxies are heavily influenced by the presence of dust grains, small solid molecules of various sizes that can absorb and reradiate stellar light in the gaseous interstellar medium. I will talk about the challenge of modeling small-scale grain physics, focusing on the hydrodynamical drag force coupling grains and gas and the time-evolving size distribution of dust grains. To validate the numerical implementation of grain physics in a modern astrophysical code, I will show results from a variety of test problems in hydrodynamics and grain size dynamics.


**FRIDAY, MARCH 3, 2017**
**12:00 PM – 1:00 PM**
**Building 32, Room 155**
**(STATA)**

***Pizza and beverages will be provided.***

http://math.mit.edu/crib/

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