



Department of Chemical Engineering presents

Professor Martha Grover



Department of Chemical & Biomolecular EngineeringX
GeorgiaTech

September 19, 2018

Goergen Hall 101 @ 3:25pm

“Optimal Control of Crystallization”

The organization of a large collection of particles into an ordered crystalline array is needed for many applications, including pharmaceutical separations, nuclear waste disposal, and optoelectronic metamaterials. Due to improvements in sensing technology, it is now becoming possible to monitor the crystalline state in real time during the crystallization process, and this sensor technology opens up new possibilities for feedback control. Here we monitor the crystalline state and use this data to build an empirical model. An optimal feedback policy is then calculated using the empirical model along with dynamic programming. Alternatively, the empirical model can be calculated from simulation “data” coming from a detailed particle-level simulation. Experimental results demonstrating the method will be presented for molecular crystallization and colloidal crystallization.

Biography

Martha Grover is a Professor in the School of Chemical & Biomolecular Engineering at Georgia Tech. She earned her BS in Mechanical Engineering from the University of Illinois, Urbana-Champaign, and her MS and PhD in Mechanical Engineering from Caltech. She joined Georgia Tech as an Assistant Professor in 2002, and received an NSF CAREER award in 2004. In 2011 she received the Outstanding Young Researcher Award from the Computing and Systems Technology Division of AIChE. Her research program is dedicated to understanding, modeling, and engineering the self-assembly of atoms and small molecules to create larger scale structures and complex functionality. Her approach draws on process systems engineering, combining modeling and experiments in applications dominated by kinetics, including surface deposition, crystal growth, polymer reaction engineering, and colloidal assembly. She is a member of the NSF/NASA Center for Chemical Evolution, and Georgia Tech’s Decision and Control Laboratory.