Institute for Mathematical Sciences

Ng Kong Beng Public Lecture Series

黄光明公开讲座

Bubbles-Foams, Grains- Metals: Curvature Flow in Cellular Materials

Speaker: David J. Srolovitz

Joseph Bordogna Professor of Engineering and Applied Science at the University of Pennsylvania and Director of the Penn Institute for Computational Science

Date: Monday, 9 February 2015

Time: 6:30 - 7:30 pm

Venue: Possibility Room, Level 5

National Library Building

100 Victoria Street

Singapore 188064

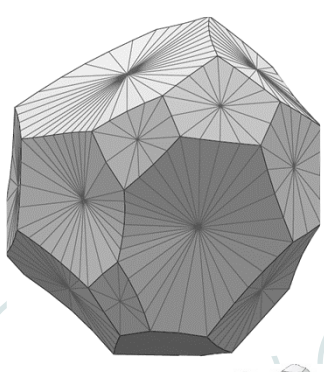
Free Admission

About the Speaker

David J. Srolovitz is the Joseph Bordogna Professor of Engineering and Applied Science at the University of Pennsylvania and Director of the Penn Institute for Computational Science. He is the author of over 400 papers on topics in materials theory and simulation ranging from crystal defects, microstructure evolution, deformation, and growth processes. He is the winner of the 2013 Materials Research Society's *Materials Theory Award*. Prior to joining the University of Pennsylvania, Srolovitz was a Professor of Mechanical & Aerospace Engineering and Applied & Computational Mathematics at Princeton University, Professor of Materials Science & Engineering and Applied Physics at the University of Michigan, and Professor of Physics at Yeshiva University. He also served as the Executive Director of the Institute of High Performance Computing, A*STAR in Singapore and was on the staff of Los Alamos National Laboratory (Theoretical Division) and Exxon Corporate Research (Metallurgy). He was one of the world's most highly cited researchers in materials theory and simulation.

Abstract

The bubbles in the head of a beer or in dishwater, and grains in metals and ceramics, all evolve according to the same universal law: curvature flow. Curvature flow is driven by surface tension; motion that minimizes the total surface area. In foams and in polycrystalline materials, curvature flow also has to respect the connectedness of the bubbles and grains - giving rise to interesting issues in topology and its evolution. This type of evolution has interested generations of metallurgists, chemical engineers, physicists, and mathematicians including John von Neumann over a half century ago. This talk will focus on the fundamental ideas of curvature flow in foams and in solid materials, including several recent developments and computer simulations.



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