

7th Annual Women in Mathematics Day
Jean E. Rubin Memorial Lecture
Tuesday, November 12, 2013
4:30 p.m.
MATH 175

Refreshments will be served at 4:00 p.m. in the Math Library Lounge (3rd floor MATH Bldg.).

Variational Methods in Materials and Image Processing

Abstract

Several questions in applied analysis motivated by issues in computer vision, physics, materials sciences, and other areas of engineering may be treated variationally leading to higher order problems and to models involving lower dimension density measures. Their study often requires state-of-the-art techniques, new ideas, and the introduction of innovative tools in partial differential equations, geometric measure theory, and the calculus of variations.

In this talk it will be shown how some of these questions may be reduced to well understood first order problems, while in others the higher order terms play a fundamental role. Applications to phase transitions, to the equilibrium of foams under the action of surfactants, imaging, micromagnetics, thin films, and quantum dots will be addressed.

Speaker:

Irene Fonseca

Carnegie Mellon University

Mellon College of Science Professor of Mathematics

Irene Fonseca's work combines research, teaching, and training at the interface between pure and applied analysis. Since 1998, she has been the Director of the (NSF funded) Center for Nonlinear Analysis in the CMU Department of Mathematical Sciences; its primary focus is research and training in applied mathematics at the broad interface between mathematics, the physical sciences, and engineering. Her research program includes the mathematical study of shape memory alloys, ferroelectric magnetic materials, composites, liquid crystals, thin structures, phase transitions, and image segmentation and recolorization in computer vision.

Professor Fonseca received her undergraduate education at the University of Lisbon and her M.S. and Ph.D. from the University of Minnesota. She is the current President of the Society for Industrial and Applied Mathematics (SIAM). In 2006 she was the Sonia Kovalevsky Lecturer at the annual AWM-SIAM meeting, and she has received numerous recognitions from the profession, from Carnegie Mellon, and from her native Portugal. She is a Fellow of the Society for Industrial and Applied Mathematics (SIAM) and a Fellow of the American Mathematical Society (AMS).



Jean E. Rubin was Professor of Mathematics at Purdue University from 1967 until her death in 2002. She earned a B.S. from Queen's College in New York City in 1948, an M.A. from Columbia in 1949, and a Ph.D. from Stanford in 1955. She taught at the University of Oregon and Michigan State before coming to Purdue. Professor Rubin was the author of more than 40 papers and five books in set theory and questions related to the axiom of choice.