PURDUE UNIVERSITY

Department of Mathematics

15th Annual Women in Mathematics Day
Jean E. Rubin Memorial Lecture

Tuesday, October 17, 2023
3:30 PM BRWN 1154

Refreshments will be served at 2:30 p.m. in the Math Common Room, MATH 304

On some nonlocal models in the theory of dislocations in crystals

Abstract: Integro-differential equations appear in several contexts and they have been studied for many years in probability theory (stochastic processes with jumps), fluid mechanics (SQG equation), mathematical physics (relativistic Schrödinger operators), and in applied sciences. From an analytical point of view, the general theory for such equations have been mostly developed in the last 15 years. In this talk I will explain the so-called Peierls-Nabarro model, an integro-differential equation originally introduced by physicists Rudolf Peierls and Frank R. N. Nabarro in the 1940's to describe defect lines (dislocations) in crystalline materials. I will then discuss generalizations of the model and new analytical results which formally connect the microscopic Peierls-Nabarro model to larger scale models, already well-known in the physics literature.

Speaker:
Stefania Patrizi

University of Texas at Austin
Associate Professor of Mathematics

Stefania Patrizi is a mathematician working in the field of Partial Differential Equations. Her work focuses on the homogenization of partial differential equations, free boundary problems, fully nonlinear elliptic equations, and crystal dislocation dynamics.

Patrizi, who was born in Italy, received her Ph.D from University La Sapienza in Rome. Currently she is an Associate Professor of Mathematics at the University of Texas at Austin. Prior to this she held postdoctoral fellowships at the Weierstrass Institute for Applied Analysis and Stochastics (WIAS) in Berlin, Germany, and at the Instituto Superior Tecnico in Lisbon, Portugal. Patrizi's research is supported by the National Science Foundation.

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.

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