



WPI

HAROLD J GAY LECTURE SERIES

PDEs and Fractals

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Transport in Small Systems with a Look at Motor Proteins

Friday, 2:00 pm
April 18, 2008
Higgins Labs 202



ABSTRACT Motion in small live systems has many challenges. Prominent environmental conditions are high viscosity and warmth. Not only is it difficult to move, but maintaining a course is rendered difficult by immersion in a highly fluctuating bath. This holds especially for the motor proteins responsible for much of eukaryotic cellular traffic. The situation falls under the rubric of diffusion mediated transport. We give some brief historical notes, including the original work of many distinguished scientists, and then turn to an approach based on the Monge transport problem (1787) and its modern version, Monge-Kantorovich Theory, which offers us a means of studying these systems with analysis. We arrive at a precipice: does this help? Can we say anything about the behavior of the cellular process? An exciting venue for math in the natural world!

Geometry with its applications has been at the heart of the development of partial differential equations and boundary value problems since the very beginning. In physics, biology, economics, and other applied fields, a variety of new problems are now emerging that display unusual geometrical, analytical and scaling features, possibly of fractal type. The objective of these lectures is to acquire the view of outstanding mathematicians on the subject of differential equations and fractals, and their developments and applications, in a broad perspective encompassing both classical highlights and contemporary trends.

Sponsored by WPI and hosted by the Department of Mathematics
Coffee and tea available one half hour before lecture time
Participation of faculty and students is most welcome

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