



WPI

HAROLD J GAY LECTURE SERIES

PDEs and Fractals

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Imaging with noise

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11:00am, Bartlett
Presentation Room



ABSTRACT It is somewhat surprising at first that it is possible to locate a network of sensors from cross correlations of noise signals that they record. This is assuming that the speed of propagation in the ambient environment is known and that the noise sources are sufficiently diverse. If the sensor locations are known and the propagation speed is not known then it can be estimated from cross correlation information. Although a basic understanding of these possibilities had been available for some time, it is the success of recent applications in seismology that has revealed the great potential of correlation methods, passive sensors and the constructive use of ambient noise in imaging. I will introduce these ideas in an interdisciplinary, mathematical way and show that a great deal can be done with them. Things become more complicated, and mathematically more interesting, when the ambient medium is also strongly scattering. I will end with a review of what is known so far in this case, and what might be expected.

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.

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Coffee and tea available one half hour before lecture time in Stratton Hall 107

Participation of faculty and students is most welcome

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