Distinguished Colloquium Series in Interdisciplinary & Applied Mathematics

September 23, 2014, 5:00 p.m., 750 CEPSR, Costa Engineering
Refreshments served at 4:30 p.m. in 200 S.W. Mudd

Andrea Bertozzi
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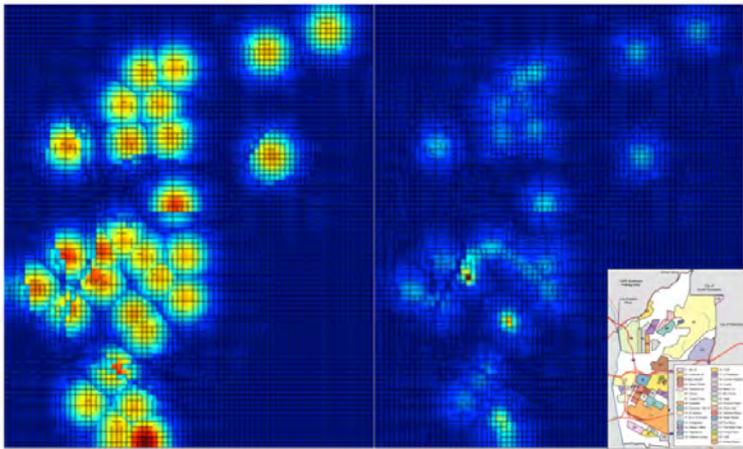
Image: The pictures shows density of gang populations on the left and density of graffiti on the right, from a simulation of a model for gang activity in the Hollenbeck Division of LAPD (insert lower right).

"Mathematics of Crime"

There is an extensive applied mathematics literature developed for problems in the biological and physical sciences. Our understanding of social science problems from a mathematical standpoint is less developed, but also presents some very interesting problems, especially for young researchers. This lecture uses crime as a case study for using applied mathematical techniques in a social science application and covers a variety of mathematical methods that are applicable to such problems. We will review recent work on agent based models, methods in linear and nonlinear partial differential equations, variational methods for inverse problems and statistical point process models. From an application standpoint we will look at problems in residential burglaries and gang crimes. Examples will consider both "bottom up" and "top down" approaches to understanding the mathematics of crime, and how the two approaches could converge to a unifying theory.

Andrea Bertozzi is an applied mathematician whose work has impacted many fields: the theory and applications of nonlinear partial differential equations, fluid dynamics, geometric methods for image processing, crime modeling and analysis, and swarming/cooperative dynamics. Among her many honors are: SIAM's Kovalevsky Prize (2009), election to the American Academy of Arts and Sciences (2010), and Fellow of both Society of Industrial and Applied Mathematics and the American Mathematical Society (2010). Prof. Bertozzi currently serves as Chair of the Science Board of the NSF Institute for Computational and Experimental Research in Mathematics at Brown University and serves on the Science Board of the Mathematical Sciences Research Institute at Berkeley.