

# Physics Colloquium

Michigan Technological University

(Note: different day, time and room)

Wednesday, February 7, 2007

2:00 - 3:00 pm

Room 101, Fisher Hall

## Networks in Physics and Biology

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### Abstract

Dynamical processes associated with inhomogeneous network structure are proving themselves indispensable as the conceptual workhorse that quantitative science takes to dealing with biological, social and other complex phenomena. In this talk I will give an overview of the problems my group is attacking using network models and techniques combining graph analyses with statistical sampling. These results provide new insights and understanding about long-standing problems in both astrophysics (sunspots) and geophysics (seismicity). Graph analyses of sub-ensembles sampled from biological networks, such as protein interaction networks, give tools to quantify errors and determine the likelihood that detected features may be considered reliable. It also provides a host of measurements with which to constrain expectation values in models of these networks.

### Biography

Prof. Maya Paczuski is the Head of the Complexity Science Group in the Department of Physics at the University of Calgary. This group was founded last year in order to establish interdisciplinary collaborations that bring quantitative methods to bear on outstanding problems in biology, social science, health, and information management. Prof. Paczuski received all her three degrees at MIT, where she held an NSF Graduate Fellowship and was supervised by Mehran Kardar for her doctoral thesis. She was awarded a DOE "Distinguished" Postdoctoral Scholarship while a researcher with Per Bak and Vic Emery at Brookhaven National Laboratory. She then took a junior faculty position in the Physics Department at the University of Houston, and subsequently moved to Imperial College London. She has held visiting appointments at the Perimeter Institute for Theoretical Physics, the Niels Bohr Institute, and the von Neumann Institute for Computing. Maya enjoys Canada, good food, and the great outdoors.