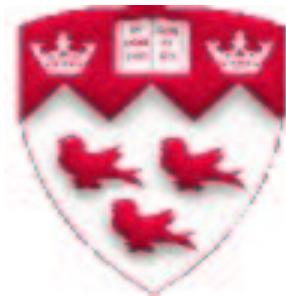# Applied

Mathematics

McGill
Applied Mathematics

April 5, 2002

Eric Vanden-Eijnden, Courant Institute, NYU.

Title: Reduced dynamics for metastable systems driven by small thermal noise: switching pathways, free energy barriers, and switching rates.

FRIDAY April 5,2002

Time: 4:00 pm

Room: Burnside 1205

Abstract: I will consider the dynamics of metastable systems in finite and infinite dimensions in the presence of thermal noise effects. When the noise is small, the dynamics proceeds by long waiting periods in the metastables states followed by sudden jumps from one state to the other. The dynamics can be reduced to a Markov chain on the meatstable states by determining the optimal paths in phase space by which the system makes the jumps, and the rates at which those jumps occur. I will discuss numerical methods for identifying the optimal switching paths and the parameters of the Markov chain, and I will illustrate the techniques on various examples from material science and molecular dynamics.

$dq = p\,dt, \quad dp = (q - q^3 - p)dt + \varepsilon\,dW, \quad H = (1 - q^2)^2/4 + p^2/2$