

## IGERT: Non-equilibrium Dynamics Across Space and Time: A Common Approach for Engineers, Earth Scientists, and Ecologists

Director: Claudia Neuhauser, University of Minnesota

Participating Institutions: National Center for Earth-surface Dynamics (NCED), University of Minnesota



This training grant will bring together scholars of ecology, civil engineering, and the earth sciences to study the interplay between landscape changes and ecosystem processes across a wide range of spatial and temporal scales and across interfaces, such as agroecoregion or urban boundaries, with an emphasis on non-equilibrium dynamics. It recognizes the need for engineers to increasingly consider environmental constraints in addition to economic constraints, and the need for ecologists to understand effects of physical processes and materials transport on ecosystem dynamics.

Throughout the Earth's history, changes in the abiotic and biotic world have taken place over a wide range of temporal and spatial scales. More recently, human activities have created interfaces between natural and human-dominated habitats. These actions have greatly accelerated the rate at which the physical and biological world is perturbed through modifications in transport processes, resulting in a biotic and physical world that is potentially far from equilibrium. Nonlinearities in the dynamics of processes greatly complicate scaling across space and time. The scientific theme of this training program will emphasize non-equilibrium dynamics, and develop a framework for both empirical and theoretical work to understand the physical and biological consequences of non-equilibrium dynamics at different temporal and spatial scales in a nonlinear world.

University of Minnesota research facilities at Itasca State Park and the National Center for Earth-surface Dynamics (NCED) will provide opportunities for training and research. Key education and training features are a one-year comprehensive, team-taught course that emphasizes collaborative projects and that will culminate in a week-long working group retreat to complete and present the group projects. This one-year course will lead students through data collection using modern instrumentation, data analysis, data interpretation, and model building across spatial and temporal scales and across interfaces, with a focus on non-equilibrium processes in a nonlinear world. Professional training for academic and non-academic career options are planned that include internships, future faculty training, and training in technical and collaborative skills, ethics, and legal issues.



If you are interested in this program, e-mail Claudia Neuhauser ([cneuhaus@cbs.umn.edu](mailto:cneuhaus@cbs.umn.edu)) for further information. Applications must be sent to both the IGERT program and one of the affiliated graduate programs (Ecology, Evolution and Behavior or Civil Engineering).

**Application Deadline for Fall 2006: December 15, 2005**