

# **IGERT: Vulnerability and Sustainability in Coupled Human-Natural Systems: An Integrative Traineeship in Sustainability and the Global Environment**

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## **Project Summary**

*Intellectual Merit:* Nature and society are tightly interconnected in the contemporary world. The widespread wreckage wrought by the recent Indian Ocean tsunami offers a blunt demonstration of the dependence of human existence on stable relationships with nature; however, fine-grained variations in the patterns of destructiveness also tell a more nuanced story of vulnerability and resilience in interwoven social and ecological relationships. Among tsunami victims, natural disaster and globalization combined in complex, subtle configurations to create zones of death and havens of life, devastated communities and others that emerged relatively unscathed. More generally, the nuanced dynamics of **coupled human-natural systems** carry critical implications for the sustainability of human communities and the global environment. Often, however, disciplinary divides blind both research and policy to the limits of purely social or ecological analyses and to the need to effectively integrate the human and natural sciences. Our objective in this IGERT program is to bridge these divides, to put coupled human-natural systems at the center of analysis, and thus to strengthen capacity to cope with forces of change from globalization to climate change and loss of biological diversity.

UW-Madison is ideally situated to achieve this objective. In 2000, UW established a new Center for Sustainability and the Global Environment (SAGE), which has subsequently recruited six new faculty members with strong interests and skills in bridging the human and natural sciences in global environmental research. Working with additional UW faculty, including the newly hired Director of the Nelson Institute for Environmental Studies, this group proposes to establish a graduate **Certificate in Sustainability and the Global Environment** combining coursework, research, and professional development designed to engage students from a wide range of disciplinary and professional backgrounds in a common curriculum and training program. The objective is to create a new cadre of researchers whose orientation and skills transcend the traditional disciplines, enabling them to pursue fully integrated studies of coupled human-natural systems and to communicate their findings effectively to policy communities. The proposed IGERT program is based on a **two-year core curriculum, with supplementary training and research opportunities**, including a summer outreach program to underrepresented minority students, international field research experiences, and teaching development opportunities. The curriculum is organized following global, regional, and local scales of inquiry and interweaves **three threads taught in synchrony: fundamental knowledge, transdisciplinary approaches, and professional / leadership skills**. Depending on individual career orientation and research interests, each IGERT scholar will work within interdisciplinary teams to produce either an interdisciplinary NSF-style research proposal, or a multi-stakeholder policy simulation and subsequent policy recommendations report.

*Broader Impacts:* This program will pioneer a new approach to graduate education that will serve as a model for programs that seek to integrate research in the human and natural sciences. A core outcome of the project will be new models of vulnerability and sustainability assessment that extend **place-based approaches, research on policy and governance, and global systems modeling** to grapple with the cross-scalar dynamics of coupled human-natural systems. Most importantly, it will impart a cadre of future scholars and leaders with the skills to integrate natural and social science research and to forge strong links to decision-making and public policy, business and non-governmental organizations, and civil society.

**Keywords: Environmental Sciences, Social Sciences, Biology, Coupled Human-Natural Systems**