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Fellowships Support UCSB Graduate Student's Research in Homeland Security

A doctoral student in the geography department at the University of California, Santa Barbara whose research in modeling and simulation resolution has important applications for homeland security, has recently been awarded three prestigious grants and fellowships. Kriste Henson is the recipient of an Eisenhower Graduate Fellowship from the United States Department of Transportation, a Geography and Regional Science Dissertation Improvement Grant from the National Science Foundation, and a Doctoral Dissertation Grant from the University of California Transportation Center.

The Eisenhower Graduate Fellowship consists of \$35,500 and will fund Henson's doctoral work, which focuses on a new methodology for simulating the movements of individuals and populations. Henson is creating a template of population activity that can be applied to any urban or rural area in the United States.

"The template simulates where people are at specific times of day so that resources could be allocated optimally in the event of an emergency. It's like simulating every single person in Santa Barbara as a function of who they are and the environment in which they move," said Kostas Goulias, a professor of geography at UCSB and Henson's faculty adviser.

Henson is currently a member of the technical staff in Los Alamos National Laboratory's Decisions Applications Division, where she works on projects related to homeland security. Some of these include modeling dependencies between infrastructures and bioevent reconstructions.

"Homeland security applications require fine modeling and simulation resolution in time and space to represent human activity and travel behavior," said Henson. "Los Alamos National Laboratory's Transportation Analysis Simulation System is an activity-based transportation system that has the ability to simulate movements of individuals around a network on a second-by-second basis. At the core of the system are 'synthetic' schedules that are formulated based on activity and travel diaries."

In order to model cities or large regions in a timely manner, it is necessary for one person's activity patterns to be "transferred" to another person living in a different geographic location. To develop these models and account for many influencing factors, Henson is developing a Structural Equations Model (SEM) based on sociodemographic information garnered from a national household survey, land use, transportation infrastructure, and accessibility measures.

"The key advantage to Kriste's method is going one step further and creating a model that's applicable to every city," said Goulias. "We can develop a tailored model for a city like Santa Barbara, but we really need one that can be applied generally."

Henson expects to complete her Ph.D. in 2009 and continue working at Los Alamos National Laboratory.

About UC Santa Barbara

The University of California, Santa Barbara is a leading research institution that also provides a comprehensive liberal arts learning experience. Our academic community of faculty, students, and staff is characterized by a culture of interdisciplinary collaboration that is responsive to the needs of our multicultural and global society. All of this takes place within a living and learning environment like no other, as we draw inspiration from the beauty and resources of our extraordinary location at the edge of the Pacific Ocean.