SCALE: SPATIAL CONNECTIONS AROUND OUR LOCAL ENVIRONMENT

Institution: University of California, Santa Barbara

PI: Michael F. Goodchild
Co-PIs: Carla D'Antonio, Catherine Gautier-Downes, Bill Jacob, Yukari Okamoto

STEM faculty advisors and departments involved:
Michael F. Goodchild (Geography), Carla D'Antonio (Environmental Studies), Catherine Gautier-Downes (Geography), Bill Jacob (Mathematics). Other faculty advisors from Geography; Environmental Studies; Earth Science; Ecology, Evolution, and Marine Biology; Mathematics; and the Bren School of Environmental Science and Management will be determined as Fellows are recruited.

Number of STEM graduate Fellows per year: 8
Number of K-12 teachers working with the Fellows per year: 12
Number of K-12 classes anticipated to be served per year: 8
Target audience of the project: Grade 6 Earth Science
Setting: Urban, suburban, rural

NSF-supported STEM disciplines and themes involved: Geography, Earth Science, Ecology, Mathematics

Countries involved in international collaboration: Canada, Ireland

Intellectual merit: SCALE will introduce Grade 6 students and teachers to contemporary analytic and technology tools that develop spatial awareness of the local environment, together with their underlying spatial concepts. Graduate students will collaborate with teachers in a curriculum that combines in-classroom lessons and out-of-classroom activities and can be scheduled over a period of four to six weeks. Research has shown that attention to spatial concepts can improve students’ spatial intelligence, and increase eventual career participation in STEM disciplines. These learning experiences will mesh with the California State Standards for Earth Science and Mathematics, and will introduce students to current research practices in the STEM disciplines of geography and the life, environmental, and earth sciences, and the role that spatial technologies (remote sensing, GPS, GIS) play in those practices. The project will build on a pilot study in two classrooms that has been funded for the past two years by the US Fish and Wildlife Service. Fellows will gain invaluable experience in communicating their research themes and enthusiasms to Grade 6 students.

Broader impacts: Spatial technologies are now widely available to the general public through services such as Google Maps, and increasingly essential tools in environmental science. This project will provide an opportunity to engage Grade 6 students in the science and math concepts that lie behind these tools, and to practices of critical spatial thinking that ensure their effective and appropriate use, at an age when their interest in STEM is at a critical point. The project will span the environmental and social sciences, providing students with a sense of the important linkages between them. Schools and teachers will be left with teaching materials and equipment after their GK-12 participation, which will help to ensure the project’s lasting influence. We propose an international component that will educate Fellows about innovative spatially enabled research and educational outreach in Canada and Ireland, countries where recent STEM strategies and experience are very different from those in the US.