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NSF Grant Will Create Network to Prepare Roads, Bridges for Changing Climate

DURHAM, N.H. – As our climate changes, will roadways built to withstand New England winters hold up to increasingly normal Maryland-like summers? If sea levels rise, will ships still be able to pass under bridges? How will the bridges themselves survive more powerful storms?

A new National Science Foundation grant led by researchers from the University of New Hampshire hopes to jumpstart our ability to answer these questions by bridging the knowledge gap between climate scientists, who understand where the Earth’s climate is headed in the future, and the civil engineers and transportation officials who help build those roads and bridges today. The four-year grant, through the NSF’s Science, Engineering and Education for Sustainability (SEES) – Research Coordination Networks (RCN) program, is for $750,000.

“This grant aims to fill a very big void in the field,” says UNH professor of civil engineering Jennifer Jacobs, principal investigator on the grant. Although road and bridge engineers recognize the importance of planning for a changing climate in their work, they lack the capability of readily using the relevant data from climate scientists. “The climate change community and the infrastructure engineers are not yet talking. They’re not at the same meetings, they’re not in the same departments at universities,” Jacobs adds.

While road and bridge engineers do look to climate data to inform materials, design and construction practices, and longevity, data representing the changing nature of the climate has largely eluded them, in part because of its complexity.

“If climate is changing, using weather data from 20 years ago is not going to represent what the road will experience in the next 20 years,” says Jo Daniel, co-principal investigator and associate professor of civil engineering at UNH. The researchers note that inadequate designs for a changing climate could ultimately cost the nation tens of billions of dollars.

The grant will fund the creation of the Infrastructure and Climate Network, or ICNet, to support the integration of climate science and engineering research for sustainable transportation infrastructure. Focused on the northeast, the ICNet currently comprises more than 50 researchers representing more than 80 percent of the graduate degree-granting civil engineering departments in the region.
Representatives from state departments of transportation and practicing engineers will also be involved.

ICNet will convene annual workshops to bring these researchers together; participants will build and populate a Web-based “knowledge commons” for sharing of resources and information. The workshops will use an “Anytown Northeast” case study. Unique to this process, the researchers say, is the inclusion of social scientists who will assist in helping the scientists and engineers create new working relationships and lines of communication.

“We’re going to utilize a variety of social science techniques from the consensus-building field to deal with this very challenging problem of linking knowledge to action,” says co-principal investigator Jack Kartez, professor of community planning and development at the University of Southern Maine’s Muskie School of Public Service. “Linking knowledge to action is not automatic, but it’s critical.”

Kartez and colleagues will also monitor and assess the collaborative process to derive lessons that could be translated to other regions and issues. The researchers anticipate that this New England-based collaborative could be replicated elsewhere.

“This uniquely positions UNH and our collaborators to take a lead in multiple areas that should be taking off on a national level,” Jacobs says.

In addition to Jacobs, Daniel and Kartez, co-investigators are Katharine Hayhoe, director of the Climate Science Center and associate professor of political science at Texas Tech University, and Paul Kirshen, research professor of civil engineering at UNH; Ellen Douglas, associate professor at the University of Massachusetts Boston, has a senior leadership role in the project. Other UNH faculty taking a leadership role in the ICNet are Erin Bell, associate professor of civil engineering; Charles Goodspeed, associate professor of civil engineering; and Cameron Wake, research associate professor in the Institute for the Study of Earth, Oceans, and Space (EOS).

The University of New Hampshire, founded in 1866, is a world-class public research university with the feel of a New England liberal arts college. A land, sea, and space-grant university, UNH is the state’s flagship public institution, enrolling 12,200 undergraduate and 2,300 graduate students.

Photograph available to download:
http://nsf.gov/news/mmg/media/images/sees_rcn_award5_h.jpg

Caption: On very high tides along the New Hampshire coast, this causeway is almost submerged, illustrating the importance of infrastructure engineers to collaborate with climate scientists.

Credit: Steve Miller, Great Bay National Estuarine Research Reserve

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