Seminar: Dr. Christa Brelsford

Presenter:
Christa Brelsford, Oak Ridge National Laboratories

Time of Event:
Tuesday, November 27, 2018 - 11:00

Location:
National Socio-Environmental Synthesis Center (SESYNC)
1 Park Place, Suite 300
Annapolis, MD 21401

Empirical Strategies for Coupling Models of Social and Physical Systems

Seminar presented by Christa Brelsford, Liane Russell Fellow at the Oak Ridge National Laboratory.

Quantifying interactions between social systems and the physical environment we live within has long been a major scientific challenge. A better empirical understanding of dynamic interactions between the built environment and urban social structure is necessary to support predictions of how cities will respond to climate change, ensure energy and water security for their residents, and to facilitate urban sustainability and resilience. In this talk, I will describe three projects using different datasets, methods, and theoretical backgrounds that are all aimed at developing empirical strategies to increase our understanding of how social and physical systems are coupled. Using Japanese language twitter data, I describe how the online social system responded to the Tohoku earthquake and tsunami in March 2011. Using household level water consumption and infrastructure data, I show that peer influence at the neighborhood scale does increase a home's likelihood of participating in a turf removal incentive program. And finally, using a dataset of historical disease cases in the US, I consider the role that the physical and technological environment plays in influencing socio-economic outcomes in urban environments, and demonstrate that the invention of a commercially viable Diphtheria vaccine occurred at the same time as the scaling relationship between disease cases and city size failed. In all of these projects, sources of information that have been are newly available or were invented in the era of cheap computing are allowing novel research strategies into the relationship between human social systems and the physical environment.

About the speaker: Christa Brelsford is the Liane B. Russell Fellow at Oak Ridge National Laboratory in the Geographic Information Science and Technology group. Previously, she was a Postdoctoral Fellow at the Santa Fe Institute. She obtained her Ph.D. from the School of Sustainability at Arizona State University in 2014 for research on the determinants of residential water demand. Christa’s core research goal is to develop empirical methods to understand interactions between human and physical systems, especially in an urban context. She uses empirical methods like spatial analysis, network analysis, and remote sensing to explore the shape and topology of cities and neighborhoods. Christa’s research has been applied to problems of water demand, water institutions, and informal settlement upgrading.

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