School of Sustainability
Arizona State University

In Partial Fulfillment of the Requirements for the Degree of

Doctor of Philosophy

Robert J. Hobbins

Will defend his prospectus

Knowledge System Innovation for Coastal Resilience

Abstract

The burgeoning development of coastal cities coupled with increasing exposure due to sea level rise (SLR) and extreme weather events has exacerbated the vulnerability of coastal communities and infrastructure to floods. The most destructive weather events in the United States have been recent coastal floods totaling $497 billion in losses: Katrina, Harvey, Maria, Sandy, and Irma. Florida, for instance, has suffered the most flood losses in the US between 1986-2015 ($68.6 billion) and losses are expected to increase as South Florida is experiencing SLR at three times the global average. Strategies and solutions are urgently needed to build coastal resilience and help communities thrive in an increasingly uncertain future, but this places great demands on the knowledge systems (KS) that decision-makers, infrastructure designers, and citizens use to assess climate risks and make adaptation decisions. Most KS used to inform climate resilience decisions today are outdated and do not take future climate conditions and sea levels into consideration. Hence, upgrading these KS is a crucial strategy to build urban resilience.

Knowledge systems are the social practices and institutional standards that shape the production, validation, communication, and application of knowledge relevant to policy and decision-making. KS innovation is not just about producing new data and information, but about analyzing, updating, and sometimes transforming, the actor interactions, values, and expectations underlying how knowledge is made and used. While KS are increasingly gaining attention in the sustainability and resilience literature, few studies empirically investigate how KS fail and the innovations needed to make them work better for decision-makers. Furthermore, no previous study has performed an analysis of coastal flood KS. This dissertation fills these critical research gaps. In this dissertation, I ask how are KS working (or not) to inform resilience decision-making and

action, what do they need to do, and what sensibilities should they have to build resilience of both communities and the built environment to coastal floods?

This dissertation uses KS analysis and a multi-level governance approach to analyze KS at national, regional, and local scales being used for assessing flood risk and climate resilience decision making in coastal cities. A case study has been designed for each scale, yet all studies focus on the use of these KS in Greater Miami – an area including many of the most vulnerable coastal cities in the world. The first study maps the national FEMA Flood Insurance Rate Map KS. The second study maps the Southeast Florida Regional Climate Change Compact's KS. The third study analyzes several Greater Miami KS innovations by diverse actors. All studies will use a mixed-methods approach combining qualitative and quantitative methods including participant observation, content analysis, semi-structured interviews, and a climate resilience survey.

Results of this dissertation will contribute to the conceptual development of KS for urban resilience. The methods developed will serve researchers and practitioners in analyzing other critical KS for urban resilience. Resilience professionals across the US will also greatly benefit from the rich analyses of KS that they routinely us for decision making.

Monday, December, 3, 2018
12:00 PM
Wrigley Hall, Room 481

Faculty, students, and the public are invited.

Supervisory Committee:

Dr. Clark Miller (Chair)
Dr. Tischa Muñoz-Erickson (member)
Dr. Sara Meerow (member)