



In Partial Fulfillment of the Requirements for the Degree of

Doctor of Philosophy
Melissa Guardaro

Will defend her dissertation

**Exploring the Relationship Between Social Capital
and Vulnerability to Extreme Heat**

Abstract

Urban heat is a growing problem that impacts public health, water and energy use, and the economy and affects population subgroups differently. Exposure and sensitivity, two key factors in determining vulnerability, have been widely researched. This dissertation focuses on the adaptive capacity component of urban heat vulnerability at the individual, household, and community scale. Using a mixed methods approach and metropolitan Phoenix as a test site, I explored how vulnerable communities understand and adapt to increasing extreme urban heat to uncover adaptive capacity that is not being operationalized well through current heat vulnerability frameworks. Twenty-three open ended interviews were conducted where residents were encouraged to tell their stories about past and present extreme heat adaptive capacity behaviors. A community-based participatory research project was piloted in three underserved neighborhoods to address urban heat on a local scale and collaboratively create community heat action plans. The community engagement methodology consisted of a series of three workshops and demonstration projects which aimed to empower and identify community leaders and build awareness about heat-reducing solutions. Last, a stakeholder meeting for the community of practitioners was held eight months after the last workshop to discuss how the heat action plans will be integrated into other municipal and community efforts. Using data from the interviews, workshops, and stakeholder meeting, social capital was examined in the context of urban heat. Although social capital has been measured in a multitude of ways to gauge social relationships, trust, and reciprocity within a community, it is situational and reflects a position within the formal and informal aspects of any issue. Three narratives emerged from the interviews illuminating differentiated capacities to cope with urban heat: heat is an inconvenience, heat is a manageable problem, and heat is a catastrophe. For each of these narratives, generic adaptive capacity is impacted differently by specific heat adaptive capacity. The heat action plan workshops generated hyper-local heat solutions that reflected the neighborhoods' different identities. Community-based organizations were instrumental in the success of this program. Social capital indicators were developed specific to urban heat that rely on heavily on family and personal relationships, attitudes

and beliefs, perceived support, network size and community engagement. A measurement of effective social capital for urban heat further explains adaptive capacity and isolation issues in coping with heat and points to appropriate local pathways for effective community engagement and action. This research highlights how extreme heat vulnerability may need to be rethought to capture adaptive capacity nuances and the dynamic structure of who is vulnerable under what circumstances.

Tuesday, November 5, 2019
8:00 am
Wrigley Hall, Room 481

Faculty, students, and the public are invited.

Supervisory Committee:

Dr. Charles Redman, Chair
Dr. David Hondula
Dr. Erik Johnston