April 4, 2024

Equity-Based Infrastructure Decision Support for Improved Community Resilience

Abigail (Abby) Beck

PhD. Candidate in Civil Engineering
University of Illinois Urbana-Champaign

Seminar Details

April 4, 2024
2:30pm – 4:00pm

UH Campus: Agrawal Engineering Research Building (AERB) 100

Online via Zoom
https://us02web.zoom.us/j/82581016997

ABSTRACT

Infrastructure provides critical services to a community and its provision or absence greatly dictates a community's impacts, functionality, and resilience post hazard. If equity considerations, such as reducing inequitable outage impacts, are not integrated into infrastructure decisions (e.g., retrofit) then infrastructure is not equitably serving a community nor is community resilience best improved. This talk presents novel equity-based infrastructure decision support tools for improved community resilience. Equity is not easily defined but is best viewed as being defined by five dimensions each with their own definition: recognitional, distributional, restorative, transgenerational, and procedural. The primary focus of this talk will be on two dimensions. I will first elucidate an innovative infrastructure outage impact criticality analysis enabling assessment of infrastructure components from a social impact perspective in support of recognitional equity. The framework is built upon the integration of a network analysis approach with social impact models. Secondly, I will present an equity retrofit metric to quantify the inequity in service provision to vulnerable population subsets in support of restorative equity. The metric is derived upon Theil's T and supplemented with network reliability quantifications for the infrastructure application. I will conclude with a discussion of future equity driven investigations.

BIOGRAPHY

Abigail (Abby) Beck is a PhD. Candidate in Civil Engineering at the University of Illinois Urbana-Champaign. She received her M.S. in Civil Engineering from the University of Illinois Urbana-Champaign and her B.S. in Civil Engineering from the University of Texas at Austin. Her research surrounds equity-based infrastructure decision support by integrating her fundamental specialization in structural reliability, risk assessment, systems modeling, and probabilistic methods with social science approaches. She is a recipient of the NSF Graduate Research Fellowship and a 2023-2024 Mavis Future Faculty Fellow. She is a member of the NIST Center of Excellence for Community Resilience and collaborates with engineers, economists, social scientists, and planners of the development of tools to support community resilience decision-making. She has been recognized for her research at multiple international conferences with a Student Best Paper Award at ICOSSAR 2021/2022 and CERRA Student Recognition Award at ICASP 2023.