ECOLOGICAL SCIENCES
& ENGINEERING
INTERDISCIPLINARY GRADUATE PROGRAM

THESIS DEFENSE



June 16, 2026
4:00 PM EST
HAMP G212A

Logical Interdependency in Socio-Technical System

Abstract

Water infrastructure systems protect communities from floods, droughts, and service disruptions. Yet their resilience depends not only on physical design, but also on how people use, govern, coordinate, and maintain them. Existing infrastructure interdependency research has largely focused on visible physical, geographic, and cyber connections among systems to understand system-level resilience. Less is known about logical interdependencies: less visible, human-mediated relations by which one infrastructure affects another through human behavior and the rules that shape that behavior. Because these relations are often intangible, they may become visible only after failures occur. This dissertation asks how logical interdependencies make water infrastructure systems more resilient or fragile. It answers this question through three connected studies: a behavioral experiment on public and private water systems, a sociohydrological model of reservoir operation under rules and discretionary decision heuristics, and a hidden logical risk framework integrating Institutional Grammar, STAMP, and Bayesian inference.

SUKRATI GAUTAM

Ph.D. Candidate, ESE Student

BIO

AI Safety, Researcher

M.S.: Purdue, Civil
Undergrad: IIT Delhi

Industrial Experience
Applied Scientist: Amazon
Applied Scientist: Bayer
Data Scientist: Microsoft

DR. David J. Yu

Advisor

June 16, 2026
4:00 PM
HAMP G212A