

# Emerging threats and ethical implications of cyber-physical critical infrastructure

Caitlin Grady  
*Department of Civil and Environmental  
Engineering  
Rock Ethics Institute  
Penn State University  
University Park, PA USA  
cgrady@psu.edu*

Sarah Rajtmajer  
*College of Information Sciences and  
Technology  
Rock Ethics Institute  
Penn State University  
University Park, PA USA  
smr48@psu.edu*

Lauren Dennis  
*Department of Civil and Environmental  
Engineering  
Penn State University  
University Park, PA USA  
lud93@psu.edu*

***Abstract***— The provisioning of basic goods and services relies upon an intricate web of critical infrastructure systems. New technology and increasing cyber-connectedness are changing how cyber and physical critical infrastructure assets are related and reliant upon each other. This conference presentation presents two important aspects of cyber-physical critical infrastructure. First, we articulate the emerging threat landscape through categorizing and describing the myriad of shifting motivations and emerging types of harm to cyber-physical critical infrastructure. Next, we present a coupled epistemic-ethical analysis of responsibility, ethics, and moral principles tied to these threats across cyber-physical critical infrastructure. Finally, we articulate several future research thrusts across both ethical and epistemic inquiry highlighting the need for value transparency throughout scientific and decision-making processes.

***Keywords***—critical infrastructure; ethics; risk; cybersecurity; cyber attack; responsibility