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Tracy Kijewski-Correa is Associate Professor and Associate Chair of the Department of Civil Engineering and Geological Sciences at the University of Notre Dame and performs research largely focused upon improved understanding of structural response under dynamic loads. These efforts include an NSF-funded, full-scale monitoring program for signature buildings in three countries around the globe. Other activities include research in cyber-physical systems and embedded sensing, in collaboration with a multi-disciplinary, college-wide research team focused on wireless sensor networks for detection of damage in civil infrastructure and terrorist activities in major cities. In addition, Dr. Kijewski-Correa is a PI on two NSF-funded projects leveraging cyber-infrastructure to mitigate wind hazards on structures and to create new paradigms for open sourcing the design of civil infrastructure. Recently, these efforts have been extended by Notre Dame's SAPC Program to include the seeding of CYBER-EYE: A Cyber-Collaboratory for National Risk Modeling and Assessment to Mitigate the Impacts of Hurricanes in a Changing Climate. Dr. Kijewski-Correa was also involved in post-disaster reconnaissance and sustainable redevelopment after the 2004 Boxing Day Tsunami in Southeast Asia and the 2010 Haiti Earthquake. She will now lead the infrastructure team in Notre Dame's "Committed To Haiti" redevelopment program.

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Leveraging Cyberinfrastructure to Achieve Hazard Resilient and Sustainable Communities: Lessons Learned in the Technology Adoption Life Cycle

In our increasingly interconnected society, the impacts of natural disasters can ripple regionally and even globally. Sadly, our response to date has failed to leverage the intellectual and computational resources being developed globally to decrease these hazards' threats to life, to infrastructure, to ecosystems, and to local and global economies. This has largely stemmed from a deeply engrained habit of executing research using limited local resources scattered physically throughout university, government, and private research laboratories as well as industry and trade organizations. Additionally, this traditional approach to research and even education fails to acknowledge the intersection of this work with economics, public policy and social science.

Recently the United Nations has called for "e*nhanced k*nowledge/technology transfer through cyberinfrastructure," a sentiment shared by the US National Science Foundation in its prototyping of several engineering virtual organizations (EVOs) in an number of disciplines, including civil engineering. These efforts have sought to incentivize sharing of resources in the form of databases, computational and experimental tools, and full-scale data to usher in a 21st Century Research Paradigm capable of truly responding to the threats of natural hazards. Further, these efforts recognize that the nature of many these hazards as well as the complexity of the societal systems they impact requires a dramatic expansion of the intellectual and cyber-infrastructure supporting research at the intersection of numerous disciplines. Not only can such EVOs create an accessible venue where diverse stakeholders can be engaged to realize an integrated computational platform far more powerful than the sum of its parts, but they facilitate the evolution of social networks that can catalyze new interdisciplinary, international collaborations.

However, though well-intentioned, seeding EVOs with participants and resources and then providing incentivization and governance to sustain and grow these EVOs has proven challenging. Therefore, while scalable cyberinfrastructure and global virtual collaboratories will undoubtedly play a crucial role in the enhancing the hazard-resilience of Mega-cities, these efforts will have limited success without appropriate consideration of the psychology of participants/collaborators and the needs and technology readiness of end users/stakeholders, as well as the natural reluctance on the part of many researchers to freely share proprietary data sets and resources. Therefore, any viable effort must also understand how the *Technology Adoption Life Cycle* enables discontinuous innovations to be realized and must be informed by social science to identify appropriate niche groups to seed the virtual collaboratory and appropriate education and outreach mechanisms to foster its growth.

Our experiences with the founding of an EVO dedicated to mitigating the hazards associated with wind-driven events (VORTEX-Winds), the foundation of an integrated cyber platform for risk modeling and assessment for hurricanes (CYBER-EYE), and the launch of a new Cyber-Enabled Discovery and Innovation Project on open-sourced approaches to the design of Civil Infrastructure using Citizen Engineers will be shared at this workshop to underscore both the power of cyber-enabled collaboration, as well as the barriers that arise both in both achieving scalable, secure and trustworthy work flows while the traversing technology adoption chasms presented by both collaborators and end users.