Keynote Speaker Bio

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Dr. Henry V. Burton is an Associate Professor and the Presidential Chair in Structural Engineering in the Department of Civil and Environmental Engineering at the University of California, Los Angeles. His research is directed towards understanding and modeling the relationship between the performance of infrastructure systems within the built environment, and the ability of communities to minimize the extent of socioeconomic disruption following extreme events. Dr. Burton is a registered structural engineer in the state of California. Prior to obtaining his PhD in Civil and Environmental Engineering at Stanford University, he spent six years in practice at Degenkolb Engineers, where he worked on numerous projects involving design of new buildings and seismic evaluation and retrofit of existing buildings. He is a recipient of the National Science Foundation Next Generation of Disaster Researchers Fellowship (2014), the National Science Foundation CAREER Award (2016), and the Structural Engineering Association of Southern California (SEAOSC) S.B. Barnes Research Award (2024).

Artificial Intelligence in Structural Engineering: From Statistical and Machine Learning to Causal Analysis

Collecting and analyzing empirical data are essential to learning and implementing lessons in structural engineering. Historically, the methods that have been used to analyze and draw conclusions from such data have been limited to statistical and machine learning. The models developed using these techniques are able to capture associative relationships between important variables. However, the intervention decisions geared toward enhancing the resilience of infrastructure should ideally be informed by an understanding of the causal mechanisms that drive their performance. This presentation will advocate for a paradigm shift in structural/earthquake engineering where the language, tools, and models that have been developed to draw causal conclusions from observational data are adopted. Several categories of data-driven structural/earthquake engineering problems that can benefit from causal insights will be examined. Example applications of causal analysis to structural/engineering problems will be highlighted, including case studies where machine learning models are used to establish causal relationships.