



Keynote

Risk and Resilience: Past and Future

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Risk-based approaches have been used to predict global change and mitigate consequences associated with changing environment. Risk assessment requires quantifying the risk of each component of a system and its associated uncertainties. **Quantification's goal is to identify each component's contribution to the overall risk to ascertain if one component poses substantially more risk than the others.** If so, that component becomes the basis for developing a quantitative benchmark, which becomes the de facto risk-based standard. The rapid technological evolution, unprecedented nature, and extent of emerging threats defy us to enumerate the potential hazards, much less estimate reliable probabilities of occurrence and the magnitude of consequences. Thus, a comprehensive approach to protecting the nation's critical infrastructure, economy, and well-being must be risk based—not risk exclusive—and it must not end at risk assessment but rather provide a way for decision makers to make their organizational systems resilient to a range of threats within specific cost and time restraints.. Managing for resilience requires ensuring a system's ability to plan and **prepare** for a hazard, and then **absorb, recover, and adapt** to the hazard. This, coupled with a systems view, in which systems are defined as containing components across physical, information, cognitive, and social environments in which the system exists, is the basis for resilience. **Decision analytical tools and Network Science approaches can be used to quantify resilience.**

This keynote will review history of risk assessment and management and discuss emergence of resilience management and its role in Global Change research. Case studies in the areas of **coastal infrastructure, cybersecurity, supply chain, and disease epidemics management** will be discussed.

Dr. Linkov leads the Risk and Decision Science Team and Focus Area at the US Army Engineer Research and Development Center, he is also Adjunct Professor of Engineering and Public Policy at Carnegie Mellon University, Professor of Practice at the University of Connecticut, and Visiting Professor at Ca Foscari University of Venice. Dr. Linkov has managed multiple risk assessments and risk management projects in the areas of resilient infrastructure, cybersecurity, nanomaterials, environmental management, climate change, energy, and systems vulnerability. He is recipient of two Army medals for outstanding civilian service. He is the recipient of the 2014 Society for Risk Analysis (SRA) Outstanding Practitioner Award, 2005 SRA Chauncey Starr Award for exceptional contribution to Risk Analysis, SRA Fellow award and was an elected SRA Councilor (2009-2013). Dr. Linkov has a B.S. and M.Sc. in Physics and Mathematics (Polytechnic Institute) and a Ph.D. in Environmental, Occupational and Radiation Health (University of Pittsburgh). He completed his postdoctoral training in Risk Assessment at Harvard University.