

## **The Multilevel Framework of System Safety: Foundational Research and Future Prospects**

**Abstract:** *Although it is generally accepted that accidents in complex systems result from many interacting factors that are generally analyzed separately using methods from distinct disciplines, researchers have only scratched the surface in developing collaborative and holistic approaches to address system safety. Recent research provides a system-level perspective but does not fully incorporate the richness of disciplinary methods developed over several decades. Based on the historical timeline of methodological approaches and semi-structured interviews with safety experts, this research develops a framework for examining system safety from a multilevel perspective, including proximate technical causes, human error, organizational culture, and societal influences. At each “level” of the framework, a set of methods, tools, and disciplinary knowledge exists and has been widely applied. Each disciplinary perspective provides a unique “lens” with which to examine system safety. The framework provides a platform for interdisciplinary research and can serve as the basis for specific practical guidelines for design, management, accident investigation, and policymaking. The System Safety Database, intended as the engine for operationalizing the framework, will generate reports and provide essential information to those responsible for ensuring safety, investigating accidents, conducting system safety research, and/or managing hazardous systems. The framework and accompanying database will provide stakeholders at all levels, from operators to policymakers, with the tools and perspectives needed to improve safety in complex socio-technical systems.*

### **Speaker's Biography**



Mark S. Avnet is an Assistant Professor of Industrial and Systems Engineering and Aerospace Engineering at Texas A&M University. He is the director of the System Architecture and Management Laboratory, which conducts interdisciplinary research on an array of socio-technical systems and engineering design problems. Mark holds an S.B. in Physics from the Massachusetts Institute of Technology, an M.A. in Science, Technology, and Public Policy from The George Washington University, and a Ph.D. in Engineering Systems from MIT. He has worked in industry as a software developer and has served at NASA Centers and Headquarters in a variety of technical and policy roles. Before joining the faculty at Texas A&M, Mark was a management consultant with McKinsey & Company, where he focused on the design and implementation of operational improvement programs with an emphasis on manufacturing optimization, procurement, and organizational change in the aerospace industry. His current research focuses on the technical and organizational factors that influence safety in complex systems.

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**RSVP: <http://goo.gl/forms/2dbgE1twsd>**

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