



THE UNIVERSITY OF ARIZONA

College of Engineering

The Department of Aerospace and Mechanical Engineering
Kececioglu Memorial Lecture

Thursday, Sept. 5, 2019 at 4:00 pm
AME Lecture Hall, Room S212



Dr. Bilal M. Ayyub, PhD, PE, Dist.M.ASCE, Hon.M.ASME
Professor, Department of Civil and Environmental Engineering
Director, Center for Technology & Systems Management
University of Maryland, College Park

Infrastructure Resilience: Definitions, Quantification and Associated Economics

Abstract: The concept of resilience is applicable to systems with anticipated performances and subject to disturbances. Understanding and quantifying resilience enable societies to use resources efficiently for enhancing or maintaining the performance of systems such as infrastructures. For example, natural disasters as disturbances resulted in worldwide direct damages of US\$366 billion and 29,782 fatalities in 2011 alone. Storms and floods accounted for up to 70% of the 302 natural disasters worldwide, with earthquakes producing the greatest number of fatalities. Managing these risks and others rationally requires an appropriate definition of resilience and associated metrics. This presentation provides a resilience definition that meets a set of requirements with clear relationships to reliability and risk as key relevant metrics. Such metrics provide a sound basis for the development of effective decision- and policy-making methods for multihazard environments for various system types including lifeline, environmental, etc. systems. The presentation also examines recovery, with its classifications based on level, spatial, and temporal considerations. The economics of resilience and the concept of adaptive design for climate-resilient infrastructure are briefly discussed.

Bio: Dr. Ayyub is a University of Maryland Professor of Civil and Environmental Engineering, Professor of Reliability Engineering, and Professor of Applied Mathematics and Scientific Computation. He is also a chair professor at Tongji University, Shanghai, China (2016-18). Dr. Ayyub's main research interests are risk, resilience, uncertainty, decisions, and systems applied to civil, mechanical, infrastructure, energy, defense and maritime fields. Dr. Ayyub is a distinguished member of ASCE, an Honorary Member of ASME, and a fellow of the Structural Engineering Institute, the Society for Risk Analysis, and SNAME. Dr. Ayyub completed projects for governmental and private entities, such as the National Science Foundation, Department of Defense, Hartford, Chevron, Bechtel, etc. Dr. Ayyub is the recipient of several awards and research prizes from ASCE, ASNE, ASME, ENR, the Department of the Army, etc. He has authored and co-authored more than 650 publications including 8 textbooks and more than 15 edited books. He is also the founding Editor-in-Chief of the ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems. His most recent edited book on Climate-Resilient Infrastructure published by ASCE was selected as an Engineering-News Record Newsmaker in 2017.

Light Reception immediately following lecture in the AME East Courtyard