

# KAVANAGH LECTURE Series

Thursday, April 5, 2018 at 7:30 p.m.

117 John Bill Freeman Auditorium at the Hub-Robeson Center

*Sponsored by: The Department of Civil and Environmental Engineering*



## Risk, Resilience, and Sustainability of Civil Infrastructure in a Life-Cycle Context

**Dr. Dan M. Frangopol**

*The Fazlur R. Khan Endowed Chair of Structural Engineering  
and Architecture at Lehigh University*

**Abstract:** Decisions regarding civil infrastructure systems should be supported by an integrated framework considering risk, resilience, and sustainability in a life-cycle context. This framework should take into account multiple objectives including, among other factors, the likelihood of successful performance and the total expected cost over the entire life-cycle of civil infrastructure. The primary objective of this lecture is to present a framework for risk-, resilience-, and sustainability-informed decision making for civil infrastructure systems and networks using a life-cycle multi-objective optimization approach. Risk-based performance metrics allow engineers to combine the probability of structural failure with the consequences corresponding to this event. The sustainability performance metric is established considering the risks associated with economic, social, and environmental impacts, utility theory, and the decision maker's risk attitude. Applications include time-variant reliability, risk, resilience, and sustainability of bridges, bridge transportation networks, and interdependent infrastructure systems under multi-hazards.

**Biography:** Dr. Dan Frangopol is the inaugural holder of the Fazlur R. Khan Endowed Chair of Structural Engineering and Architecture at Lehigh University. Before joining Lehigh University in 2006, he was a professor of civil engineering at the University of Colorado at Boulder, where he is now

professor emeritus. He is recognized as a leader in the field of life-cycle engineering of civil and marine structures. Frangopol is the founding president of the International Associations for Bridge Maintenance and Safety (IABMAS) and Life-Cycle Civil Engineering (IALCCE). He has authored/co-authored more than 40 book chapters and over 370 articles in archival journals including nine prize winning papers. He is the founding editor of *Structure and Infrastructure Engineering* and of the book series *Structures and Infrastructures*. Frangopol is the recipient of several medals, awards, and prizes, from ASCE, IABSE, IASSAR and other professional organizations, such as the OPAL Award, the Newmark Medal, the Alfredo Ang Award, the T.Y. Lin Medal, the F. R. Khan Medal, and the Croes Medal (twice), to name a few. He has served as a consultant or advisor to numerous companies. He holds four honorary doctorates and 12 honorary professorships from major universities. He is a foreign member of the Academy of Europe (London) and the Royal Academy of Belgium, an Honorary Member of the Romanian Academy, and a Distinguished Member of ASCE.

For additional information on Frangopol's activities, please visit [www.lehigh.edu/~dmf206/](http://www.lehigh.edu/~dmf206/).

*Attendees will earn 1.0 PDH. Certificate provided at the lecture.*

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