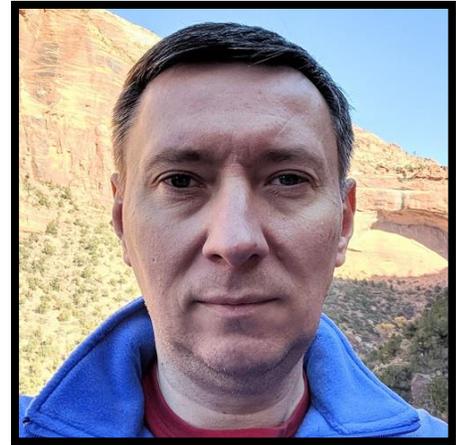


## On Risk Optimization in Networks and Discrete Systems

ABSTRACT - In this talk we discuss risk-averse stochastic optimization in discrete systems, such as networks or graphs. In particular, we consider identification of minimum-risk structures in graphs with random vertex or edge weights. The risk aversity is facilitated by employing a family of certainty equivalent coherent/convex measures of risk, resulting in mixed-integer conic programming with nonsymmetric cones. A connection of this framework to determining the systemic risk of a networked system is discussed. In addition, the discrete setting allows us to obtain new insights into the interplay of risk reduction and diversification, the staple strategy in risk management. A graph-based combinatorial branch-and-bound solution scheme is proposed, where the bounding step is performed using polyhedral approximations. Numerical experiments and case studies are presented.



**Dr. Pavlo Krokhmal**

Professor

Dept. of Systems and Industrial  
Engineering, University of Arizona

**SPEAKER BIO** – Pavlo Krokhmal is a Professor in the Systems and Industrial Engineering Department at the University of Arizona. His research interests include decision making and optimization under uncertainty, stochastic programming, risk-averse optimization and risk management, financial engineering, and computational and applied mathematics. He received his Ph.D. in Operations Research from the University of Florida in 2003 and Ph.D. in Mechanics of Solids and Applied Mathematics from Kyiv National Taras Shevchenko University in Ukraine in 1999. He is a recipient of the AFOSR Young Investigator Award and NRC Senior Associateship Award. His research has been supported by the AFOSR, AFRL, DTRA, NSF, and private industry. He is Co-Editor-in-Chief of Optimization Letters, and an Associate Editor of IISE Transactions, Journal of Global Optimization, and SN Operations Research Forum.