

**Recent Appointments**

- Professor (2015-present). Systems Engineering and Operations Research, George Mason University.
- Chair (2017-2025), Dept. of Systems Engineering and Operations Research, George Mason University.

Education

- PhD, Industrial Engineering and Operations Research, U. of California, Berkeley
- MS, Industrial Engineering & Operations Research, U. of California, Berkeley
- BS, Mathematics, Harvey Mudd College

John Shortle is a professor in the Department of Systems Engineering and Operations Research at George Mason University, where he served as department chair from 2017 to 2025. His research focuses on stochastic modeling, simulation, optimization, and risk analysis, with particular emphasis on aviation safety and the analysis of rare events in complex systems. His work combines methods from operations research, probability, and systems engineering to model complex systems under uncertainty, quantify safety risks, and develop computationally efficient methods for analyzing low-probability events.

A major focus of his aviation research is the development of quantitative methods for assessing collision risks in the National Airspace System. This includes modeling aircraft trajectories, analyzing close-proximity events, and estimating the probabilities of rare but potentially catastrophic outcomes. His research addresses challenges associated with limited data on rare events, uncertainties in aircraft behavior and operating conditions, and the computational complexity of estimating extremely small failure probabilities. Recent work also investigates the reliability and safety of increasingly automated systems, including dependencies and common-cause failures among system components.

Examples of recent projects include:

- AI-based methods for generating synthetic flight tracks for collision-risk analysis
- Rare-event simulation methods for computationally efficient estimation of collision risk
- Probabilistic assessment of wake-vortex encounter risk
- Uncertainty quantification for aviation safety models with limited data
- Assessment of common-cause failures for accident models
- Collision risk assessment for aircraft with diverse collision avoidance capabilities
- Integrating safety analysis within model-based system engineering frameworks

He is a co-author of the widely used textbook, *Fundamentals of Queueing Theory*. He is an associate editor for *Aerospace* and has served as an associated editor for *IEEE Transactions on Reliability* and the *Journal of Probability and Statistical Science*. Dr. Shortle served as general co-chair for the Conference on Systems Engineering Research (CSER) 2026, local chair for the Council of Engineering Systems Universities Conference (CESUN) 2025, program chair for the Winter Simulation Conference 2023, and program co-chair of the INFORMS Annual Meeting 2020. Prior to joining Mason, he worked in the telecommunications industry at US WEST Advanced Technologies. For his work there, he won the Daniel H. Wagner Prize for Excellence in Operations Research Practice.