October 30, 2026

# The ‘Art’ and Science of Decision Making in Structural Life Cycle Asset Management

## Beyer Distinguished Lecture

Dr. Michael Todd

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ABSTRACT: Constrained budgets, increasing demand, and the necessity to push infrastructure past its design life necessitates an active structural life cycle management strategy. This strategy must necessarily include some kind of structural health monitoring (SHM) capability and a core model or suite of models that represent a digital twin of the structural asset, which may be exercised for a variety of tasks ranging across limit state predictions (prognostics) or optimization of processes from maintenance scheduling to SHM design, among others. Challenging such a strategy is the inherent and ubiquitous presence of various sources of uncertainty, including (but not limited) to uncertain future demand/loads, uncertain management budgets, and decision-makers with different risk profiles. This presentation will describe a strategy that integrates elements of physics-based modeling, damage progression modeling, Bayesian inference, system optimization, uncertainty quantification, and decision-making, including the influence of risk aversion in an asset decision-maker. The framework will be exercised on the monitoring and life cycle management of lock chamber miter gates, which are important inland waterways navigation corridor structures.


BIOGRAPHY: Dr. Michael Todd received his B.S.E. (1992), M.S. (1993), and Ph.D. (1996) from Duke University's Department of Mechanical Engineering and Materials Science, where he was an NSF Graduate Research Fellow. In 1996, he began as an A.S.E.E. post-doctoral fellow, then a staff research engineer (1998), and finally Section Head (2000) at the United States Naval Research Laboratory in the Fiber Optic Smart Structures Section. He joined the Structural Engineering Department at the University of California San Diego in 2003, where he currently serves as Distinguished Professor and Chair. To date, he has published over 500 journal papers and proceedings, 13 book chapters, and has 6 patents. His main research areas are developing structural health monitoring (SHM) solutions (primarily in vibration, optical, and ultrasonic domains), stochastic modeling/uncertainty propagation for structural health monitoring applications, developing real-time shape reconstruction strategies for highly flexible structural systems, designing and testing fiber optic measurement systems, and developing noise propagation models for fiber optic measurement systems. Prof. Todd won the 1999 Alan Berman NRL Publication Award, the 2003 and 2004 NRL Patent Award, and the 2004 William J. von Leibig Center for Entrepreneurism and Technology Advancement fellowship winner. He also won the 2005 Structural Health Monitoring Person-of-the-Year Award, won the 2016 D. J. DeMichele Award in Dynamics from the Society of Experimental Mechanics, the 2021 SHM Lifetime Achievement Award, the 2023 SPIE NDE Lifetime Achievement Award, and the 2024 Roy Sharpe Prize for Outstanding Contribution to NDT. He served as the Managing Editor of Structural Health Monitoring: An International Journal from 2016-2026 and is a Fellow of the Society of Experimental Mechanics and a Fellow of the American Society of Mechanical Engineers.

## Seminar Details

*Friday, October 30, 2026*
*2:30pm – 4:00pm*

*UH Campus Classroom & Business Building Room CBB 118*

*Online via TEAMS* [https://www.cive.uh.edu/research/seminars](https://www.cive.uh.edu/research/seminars)