Seminar Title: A Holistic Approach to Transportation Infrastructure Preservation: Condition, Performance, and Behavior Characterization of Highway Bridges

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Speaker Bio:
Devin Harris is an Assistant Professor in the Department of Civil and Environmental Engineering at the University of Virginia. Prior to his current appointment he was the Donald F. and Rose Ann Tomasini Assistant Professor in structural engineering in the Civil & Environmental Engineering Department at Michigan Technological University. He completed his undergraduate degree from the University of Florida and his M.S. and Ph.D. from Virginia Tech. His research expertise is in structural engineering, with a main focus on bridge design and behavior. His research group (MOB Lab) focuses on a variety of topics related bridge engineering including high performance material design and implementation, system behavior, condition assessment, technology integration and structural health monitoring. Dr. Harris’ research approach often utilizes a combination of laboratory experiment, field investigations and finite element modeling.

In addition to his research activities, Dr. Harris is actively involved in the American Concrete Institute (ACI), and the Transportation Research Board (TRB), with additional affiliations in the American Society of Civil Engineers, American Railway Engineering and Maintenance-of-Way Association (AREMA), Precast/Prestressed Concrete Institute, and the National Society of Black Engineers.

Abstract:
As transportation infrastructure across the globe approaches the end of its service life, there is an ever-present need for solutions to preserve this complex and interdependent network. The infrastructure network in the United States has received a great deal of attention, both in the political arena and in the public domain. At the core of this transportation infrastructure network are highway bridges, which serve as the bottleneck within most transportation systems. In the current era, these bridges are rapidly approaching the end of their design service lives, with the average age of a typical bridge being 42 years, relative to historical 50-year design life. This metric underscores the need to make rational decisions regarding the preservation of our infrastructure components to ensure sufficient network capacity is maintained today in order to keep pace with future demand. This presentation describes a multi-component investigation that explores the performance of in-service bridges from the perspective of condition assessment, system-level behavior characterization, and their implications on preservation and decision-making. This holistic approach represents a critical component of a larger framework in the area of the structural health-monitoring framework, that is often under emphasized and sits in the shadow of sensor technologies and smart systems however, this approach is critical to understanding how bridge systems should behave and be evaluated for critical decision-making.