

# DEPARTMENT OF MECHANICAL & AEROSPACE ENGINEERING

## WILLIAM MAXWELL REED SEMINAR SERIES

**“Enabling a safe and sustainable commercial space economy!”**

**Piyush M. Mehta, Ph.D.**

**Department of Mechanical, Materials, and Aerospace Engineering  
West Virginia University**

### **Abstract:**

Space debris remains a persistent threat to assets and humans in space. The proliferation of low Earth orbit (LEO) with replenishable small satellite mega-constellations driven by commercial interests has further stressed Space Situational Awareness (SSA) and put focus on space traffic management (STM). While the trackable debris catalog has grown significantly over the last decade, lethal non-trackable (LNT) debris smaller than the order of centimeters in size remains a challenge as they fall below the detection and tracking capability of most ground-based sensors. In addition to catalog maintenance under SSA, STM has put focus on enhanced and concerted space operations that includes conjunction assessment and collision avoidance. The US Space Policy Directive-3, National STM Policy has emphasized the necessity “to make significant contributions to establish a quality threshold for actionable collision avoidance warning to minimize false alarms”. Accurate calculation of Probability of Collision (PoC) for confident decision-making require realistic covariance information since maneuvers are expensive (personnel cost, science data or commercial service outage, fuel costs). The continued LEO proliferation will overwhelm the operators who are likely to receive multiple collision warning messages a day.

This talk will cover the work under two high-profile projects supported by Intelligence Advanced Research Projects Activity (IARPA) and Office of Space Commerce (OSC) targeted at addressing the challenge of LNT debris and enhancing LEO operations, respectively, critical for a safe and sustainable space economy and environment. The talk will provide an overview of the projects and a summary of the technical advances.

### **Speaker Bio:**



Prof. Mehta is currently an associate professor in the department of mechanical, materials, and aerospace engineering at West Virginia University. He is the director of the Astrodynamics, Space Science and Space Technology (ASSIST) Lab and the Center for Innovation in Space Exploration and Research (CISER) with interests at the intersection of astrodynamics, space weather, data science, and space safety and sustainability. He advises a large group of researchers supported by over \$40 Million in awards by NSF, NASA, DoD, DoE, and IARPA. He is the recipient of the highly prestigious 2021 NSF CAREER award and the PI of a \$20 Million IARPA project under the Space debris Identification and TRacking (SINTRA) program. He has co-authored more than 40 peer-reviewed publications and delivered more than 30 invited

talks across the world. He received his PhD in aerospace engineering from the University of Kansas in 2013 and has since worked in 4 countries across 3 continents.

**Date: Friday, October 11, 2024**  
**Place: WT Young Library 1-62**

**Time: 3:00 PM EST**  
**Contact: Dr. Jonathan Wenk**

Attendance open to all interested persons