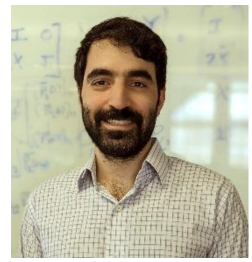
UCI Samueli School of Engineering | Department of Mechanical and Aerospace Engineering

Seminar Series

# Resilient and Adaptable Autonomy via Trustworthy AI



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Friday, January 16th, 2026 – 10:30 am
McDonnell Douglas Engineering Auditorium (MDEA)

**Abstract**: Future mechanical and aerospace systems must operate both efficiently and safely in dynamic, uncertain environments. Although advances in AI, sensing, and actuation offer new avenues for autonomy, existing methods often struggle with real-time constraints, limited data, and the need for stringent safety guarantees. This talk introduces a **Trustworthy AI framework** that integrates geometric methods, control theory, and machine learning to address these challenges in safety-critical applications.

Specifically, I will highlight **Geometric Policy Optimization (Geometric PO)**, a novel technique that leverages underlying problem structure to enhance computational and learning efficiency from input–output data, provide performance and stability guarantees, and accommodate policy constraints. I will demonstrate its capabilities—using an estimation–control duality approach—through learning optimal Kalman filtering, with an application to inferring an aircraft's wing–wave behavior under unknown gust disturbances.

Additionally, I will introduce a **risk-aware control framework** that ensures resilience against extreme events modeled by heavy-tailed distributions. Learning such risk-aware controllers under heavy-tailed process noise is enabled by a risk-constrained extension of Geometric PO. By synthesizing learning, control, and geometry, this integrated approach advances the foundation for safe, efficient, and resilient autonomy in next-generation safety-critical systems.

**Bio**: Shahriar Talebi is an Assistant Professor in the Department of Mechanical and Aerospace Engineering at the University of California, Los Angeles (UCLA), where he develops rigorous frameworks that integrate geometry, machine learning, and control to advance data-driven autonomy. His research contributes to resilient and adaptable estimation and decision-making strategies under uncertainty.

He holds a Ph.D. in Aeronautics and Astronautics and an M.S. in Mathematics from the University of Washington (2023). Prior to joining UCLA, he conducted postdoctoral research at Harvard University's John A. Paulson School of Engineering and Applied Sciences. His work emphasizes geometric learning methods for control and inference, and he has received several honors, including the William E. Boeing Endowed Fellowship, the Paul A. Carlstedt Endowment, the Latvian Arctic Pilot–A. Vagners Memorial Scholarship, and the Frank Hubbard Engineering Scholarship.