

DEPARTMENT OF MECHANICAL ENGINEERING

SEMINAR SERIES

Safe Control and Planning for Embodied AI: From Physical Constraints to Agile Autonomous Maneuvers

Aliasghar Arab, Research Professor
Grove School of Engineering at City College of New York
Tandon School of Engineering at New York University

Abstract

As robots and autonomous systems increasingly rely on learning-enabled and foundation-model-based intelligence, a central challenge is ensuring that their decisions remain physically feasible, verifiable, and safe in the real world. In this talk, I will discuss our research on safe control, motion planning, and verification for autonomous vehicles and mobile robots, with an emphasis on integrating learning-based intelligence with physics-aware safety mechanisms. The work spans constrained motion planning, nonlinear and model-predictive control, control barrier functions, risk-aware decision making, and simulation-to-hardware verification. I will also discuss how aggressive and unconventional maneuvers, including autonomous stunt and evasive driving, can be used to investigate the limits of physically achievable safety actions in emergency situations. These efforts connect to the broader challenge of embodied-AI safety: enabling intelligent autonomous systems to reason and adapt while respecting system dynamics, actuation limits, uncertainty, and explicit safety constraints.

Speaker Bio

Dr. Aliasghar (Ali) Arab is a Research Associate at the Grove School of Engineering and CUNY CREST at The City College of New York and an Adjunct Assistant Professor at NYU Tandon School of Engineering. He leads Agile Safe Autonomous Systems (ASAS) Labs and is the co-founder of General Autonomy, where he works on AI-assisted verification and validation technologies for autonomous systems. He received his Ph.D. in Mechanical and Aerospace Engineering from Rutgers University, with research focused on safe motion planning and control for autonomous vehicles. His research spans autonomous systems, nonlinear and safety-critical control, robotics, embodied AI, motion planning, simulation, and verification. Prior to academia, he held research and engineering roles at Nokia Bell Labs, Nuro, and Verizon, working on autonomous vehicles, industrial robotics, functional safety, and emerging robotic systems. He is an IEEE Senior Member and contributes to autonomous-system safety and standards activities, including UL 4600.

Date: Thursday, October 29, 2026
Location: Steinman 254

Time: 2:00 PM
Host: Bo Wang

Attendance open to all interested persons

