“Beyond Remote Sensing: UAS Innovations for Direct Environmental Sensing”

Traditionally, unoccupied aerial systems (UAS) have been used primarily for remote sensing, capturing data passively from above. While useful, recent developments in sensing, instrumentation, and controls have expanded their capabilities to physically interact with the environment, enabling direct sampling and in-situ measurements. In this seminar, I will present advances in the integration of UAS with innovative sensing and sampling technologies for environmental monitoring. The focus will be on two key projects where UAS are employed to sense remote environments, expanding the capabilities of traditional monitoring approaches. The first project investigates using UAS for real-time water quality and velocity assessments in inaccessible aquatic ecosystems, enabling high-resolution data collection through targeted sampling. The second project explores the application of UAS in terrestrial environments, where these systems facilitate in-situ soil moisture monitoring, which is critical for earth surface processes and agricultural landscapes. By combining aerial mobility with advanced sensors, these projects demonstrate new methodologies for capturing critical environmental data, with broad implications for environmental management and sustainable agricultural practices.