OLD DOMINION UNIVERSITY
Center for Coastal Physical Oceanography

INSTITUTE FOR COASTAL ADAPTATION & RESILIENCE℠

Fall 2025 Virtual Seminar Series

"CAPTURING COASTAL CHANGE: TRANSFORMING LIDAR, RGB, AND MULTISPECTRAL DATA INTO ACTIONABLE INTELLIGENCE"

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RCOAST

Monday, September 29, 2025
3:30 PM EST

ZOOM LINK

Abstract

Our coasts are changing faster than our ability to manage them. In 2024, the U.S. spent $182 billion responding to coastal hazards and over 600,000 homeowners in Florida lost their flood insurance. At present, over 22,000 miles of coastlines are eroding, globally, and that is projected to increase to 60,000 miles over the next three decades. We now have an abundance of coastal data sources, including continuous low-Earth-orbit satellite observations, a sharp increase in UAV-based LiDAR, RGB, and hyperspectral surveys, and recurring federal and state LiDAR acquisition programs—collectively rendering our coastlines data-rich. However, translating these increasingly high-resolution datasets into actionable decision support remains a persistent challenge. The scientific community has made significant advances in acquiring, classifying, and modeling coastal change, yet the integration of these insights into community-level planning and mitigation is often fragmented, delayed, or inaccessible. How do we communicate coastal science effectively, enable intelligent decision-making with hyperlocal data, and get ahead of our coastal erosion?

This seminar presents a data collection and analytics framework designed to bridge that gap by delivering UAV-based LiDAR, RGB, and multispectral products directly to end-users in coastal communities. Our approach emphasizes not only rapid and repeat data capture, but also the transformation of raw data into accessible, intelligible, and actionable intelligence. Specifically, we demonstrate methods for quantifying the performance of coastal mitigation strategies, evaluating resilience gains, and linking these metrics to community-scale budgeting and planning processes.

We conclude by discussing lessons learned from operational deployments, including how data communication strategies can accelerate science-to-decision pathways. By integrating hyperlocal data with community engagement, this work highlights a pathway toward proactive, intelligence-driven coastal erosion management.

Biography

Dr. Christy Swann is an aeolian geomorphologist developing innovative technology to measure how wind changes our environments on Earth and other planetary bodies. She began mapping beaches during her bachelor's and master's studies in Geography at East Carolina University and started building her own instruments during her Ph.D. at Texas A&M University. One of these designs earned her a NASA-funded Postdoctoral Fellowship to unravel the fundamental physics of windblown sand on Mars—work that won her two national awards for research excellence. From Martian dunes to coastal beaches, her career has been driven by a belief that the hardest-to-capture data is often the most valuable, and that collecting and processing that data well is the foundation for real scientific breakthroughs. Dr. Swann has published more than 29 scientific articles, led a team of engineers to build the first particle-tracking velocimetry system to measure turbulence on a natural beach, and helped design Mars landers. She conducted coastal science for naval operations at the Naval Research Laboratory and designed new technologies to measure windblown sand processes on Earth and Mars. In 2023, Dr. Swann founded RCOAST, a coastal adaptation data company built on a simple idea: put the power of advanced science and high-quality data into the hands of communities, so they can protect the coastlines that shape their lives.

https://www.odu.edu/coastal-physical-oceanography/seminar-series