

Spatial Technology Talks

This is a semi-regular series, hosted by spatial@ucsb, which aims to promote discussion and interaction within the university's spatial technology community and also share tools and techniques for mapping and spatial analysis.

Classifying California plant species throughout the drought using airborne hyperspectral imagery

Susan Meerdink

March 22, 2017

Geography Ph.D. candidate **Susan Meerdink** explained how she is using hyperspectral imagery to improve how plant species are mapped through different seasons.

Abstract: Accurate knowledge of plant species seasonal and inter-annual distributions are required for many research and management agendas that track ecosystem health. Airborne imaging spectroscopy data have been successfully used to map species, but often only in a single season due to data availability. During California's severe drought, NASA's Hyperspectral Infrared Imager (HyspIRI) preparatory airborne campaign flew a visible near infrared/shortwave infrared (VSWIR) imaging spectrometer and a thermal infrared (TIR) multi-spectral imager providing the opportunity to improve species discrimination over a broader temporal range. Imagery was acquired in the spring, summer, and fall of 2013–2014 spanning from Santa Barbara to Bakersfield, CA. Overall classification was fairly uniform between seasons with accuracies ranging from 84–93%. However, individual species classification varied much more between dates with accuracies ranging from 10–78%. These results show that while overall image classification across seasons is accurate, classification performance may not be sufficient for applications that focus on a specific species of interest. This research contributes to efforts aimed at monitoring ecosystems across large spatial and temporal scales and ultimately supports many research agendas that are tracking ecosystem health and changes.

Susan Meerdink is a Ph.D. Candidate in the UCSB Visualization & Image Processing for Environmental Research (VIPER) lab. She studies the ability to map plant species across seasons in the dynamic and diverse Southern California Mediterranean ecosystem. She uses various technologies to study plant health across environmental gradients and physiology's effect on optical properties of plant species. Her research leverages a number of tools including novel quantitative methods, land surface temperature, and spectroscopy in the optical and thermal domain.

Discovering and Sharing Campus Scholarship Spatially with UCSB Open Data

Sara Lafia

April 25, 2017

Graduate student **Sara Lafia** gave an overview of [UCSB's Open Data site](#), a developing campus-focused effort, built with contributions from the university library and researchers. Lafia discussed how the site makes research spatially discoverable and how students, administrators, researchers, and community members play important roles in the site's future development. Selected contents currently discoverable through the site include: Imagery from archaeologist Dr. Anabel Ford's Maya Forest GIS; volunteered geographic information from biologist Dr. Douglas Macaulay's lab; publications hosted across various repositories, like eScholarship; and layers of campus-specific information, ranging from bike path networks to the Cheadle Center for Biodiversity's active work sites. Location integrates information; learn what you could discover and contribute to this new and exciting campus resource!

[Sara Lafia](#) is a graduate student in the Geography Department at UCSB. She works with the UCSB Library and the Center for Spatial Studies on improving the spatial discovery of research data and documents. Her research addresses the question of how to spatially enable discovery of connected data and publications in a setting that allows for mapping and analysis using a Geographic Information System. She is also interested in the application of spatialization frameworks to non-spatial data, such as text, to gain new insights about themes of contents across data formats.

Ocean Color in the North Atlantic and Beyond

James Allen

May 15, 2017

James Allen, discussed his fieldwork and efforts to develop a global bio-optical algorithm that characterizes the global particle and phytoplankton size distribution using satellite remote sensing.

Abstract: Plankton ecosystems of the global ocean profoundly affect climate and life on Earth. The North Atlantic Aerosols and Marine Ecosystems Study (NAAMES) is a four-part interdisciplinary field campaign focusing on processes that control marine ecosystems and aerosols in the Western North Atlantic. Here, I will present results from the ocean optics portion of the first two cruises and how they relate to the annual plankton bloom cycle for the region. I will also show how this data will be used to help develop a global bio-optical algorithm that characterizes the global particle and phytoplankton size distribution using satellite remote sensing.

James Allen is a graduate student in the Interdepartmental Graduate Program in Marine Science and is also housed in the Geography Department here at UCSB. He got his B.S. in Meteorology at the University of Tennessee at Martin, but now studies Ocean Optics and how to apply it as a tool to characterize global biogeochemical cycles. Currently, his research is focused on the NAAMES field campaign and building a satellite algorithm to determine the global particle and phytoplankton size distribution from space.

Accessing the National Water Model

Mike Johnson

May 22, 2017

Geography Ph.D. student **Mike Johnson** gave an introduction to web tools for accessing data from the National Water Model: a joint effort between NOAA, NCAR and the academic community to produce real-time and forecast streamflow predictions for all 2.7 million stream reaches across the continental U.S.

Abstract: This talk will briefly introduce the National Water Model (NWM): a joint effort between NOAA, NCAR and the academic community to produce real-time and forecast streamflow predictions for all 2.7 million stream reaches across the continental U.S. It will cover methods for delineating local watersheds and exploring output via Hydro Share and if time permits will look at how this model is being used to forecast floods at the national scale.

Mike Johnson is a graduate student at UCSB under Dr. Keith Clarke. His research focuses on water security and supply issues in California. Last summer he was a student participant at the National Water Center's Summer Institute and will be returning this summer as a course coordinator.