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.

LiDAR Mapping

Paul Alessio

February 17, 2016

Paul Alessio, from the Department of Earth Science, discussed how by analyzing terrestrial LiDAR scans, the ongoing 2015–2016 El Niño year was used as a surrogate for future sea-level rise by determining the impact of a 20–30 cm sea-level rise on open beach and coastal cliff ecosystems.

Abstract: Sea cliffs and beaches comprise a majority of the open wave-exposed coast of Central California. A major impact of climate change with rising sea levels is coastal erosion of beaches and sea cliffs. Influences of sea level rise will be manifested as changes in erosion rates of beaches and sea cliffs, ecosystem conditions, as well as changes in the fundamental interplays between natural and societal responses. El Niño has raised local sea levels in Central California by as much as 20–30 cm. This rise is equivalent to the projected sea-level rise for the region near the end of the 21st century.

The ongoing 2015–2016 El Niño year will be used as a surrogate for future sea-level rise by determining the impact of a 20–30 cm sea-level rise on open beach and coastal cliff ecosystems. This study is being conducted as an integrated study of the impacts of SLR on the Santa Barbara Coastline by the Earth Science, Marine Science, and Geography departments at UCSB. We plan to use a time series of terrestrial LiDAR (light detecting and ranging) scans before, during, and after winter 2015–2016 to assess the potential of natural and modified features to enhance coastal resilience and mitigate the potential impacts of extreme events along the open coast. By analyzing terrestrial LiDAR scans conducted at multiple sites along the Santa Barbara coast, before and after significant storm episodes, we will be able to difference the 3D scans to quantify physical and biological changes as a simple budget (input = output +/- change in storage). We also intend to develop simple models to evaluate the influence of physical and ecological factors on sea cliff, dune, and beaches to sea level rise. Results of this study will be used to engage in community partnerships with government and non-government organizations in developing values clarification and adaptive management options.

Adapting to sea level rise requires coastal communities to carefully weigh science and values. Science can predict change and inform solutions to protect coastal ecosystems and resources. Which solutions we choose will reflect our values. Local knowledge and values are key factors in working through specific dilemmas concerning what parts of coastal systems are to be protected from SLR—and how.

Navigation in Virtual Environments: Measuring Strategy and Efficiency

Alex Boone

March 29, 2016

Ph.D. student **Alex Boone** explored the connection between measures of navigation strategy and navigation efficiency in virtual environments.

Abstract. Over the past few decades, virtual environments have gained popularity as a methodology to study spatial navigation. In these studies, participants learn an environment and then navigate between learned locations. Our work seeks to establish the connection between measures of navigation strategy and navigation efficiency in virtual environments. We also seek to establish the relation between efficiency measures and often-used self-report spatial ability measures. We have developed measures of strategy and efficiency but we are currently interested in discussing the ways in which GIScience might be applied to these data to develop richer measures.

Down the Rabbit Hole: New methods and Tools for Visualizing Scientific Information

Beth Anderson

May 19, 2016

Beth Anderson of Arkitek Scientific explored how 3D animation can be used to visually illuminate complex science for both scientific communities and laymen alike.

Abstract. Beth Anderson of Arkitek Scientific explores how 3D animation can be used to visually illuminate complex science for both scientific communities and laymen alike. How science is being done is changing, as both groups are increasingly called upon to understand very complicated phenomena: to further the field of knowledge, for health decisions, for STEM requirements and in political election cycles. How best to bridge the divide between disciplines, as well as between scientists and the public?

Animations and simulations can provide mental grappling hooks for people seeking to learn about difficult subjects. They can open the door to greater interest and understanding because they are engaging, visually stunning and stimulate the viewer's curiosity. New technologies like VR and MR will also be discussed.