R•I•T College of Science

Chester F. Carlson Center for IMAGING SCIENCE

Seminar Series

Multiple Endmember Spectral Mixture Analysis:

New Algorithms and Applications

Philip Dennison

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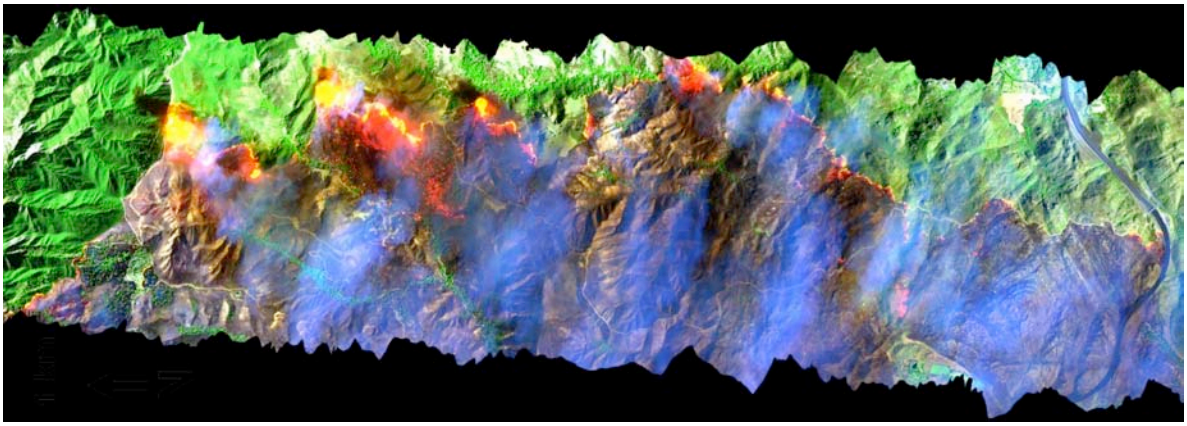
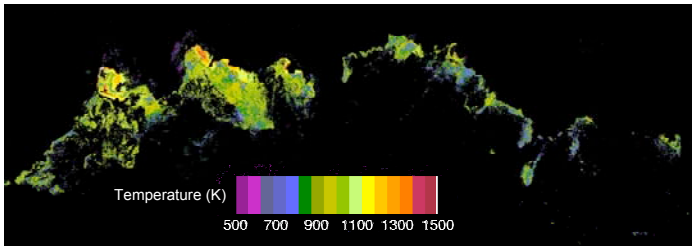


AVIRIS Image of the Simi Fire, Southern California, Oct. 2003



4pm, Wed, May 2, 2007

Auditorium of the Center for Imaging Science

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Abstract
Spectral mixture analysis (SMA) models an image spectrum as a mixture of endmembers. A further refinement of SMA, multiple endmember SMA, allows the number and identity of endmembers to vary on a per pixel basis. This talk will describe the adaptation of MESMA to two new applications: modeling temperature of wildfires using hyperspectral data, and multitemporal compositing. For fire temperature modeling, vegetation, soil, and emitting blackbody endmembers can be used to simultaneously determine both fire temperature and the identity of background materials. This technique has been demonstrated on an Airborne Visible Infrared Imaging Spectrometer (AVIRIS) scene of a 2003 wildfire in Southern California. Spectral shape metrics used for selecting appropriate endmembers can also be used to measure spectral similarity over a time period. This has led to a new compositing method that selects dates based on how well they approximate the spectral shape of other dates in a time series. Vegetation indices calculated from MODIS shape-based composites provide improved correlations with field-measured moisture content.

Speaker Bio
Phil Dennison is an assistant professor in the Department of Geography at the University of Utah. He received a Ph.D. in Geography from UC Santa Barbara in 2003, a Masters in Geography from UCSB in 1999, and B.S. in Geography from Penn State in 1999. His primary research interests include remote sensing of vegetation, remote sensing of fuel properties, and modeling wildfire spread. His research utilizes remote sensing data spanning the electromagnetic spectrum, including multispectral, hyperspectral, lidar, and radar data. Phil has developed several techniques for shape-based selection of endmembers for spectral mixture analysis. His most recent research focuses on monitoring and forecasting of live fuel moisture for determining wildfire danger and modeling trigger points for wildfire evacuation.