

**Imaging Spectroscopy for Earth and Planetary Science**

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**Bio**: David Thompson is a principal research technologist at the Jet Propulsion Laboratory, California Institute of Technology, He is a Technical Group Lead of the JPL Imaging Spectroscopy Group, Instrument Scientist for NASA’s EMIT Mission, and Investigation Scientist for NASA’s Airborne Visible Infrared Imaging Spectrometer (AVIRIS) project. His research uses spectroscopic data to characterize Earth and other planetary bodies. His algorithms have guided autonomous robots and sensors fielded in North America, South America, the Atlantic Ocean, Airborne campaigns, Low Earth Orbit, and the surface of Mars. He is recipient of the NASA Early Career Achievement Medal, the Lew Allen Award for Excellence, and the NASA Software of the Year Award.

**Abstract**: Imaging spectrometers in the visible/shortwave infrared range capture the majority of solar-reflected information, adding a spectral dimension to the spatial dimension of traditional data used in computer vision. This enables rigorous spectroscopy for quantitative maps of physical and chemical properties at high spatial resolution. The instruments have a long history of deployments for mapping terrestrial and coastal aquatic ecosystems, geology, and atmospheric properties, and are also critical tools for exploring other planetary bodies. Recognizing this potential, space agencies like NASA, ESA, and others have slated imaging spectrometers for Earth-orbiting missions with global coverage. These high-dimensional spatio-spectral datasets can address key challenges facing our environment, but pose a rich challenge for computer scientists and algorithm designers. More broadly, the technology presages new earth-based applications that measure new physical dimensions of the human-scale built environment beyond what our eyes can see. This talk will introduce remote imaging spectroscopy in the Visible and Shortwave Infrared, describing the measurement strategy and data analysis considerations including atmospheric correction. We will describe historical and current instruments, software, and public datasets.