

Analytical Chemistry Seminar – DVP^(*) Lecture

(*) Distinguished Visiting Professor



Dr. Roger C. Wiens

Space Remote Sensing Group

Los Alamos National Laboratory and the University of New Mexico, USA

Wednesday, December 9, 2015

Location: Leigh Hall 207

Time: 4:00pm (coffee and cookies at 3:50pm)

“LASER-INDUCED BREAKDOWN SPECTROSCOPY AND RAMAN SPECTROSCOPY FOR PLANETARY EXPLORATION”

Abstract

The Los Alamos spectroscopy group has embarked on a campaign to study the solar system using stand-off LIBS and Raman spectroscopy. The ChemCam instrument suite on the *Curiosity* rover has the first LIBS instrument to be used on another planetary body. So far it has provided elemental compositions for more than 6,000 observation points along the rover's traverse. ChemCam's successor, SuperCam, is being developed for the Mars 2020 rover. In addition to LIBS and high-resolution imaging, SuperCam will perform Raman spectroscopy to a distance of ~12 meters, along with passive visible and infrared reflectance spectroscopy. Our group has also worked to develop LIBS and Raman capabilities for other planetary bodies, especially for Venus. This talk will discuss hardware and operational aspects as well as all-important data-processing techniques necessary to provide quantitative LIBS and high-quality Raman spectroscopy.



Dr. Wiens started his scientific career by writing the first dissertation on the Mars atmosphere based on samples analyzed in the laboratory, from martian meteorites. He has worked as a scientist at Caltech, the University of California, and Los Alamos National Laboratory, and has made extended research visits to NASA's Johnson Space Center, Jet Propulsion Laboratory, the University of Bern, Switzerland, and Paul Sabatier University in Toulouse, France. Dr. Wiens was responsible for three instruments for NASA's Genesis mission and he acted in the capacity of Flight Payload Lead. This mission was the first to return to Earth from beyond the Moon, when it landed in 2004 with solar-wind samples that have revealed exciting details about the composition of the Sun.

Since 2004 Dr. Wiens has been the leader of the ChemCam laser instrument on the Curiosity rover (<http://mars.jpl.nasa.gov/msl/>; <http://www.msl-chemcam.com>) which landed in August, 2012. He has directed the US and French team operating ChemCam and interpreting the data returned from Mars. Dr. Wiens has been involved in other NASA robotic missions as well, including Stardust, Mars Odyssey, Lunar Prospector, and Deep Space-One, which include missions to the Moon, Mars, and two comets. In 2014 NASA selected the SuperCam instrument, a successor to ChemCam, to be built for its new Mars rover, scheduled to launch in 2020. Dr. Wiens is now leading this new instrument development.