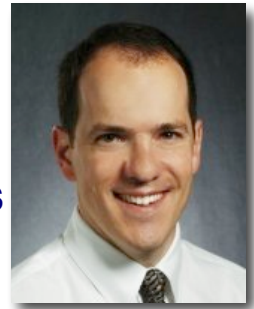


# Mechanical Engineering Department Seminar

3:35pm March 6, 2013  
1130 Mechanical Engineering



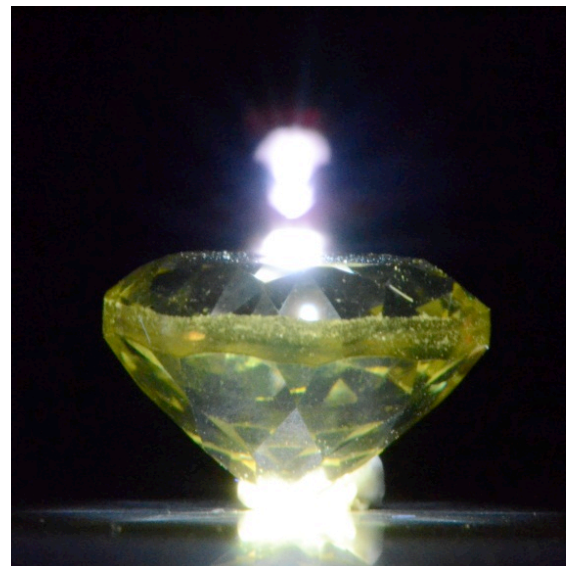
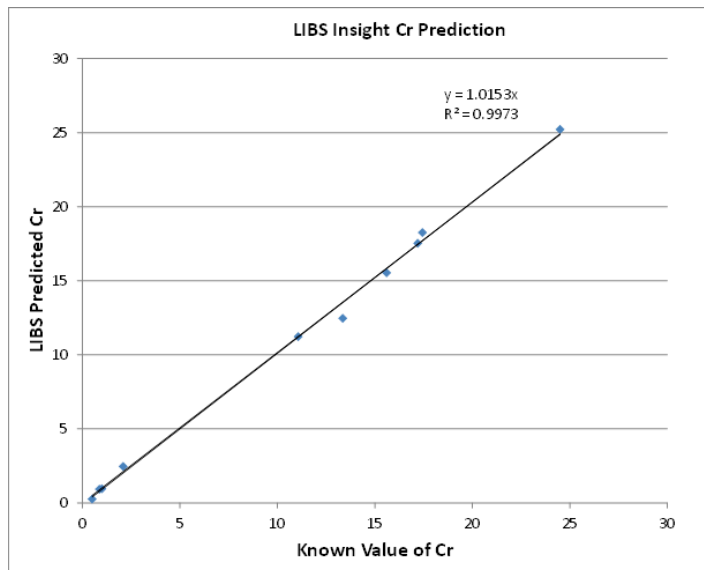
## ZAP! An Introduction to LIBS with Applications To Materials Science and Aerosol Analysis

Steven Buckley

Director of Market Development, TSI Incorporated

Laser-Induced Breakdown Spectroscopy (LIBS) is a direct elemental analysis method that can provide rapid results. A tightly-focused pulsed laser ablates material at the focal point of the laser, and forms an analytical plasma that is the source for elemental analysis. The volume of research on LIBS has expanded greatly in the past 10-15 years, to the extent that there have been more than 1000 published papers on LIBS in reputable, peer-reviewed journals in the last decade. The efficacy of LIBS is apparent in the fact that it was chosen as an analysis technology for the NASA Mars rover Curiosity.

Despite this rapid growth in interest and high-profile applications, the commercialization of LIBS has been seemingly slow, until very recently. Here we will examine the science behind several promising LIBS applications in materials science and aerosol science. In materials science we will touch on the application of LIBS to analysis of thin films, focusing on the ability to do depth profiling via successive ablations. Addressing the interface between materials science and aerosols, we will discuss recent work on measurements of impurities and real-time growth of carbon nanotubes in flames. Finally, we will examine the use of LIBS for general aerosol analysis, examining results from the direct analysis on filters as well as the promise and limitations of real-time analysis of single particles.



**Bio:** Dr. Steve Buckley is a Director of Market Development for spectroscopy products at TSI, Inc., having joined TSI in 2012 following acquisition of the LIBS business of Photon Machines, a company which he co-founded in 2006. Steve's focus on spectroscopy has included work in LIBS, PIV, laser-induced fluorescence, near-infrared tunable diode laser spectroscopy, and photofragmentation-fluorescence. After earning his Ph.D. at U.C. Berkeley in 1995, He was a post-doc and staff member at Sandia National Laboratories in Livermore, CA. Steve was in academia from 1999 – 2009, teaching first in Mechanical Engineering at the University of Maryland, and later earning tenure at the University of California, San Diego in the Mechanical and Aerospace Engineering Department. He was also a charter member of the NanoEngineering Department and the Associate Director of the Center for Energy Research at UCSD. At the University, Steve's primary research areas were combustion diagnostics and LIBS, and he taught graduate and undergraduate courses in combustion, fluid mechanics, energy, and experimental methods.