



Indiana Section of the Society for Applied Spectroscopy

April / May 2003 Newsletter

2002-2003 SEMINAR SERIES

Following a successful seminar series for the 2001-2002 year, we are looking forward to the 2002-2003 seminar. We would like to extend our sincere appreciation to LECO Corporation for their continued support of the ISSAS, and look forward to their cooperation in the future.

We are pleased to announce a seminar by this year's SAS Tour Speaker, Dr. Jill R. Scott of the Idaho National Engineering and Environmental Laboratory (INEEL). The title of Dr. Scott's talk will be "Laser-based Optical and Chemical Imager (LOCI): Marriage of Spectroscopy with Mass Spectrometry." This seminar will be held on Monday, April 14th at 5:00p.m. in Room C127 (Faculty Lounge) of the Indiana University Chemistry building.

The ISSAS will be hosting Dr. Scott for dinner at Janko's

Little Zagreb immediately following the seminar. Please contact Bill Wetzel if you are interested in attending dinner (wwetzel@indiana.edu, 855-7905).

Last year we invited the following speakers:

Professor Marcos Dantus – **Michigan State University.** Professor Dantus gave a lecture on several interesting investigations his lab is making on the femtosecond dynamics of reaction mechanisms. He discussed applications to single molecule computing and exotic reactions.

Professor David Lubman – **University of Michigan.** Professor Lubman's lecture focused on recent advances in liquid-state separations as an oncological tool. His lab uses liquid-phase IEF combined with reversed-phase HPLC-TOF to study changes in lysates with high accuracy. This method can track changes in protein expression during the progression of cancer,

and can be used as a diagnostic for patients.

Professor Mary Carroll – Union College. Professor Carroll spoke about the development of small, inexpensive instruments based on diode lasers, sol-gel based sensors, and fundamental studies of interactions between dyes and surfactants or sol-gels. She also talked of the goals and opportunities for spectroscopic research at an undergraduate institution.

Dr. Michelle Buchanan – Oak Ridge National Laboratory. Dr. Buchanan talked about the spectroscopic and chemical challenges and that face the emerging field of nanoscience. As the Director of the Center for Nanoscale Materials Science, Dr. Buchanan was able to give a unique, “big picture” perspective on this nascent field.

We would like to thank last year’s speakers, and we look forward to another year of great seminars.

WORKSHOPS AND SHORT COURSES

The Chicago Section of the Society for Applied Spectroscopy is sponsoring a Workshop on ICP-AES on May 13th. This workshop will feature nine 30-minute talks

by well-known scientists on the cutting edge of ICP-AES research.

The scheduled talks cover diverse areas including pharmaceuticals, biochemistry and petrochemical applications, among others. It will be held at the Holiday Inn – Rolling Meadows. Please note that the registration deadline will be the 7th of May. There is no registration the day of the event. Interested parties should contact Carol Snider at (708) 756 - 3210 or Dr. David C. Lankin at (847) 982 - 4611.

2002-2003 ISSAS OFFICER ANOUNCEMENTS

The 2002-2003 ISSAS officers are as follows:

William C. Wetzel – Chair
Gerardo Gamez – Chair-Elect
Robert T. Hart, Jr. – Secretary
Michael R. Webb – Treasurer

We will announce details regarding the election of next year’s officers in the June/July issue of the ISSAS newsletter.

We would like to thank Denise M. McClenathan for her service this past year as the chair of the ISSAS.

NEWS IN SPECTROSCOPY

Electronic Analog of the Mach – Zehnder Interferometer – A New Tool for Particle Physics:

Quasiparticles have long proven useful in explaining several aspects of particle physics, such as the fractional quantum Hall effect. However, under the high magnetic fields needed to generate this effect, traditional electron gas interferometers lose coherence. This makes the small variations in electron phase due to fractional quasiparticles impossible to detect. In the March 27, 2003 issue of Nature, Yang Ji et. al. of the Braun Center for Submicron Research at the Weizmann Institute of Science report fabrication of an electronic analog of the Mach-Zehnder interferometer that overcomes this problem. It operates by splitting and recombining a quantum-Hall edge state with quantum point contacts. This device is the first step in measuring the magnitude of a fractional quasiparticle and experimentally confirming this fundamental formalism of particle physics [Nature 422 415 (2003)].

THIS MONTH IN SPECTROSCOPY

In May of 1948, who first presented the principle of holography, which later earned

that scientist the 1971 Nobel Prize in Physics?

In May of 1948, Dennis Gábor presented the first report of holography [Nature 161 777 (1948)]. Gábor, a native of Hungary, was a Scientist for British Thompson - Houston Company when he developed the theory of holography while working to improve the resolution of the electron microscope. Gábor coined the term hologram from the Greek words holos and gramma, meaning, “whole message”. Further developments in the field were possible with the advent of coherent sources, and a recent report shows that beams of neutrons can form holograms as well [Nature 412 525 (2001)].

SPECTROSCOPY TRIVIA:

Who proposed the octet rule in June of 1919?

The answer to this question can be found in the next addition of “This Month in Spectroscopy” or log onto the ISSAS trivia page at <http://www.indiana.edu/~issas/trivia.html>.

ISSAS ONLINE

Please remember to check us out at our website! The ISSAS homepage will keep you updated on local section and national events as well as provide information about our corporate sponsors. Please visit our website at the following address: <http://www.indiana.edu/~issas>

NEW MEMBERSHIPS

Your local Indiana Section of the Society for Applied Spectroscopy is looking for new members. We invite you to recommend membership to any of your colleagues or students who you may feel would benefit from membership in such an organization. The fee for joining is a very reasonable price for both professional and students alike.

This is a good opportunity for the newer graduate students to get involved in a professional society. Membership also includes a subscription to the monthly journal *Applied Spectroscopy*. For further information on ISSAS membership, please feel free to contact any of the officers or visit our website the following address: <http://www.indiana.edu/~issas>.

CONTACT INFORMATION

You may contact any of the ISSAS officers via phone (812) 855-7905, fax (812) 855-0958, email at (issas@indiana.edu), or write to:

Society for Applied Spectroscopy-
Indiana Section
Department of Chemistry
Indiana University
Bloomington, Indiana 47405

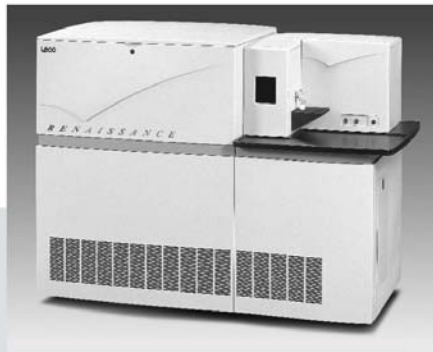
SPONSORS

The Indiana Section of the Society for Applied Spectroscopy would like give a special thank you to our corporate sponsor who made this year's newsletter and seminar possible:

LECO Corporation

We look forward to their continued support in the upcoming year. The ISSAS is in need of sponsors for next year's seminar series. If your company or organization is interested in supporting the ISSAS, please contact our Treasurer, Mike Webb at: micwebb@indiana.edu.

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Indiana Section for the Society for Applied Spectroscopy
2002-2003 Seminar Series

**LASER-BASED OPTICAL AND CHEMICAL IMAGER (LOCI):
MARRIAGE OF SPECTROSCOPY WITH MASS SPECTROMETRY**

Dr. Jill R. Scott
Idaho National Engineering and Environmental Laboratory
Idaho Falls, ID 83415
<http://www.inel.gov>

Our primary focus has been development of the laser-based optical and chemical imager (LOCI) that provides optical and chemical imaging of complex, heterogeneous sample surfaces. LOCI combines a Fourier transform mass spectrometer (FTMS), unique laser-scanning system, custom optics for fluorescence detection, and software for automated data acquisition and analysis. A key feature of LOCI is the unique laser-scanning device that provides high spatial reproducibility for depth profiling and has been automated to provide imaging capabilities. The excellent reproducibility and wavelength independence of the laser-scanning device affords the opportunity to interrogate the same sample surface via optical spectroscopy prior to obtaining mass spectra. Interpretation of mass spectra has also been automated using a Fuzzy-logic inference engine, which also produces the surface maps. Our current imaging interests include characterizing microbe affinities for specific mineral phases in basalt and determining contaminant speciation.

A second focus is characterization and reactivity of gas-phase moieties derived from surfaces. Usually, the ability of the FTMS to select and trap ions is employed to study traditional ion/molecule reactions (MS^n). However, mass spectrometry cannot give electronic or structural information directly. Therefore, we have incorporated an optical detection system for gas-phase ions trapped in the FTMS. The high resolution and mass accuracy of the FTMS is critical because conclusions regarding fluorescence behavior depend on explicitly identifying the gas-phase species.

5:00 PM
Monday, April 14, 2003
Chemistry Building Room C127
Indiana University
Bloomington, Indiana 47405

Biographical Sketch

Dr. Jill R. Scott has a multidisciplinary background that ranges from physical bioinorganic chemistry to mass spectrometry (instrument development as well as applications). For the past five years, Dr. Scott has been conducting research at the Idaho National Engineering and Environmental Laboratory in three major areas: developing the LOCI (formerly the I²LD-FTMS, or Internal Imaging Laser Desorption Fourier Transform Mass Spectrometer), a unique sample analysis instrument with imaging internal laser desorption Fourier transform mass spectrometry and other capabilities; developing methods for studying aluminosilicate, silicate, and aluminate oligomer series as well as metal species using FTMS and ion trap secondary ion mass spectrometry; and developing methods for optically observing and characterizing gas-phase ions trapped in the FTMS.

Dr. Scott has also worked on laser desorption and matrix-assisted laser desorption/ionization Fourier transform mass spectrometry for analysis of self-assembled monolayers and biomolecules while at the University of California–Riverside. Additionally, she has investigated intramolecular and intermolecular electron-transfer reactions of inorganic complexes and metalloproteins using laser flash photolysis at the University of Arkansas and pulse radiolysis at the Notre Dame Radiation Laboratory. Dr. Scott holds a Ph.D. degree in Inorganic Chemistry from the University of Arkansas in Fayetteville, Arkansas, and an M.N.S. degree in Natural Science from the University of Oklahoma in Norman, Oklahoma and B. S. in Chemistry from Oklahoma Baptist University in Shawnee, Oklahoma.

Post Seminar Dinner with Dr. Jill R. Scott

Monday, April 14, 2003

Seminar
Chemistry Building C127
Indiana University
Bloomington, IN
5:00 p.m.

Dinner
Janko's Little Zagreb
223 West Sixth Street
Bloomington, IN
6:30 p.m.

Please RSVP to Bill Wetzel (wwetzel@indiana.edu or
(812) 855-7905).