The SAS Spectrum Newsletter
The Newsletter of the Society for Applied Spectroscopy

# June 2010

# SAS AWARDS TO BE PRESENTED AT FACSS 2010 IN RALEIGH OCTOBER 17-21

## 2010 SAS ELLIS R. LIPPINCOTT AWARD

This award is given to honor the memory of Ellis R. Lippincott. The medal is sponsored jointly by the Society for Applied Spectroscopy, the Coblentz Society, and the Optical Society of America. The recipient of the award shall have made significant contributions to vibrational spectroscopy. These contributions may be theoretical, experimental, or both, as well as basic or applied. The societies proudly recognize **Dr. Martin Moskovits**, University of California, Santa Barbara, for "fundamental and continuing contributions to the field of Surface-Enhanced Raman Spectroscopy, and proposing its fundamental enhancing mechanism based on the excitation of localized surface plasmons."

Dr. Moskovits is Professor of Chemistry at the University of California, Santa Barbara where he also served as Susan and Bruce Worster Dean of Science from 2000 to 2007. From 2007 to 2010 he served as Chief Technology Officer of API Technologies Corp. (ATNY.OB), a publicly traded company (OTCBB:APIA) specializing in advanced electronics, magnetics and nanoptics for defense and communications applications, and President of its NanoOpto subsidiary. He is also a founder of Spectra Fluidics, a startup company dedicated to developing sensors based on microfluidics.

He has degrees in Physics and Chemistry from the University of Toronto, where he received his PhD in 1971. In 1968 he founded an electronics company in Toronto, which was sold in 1970. From 1971-73 he was employed as a materials scientist by Alcan International, Kingston Ontario. Returning to the University of Toronto in 1973, he eventually attained the rank of Professor of Chemical Physics in 1982. From 1993-1999 he was Chair of the Department of Chemistry at U of T. He was a member of the University of Toronto Governing Council. He was also the founding Director of the program in Nanoelectronics for the Canadian Institute for Advanced Research. In research he is best known for his work in plasmonics, and especially its application to surface-enhanced Raman and for developing porous aluminum oxide as a nanotemplate for metal and semiconductor nanowires.

He is the author or co-author of over 270 technical papers and inventor on 18 patents. He has delivered over 280 invited talks at national and international meetings and conferences. He has supervised the research of over 100 graduate students and postdoctoral fellows. In research he is known for his pioneering work in nanotechnology, developing nanofabrication techniques in anodic alumina templates, single-nanowire-based field-effect-transistor sensors, and enhanced optical and plasmonic effects in gold and silver nanostructures. He is a Fellow of the American Association

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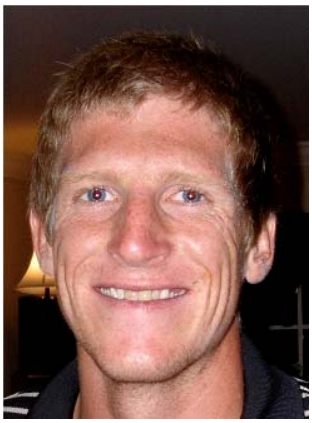
for the Advancement of Science, the Optical Society of America and the Royal Society of Canada, and Vice Chair of the US Department of Energy's Basic Energy Sciences Advisory Committee. He was a Guggenheim Fellow in 1987, winner of the 1993 Gerhard Herzberg Award of the Spectroscopy Society of Canada, 1993 Royal Society of Chemistry (London) Award in Surface and Colloid Science, 1995 Johannes Marcus Marci Medal of the Czech Spectroscopy Society, and the 2008 NanoTech Briefs Nano 50 Innovator Award.

## 2010 *APPLIED SPECTROSCOPY* WILLIAM F. MEGGERS AWARD

The *Applied Spectroscopy* William F. Meggers Award recognizes the author(s) of an outstanding paper or series of papers appearing in *Applied Spectroscopy*. SAS is proud to announce that the 2010 Meggers Award will be presented to **Patrick J. Cutler, David M. Haaland, Erik Andries,** and **Paul J. Gemperline** for these two papers:

> Methods for Kinetic Modeling of Temporally Resolved Hyperspectral Confocal Fluorescence Images. Authors: Cutler, Patrick J.; Haaland, David M.; Andries, Erik; Gemperline, Paul J. Volume 63, Issue 2, (February 2009), pp. 153-163 and
> Systematic Method for the Kinetic Modeling of Temporally Resolved Hyperspectral Microscope Images of Fluorescently Labeled Cells. Authors: Cutler, Patrick J.; Haaland, David M.; Gemperline, Paul J. Volume 63, Issue 3, (March 2009), pp. 261-270.



**Patrick J. Cutler** is currently a PhD student in the Boimedical Sciences Program at the University of New Mexico working in the Pathology Department under the advisement of Dr. Diane Lidke. Cutler began his research career working with Dr. Paul J. Gemperline at East Carolina University (ECU) while acquiring his BS in chemistry with a double major in math (2001-2006). He continued his work with Dr. Gemperline while attaining an MS in chemistry from ECU (2006-2008). During his work with Dr. Gemperline, Cutler worked on several chemometrics related projects including the kinetic modeling of hyperspectral fluorescence microscope images. In his current work, Cutler is working on single particle tracking in hyperspectral fluorescence microscope images and the application of this technique to investigate membrane protein dynamics. His focus in this research is on algorithm development and the biological system of interest. The high affinity IgE receptor, FcεRI, is being investigated in these studies. This receptor is involved in the allergic response and is an excellent system for investigating membrane protein dynamics along with signal initiation and downstream signaling effects. Cutler is a current fellow for the NSF Integrative Graduate Education and Research Traineeship in Integrating Nanotechnology with Cell Biology and Neuroscience.

**David M. Haaland** received his Ph.D. in physical chemistry from the University of Rochester and was employed by Sandia National Laboratories from 1972 until 2008. He is currently a contract employee with Sandia, the sole proprietor of Spectral Resolutions Consulting, and North American Editor of the Journal of Chemometrics. Haaland has an appointment with the University of New Mexico Department of Molecular Genetics and Microbiology.

Haaland's research interests have been the application of chemometric methods to the quantitative and qualitative analysis of spectral data. The work of Haaland and his collaborators has included development of classical least squares (CLS) methods for quantitative spectral analysis, automation of factor selection for PLS and PCR, and invention of new

augmented classical least squares (ACLS) methods that are ideally suited to updating quantitative multivariate calibration models. Haaland recently led a team in the development of a new 3D hyperspectral confocal fluorescence microscope with associated MCR software to investigate cell signaling in eukaryotic cells and the photosynthetic processes in bacteria and plants. His current research interests involve the application of multivariate curve resolution (MCR) to hyperspectral imaging from fluorescence spectrometers and the analysis of magnetic resonance spectral images of human brains.

Haaland has published 130 journal articles and conference proceedings, presented 150 invited talks, and has 13 issued U.S. patents licensed to U.S. industry. He has received the Chemistry in Statistics Award with E. V. Thomas (1991), the Bomem-Michelson Award (2004), the EAS Award for Achievements in Chemometrics (2005) and an R&D 100 Award (2009).

Since August of 2008, **Erik Andries** has been a full-time mathematics faculty at Central New Mexico Community College (CNM) in Albuquerque, NM. He is also a visiting research scientist at the Center for Advanced Research Computing (CARC) at the University of New Mexico (UNM) where he has an ongoing collaboration with John Kalivas at Idaho State University (calibration maintenance and transfer). In addition, he is also a member of the UNM Cancer Center Shared Resource for Bioinformatics and Computational Biology.

Prior to CNM, he spent two years as a research scientist at InLight Solutions where he worked on spectroscopic data analysis algorithms for non-invasive glucose sensing. Before that he was a postdoctoral fellow at the UNM Department of Pathology (developing spatio-temporal models of cell-signaling) and Sandia National Laboratories (extracting kinetic information from hyperspectral fluorescence image data using multivariate curve resolution procedures).

In 2004, Erik Andries received a Ph.D. in applied mathematics from UNM. His interest in "bio/chemo-informatics/metrics" was galvanized by a year-long industrial co-op at GlaxoSmithKline in 1999. He is originally from New Orleans, LA.

**Dr. Paul J. Gemperline**, East Carolina University Distinguished Professor of Chemistry, has more than 27 years of experience in chemometrics, a sub-discipline of analytical chemistry that utilizes multivariate statistical and numerical analysis of chemical measurements to provide information for industrial process understanding, modeling and control. The main theme of Dr. Gemperline's research is the development of new algorithms and software tools for analysis of multivariate spectroscopic measurements using chemometrics.

His work has led to advances in self-modeling curve resolution for characterization of evolving chemical systems, pharmaceutical application of chemometrics, cluster analysis and classification, and multivariate calibration. Dr. Gemperline's current research interests lie in developing chemometric methods for monitoring, understanding, and controlling batch chemical reactions and processes. Recent work has focused on the developed novel algorithms for fitting comprehensive models to batch reactions with calorimetry and in-situ spectroscopic measurements.

Professor Gemperline's research achievements include more than 60 publications in the field of chemometrics and $1.8M in external grant funds from government and industrial sources. Professor Gemperline has directed over 40 undergraduate research projects, 19 M.S. theses, hosted nine visiting Ph.D. students, and supervised five post-doctoral research assistants. Dr. Gemperline is a sought-after speaker on research topics in chemometrics, having presented more than 30 invited lectures at international venues and universities in Europe and Asia. Dr. Gemperline is currently Editor-in-Chief of the Journal of Chemometrics. In 2003, he received the Eastern Analytical Symposium Award in Chemometrics, the highest award in the sub-discipline.

## 2010 SAS FELLOWS

SAS is proud to announce its newest class of SAS Fellows, who will be recognized for their outstanding service to the field of spectroscopy at the upcoming 2010 FACSS Meeting.

**Mark A. Arnold**
**Frank V. Bright**
**Joe Caruso**
**Edward Eyring**
**Joseph Gardella**
**Tim Keiderling**
**Katrin Kneipp**
**Curtis Marcott**
**Oliver Mullins**
**Nicolo Omenetto**
**Yukihiro Ozaki**
**Steven Soper**
**Isiah Warner**

## 2010 COBLENTZ SOCIETY APPLIED ANALYTICAL VIBRATIONAL SPECTROSCOPY AWARD

The Coblentz Society is pleased to announce that **Dr. Boris Mizaikoff**, Chaired Professor of the Institute of Analytical and Bioanalytical Chemistry, University of Ulm, Germany, has been selected as the recipient of the 2010 Craver Award. In 2006, The Coblentz Society created an award to recognize the efforts of young professional spectroscopists that have made significant contributions in applied analytical vibrational spectroscopy. The Society has named this award for Clara D. Craver in recognition of her pioneering efforts in promoting the practice of infrared vibrational spectroscopy and her many years of service to the Coblentz Society. Further, the Craver Award is the Society's complement of its prestigious 'Coblentz Award' that recognizes young spectroscopists for efforts in fundamental aspects of vibrational spectroscopy. This award is presented to Professor Mizaikoff in recognition of his recent work in the development, miniaturization, and application of mid-infrared optical chemo-biosensors, and for opening up new frontiers in nano-sensing technologies.

Professor Mizaikoff earned his Ph.D. from the Vienna University of Technology in 1996 and performed postdoctoral work at the University of Texas at Austin. Early in his career, he provided coordination of four interdisciplinary, multinational European Union Research Projects.

Since his arrival at the Georgia Institute of Technology in November 2000, Dr. Mizaikoff established the Applied Sensors Laboratory as an interdisciplinary research group at the School of Chemistry and Biochemistry gaining substantial visibility within the national and international scientific community. In 2004, Dr. Mizaikoff also became the Director of the Focused Ion Beam Center. Since that time, ASL has established a reputation as an outstanding resource for innovative science, reliable research and excellence in education. The ASL research areas include: 1) miniaturized mid-infrared chemical sensor systems for molecule specific gas-phase and liquid phase analysis utilizing FT-IR spectroscopy and quantum cascade lasers for environmental analysis, process monitoring, and medical diagnostics; 2)

multifunctional scanning nanoprobes and nano-biosensors for biomedical applications, cell biology, and nano-biogeochemistry; 3) deep-sea spectroscopy and sensing for the in-situ determination of volatile organic compounds in marine environments; 4) synthetic receptors and receptor membranes for environmental, food, and biomedical analysis based on molecularly templated materials and functionalized sol-gels applicable to sensing and separations (SPE, HPLC); and 5) focused ion beam based micro- and nano-fabrication.

In autumn of 2007, Dr. Mizaikoff joined the faculty at the University of Ulm, Germany, as a Chaired Professor heading the renowned Institute of Analytical and Bioanalytical Chemistry. His research interests continue to focus on optical sensors, biosensors and biomimetic sensors operating in the mid-infrared spectral range, applications of novel IR light sources, including quantum cascade lasers, system miniaturization and integration based on micro- and nanofabrication, multifunctional analytical platforms for bioanalysis, focused ion beam (FIB) microscopy, development of chemical recognition interfaces for separation and sensing applications, chemometric data evaluation, advanced vibrational spectroscopic techniques, environmental analytical chemistry, process analytical chemistry and biomedical diagnostics.

Dr. Mizaikoff is author/co-author of over 130 peer-reviewed publications, 14 patents and numerous invited contributions at scientific conferences.

The Craver Award will be presented at the 2010 FACSS Conference to be held in Raleigh, NC, October 17-21 at the Raleigh Convention Center. Professor Mizaikoff will present the Coblentz Society's Craver Award Plenary Lecture in Applied Vibrational Spectroscopy and a separate half-day award symposium of six invited presentations will be held following his lecture at this conference.

# Awards Presented by Other Societies at FACSS

## Anachem Award

The Anachem Award was established in 1953 and is presented annually to an outstanding analytical chemist based on activities in teaching, research, administration or other activity which has advanced the art and science of the field. The Award was presented as a part of the Anachem Conference through 1972. After 1972, the Anachem Award has presented at the National FACSS as a part of a special symposium arranged and given by former students and colleagues.

Anachem is proud to announce that the 2010 award will be presented to **Dr. Marc Porter**, USTAR Professor of Chemistry, Chemical Engineering, Bioengineering, and Pathology, and the Director of the Nano Institute of Utah. He has been the director of the Microanalytical Instrumentation Center at Iowa State University (1993-2003); the Institute for Combinatorial Science at Iowa State University (2002-2006); and the Center for Combinatorial Sciences, Biodesign Institute at Arizona State University (2006-2007). He has been involved in several entrepreneurial endeavors: Advanced Analytical Technologies, Inc. (Ames, IA); CombiSep, Inc. (Ames, IA); and Concurrent Analytical, Inc. (Honolulu, HI), which has two subsidiaries – Nanopartz, Inc., a world leader in the innovation and manufacturing of spherical gold nanoparticles and gold nanorods, and Directed Bioflux, Inc., which

focuses on newly patented or proprietary technologies that reduce incubation times in heterogeneous immunoassays. Research in his laboratory is focused on fundamental and technological issues in the movement of nanotechnology to clinical diagnostics.

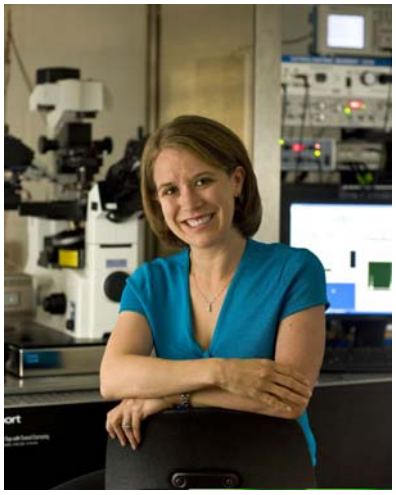
## Charles Mann Award for Applied Raman Spectroscopy

The Charles Mann Award is presented to an individual who has demonstrated advancement(s) presented at FACSS in the field of applied Raman spectroscopy and/or demonstrated dedication to the advancement of the FACSS Raman spectroscopy program and/or the ASTM Raman subcommittee.

FACSS will present this award at the Raleigh meeting to **Richard L. McCreery**, who is currently Professor of Chemistry at the University of Alberta, with a joint appointment as a Senior Research Officer at the National Institute for Nanotechnology. Until 2006, he was Dow Professor of Chemistry at the Ohio State University. He received his B.S. in chemistry from the University of California, Riverside, in 1970 and Ph.D. under Ralph Adams at the University of Kansas in 1974. His research involves spectroscopic probes of electrochemical processes, the electronic and electrochemical properties of carbon materials, and molecular electronics. Much of the research involves collaborations with materials scientists and engineers, as well as surface scientists and electrochemists. Current grant support includes projects funded by the National Science Foundation (US), an Alberta Ingenuity Scholar Award, an NSERC Discovery grant, and a CFI/SEGP funded Hybrid Device Facility in the NINT clean room. He leads an effort at NINT and U of A to investigate hybrid devices for molecular electronics, which combine existing CMOS technology with new electronic and optoelectronic devices containing active molecular components.

McCreery has written over 200 refereed publications, including a book entitled “Raman Spectroscopy for Chemical Analysis” and holds eight U.S. Patents, with two of those extended to Europe (PCT) and Japan. Six of the patents are licensed by ZettaCore Inc (Denver) to commercialize molecular memory devices having higher data density, longer retention, and lower cost than conventional microelectronic memory.

## Arthur F. Findeis Award for Achievements by a Young Analytical Scientist



The Analytical Division of the American Chemical Society is proud to announce that **Dr. Christy L. Haynes** will receive the 2010 Arthur F. Findeis Award to recognize and encourage outstanding contributions to the fields of analytical chemistry by a young analytical scientist.
Dr. Haynes is a recently tenured Associate Professor of Chemistry at the University of Minnesota. Professor Haynes began her academic career as an undergraduate at Macalester College. She performed her doctoral work with Professor Richard P. Van Duyne at Northwestern University, finishing her thesis on nanoparticle optics and surface-enhanced Raman spectroscopy in 2003. Her thesis work was recognized with the ACS Nobel Laureate Signature Award in Graduate Education. Professor Haynes performed postdoctoral work as an NIH NRSA fellow with Professor R. Mark Wightman at UNC, Chapel Hill, focusing on single cell measurements of exocytosis. She began her faculty appointment at the University of Minnesota in Fall 2005, and her group focuses on a wide array of analytical studies in both biological and environmental

contexts. Professor Haynes has been recognized with multiple prestigious awards in addition to the 2010 Findeis Award, including a Searle Scholars Award, a 3M Non-Tenured Faculty Award, an NIH New Innovator Award, a Sloan Foundation Award, a Dreyfus Teacher- Scholar Award, and the SEAC Young Investigator Award.

## SAS/FACSS Student Poster Session

The SAS/FACSS Student Poster Session and Competition will be held on Sunday, October 17, during the opening mixer for FACSS. The judging will take place on Sunday evening. All SAS student entries will be presented Sunday evening as well as on their assigned presentation day. SAS Students will compete to be one of four poster session winners. Awardees will receive a free membership in SAS, a certificate to commemorate the win, AND the opportunity to present the poster in an oral session later in the week. Student SAS members must select the appropriate box on the on-line paper submission form for FACSS to ensure they are considered.

Please consider submitting your poster for this event. Go to http://facss.org/facss/index.php to submit an abstract.

## First European Regional Section Launched in 2010

Left to right: Pavel Matousek, Caroline Rodger, Andy Brookes, and John Chalmers, founding members of the SAS UK Regional Section.

SAS members Caroline Rodger, Andy Brookes, John Chalmers and Pavel Matousek met at AstraZeneca, Macclesfield, UK on 11th February 2010 at the inaugural committee meeting to establish a UK Regional Section of SAS. This is the first SAS Regional Section outside of the American continent. Pavel Matousek will be its first Chairperson, Caroline Rodger will be the Chair Elect, Andy Brookes will serve as Secretary and John Chalmers as Treasurer.

In line with SAS' mission this Regional Section will

- Disseminate knowledge and information concerning the art and science of spectroscopy, and other allied sciences within the UK region.
- Provide a focal point for applied spectroscopists in the UK.
- Increase awareness of the SAS in the UK, especially among students and young scientists.
- Aim to increase SAS membership in the UK.
- Build applied spectroscopy networks in the UK and with the rest of the world.
- Facilitate the professional development of young scientists working in applied spectroscopy in the UK.

It is hoped that this initiative and mechanisms established will pave the way for forming new SAS Regional Sections worldwide.