SAS SPECTRUM eNEWS

Editor's Note

People are the most precious resource for any vibrant organization and societies. In this issue we celebrate the prestigious awards and appointment received by several SAS fellows, and also mourn the passing of Professor Richard P. Van Duyne, a giant in the field of spectroscopy. We encourage members to visit the free to view collection of Dr. Van Duyne's works in *Applied Spectroscopy*. We are excited to see the many spectroscopy-related activities the SAS Student Chapter at Mayaguez Campus of the University of Puerto Rico (UPR-M) successfully organizing in the 2018–2019 academic year, and we continue to welcome new members to SAS and ask for existing members to step up to volunteer for the SAS Executive Committee and Governing Board, which is a great opportunity to hone your leadership skills, influence the future direction of the society, and interact with other fellow spectroscopists.

Xiaoyun "Shawn" Chen, Newsletter Editor

Congratulations to SAS Fellows

Dr. Joel Harris was selected as an ACS Fellow for 2019! More details can be found at the following link: https://www.acs.org/content/acs/en/funding-and-awards/fellows/list-of-2019-acs-fellows.html.

Dr. Larry Nafie was selected as the 2019 Chirality Medal awardee and received the medal at the Chirality meeting the week of 14 July (https://chirality2019.sciencesconf.org/). The Chirality Medal was instituted by the Societa Chimica Italiana in 1991 to honor internationally recognized scientists who have made a distinguished contribution to all aspects of chirality. It is awarded each year by a Chirality Medal Honor Committee comprising the Chirality International Committee members and the most recent recipients of the medal.

Dr. David Hahn is the new Dean of the University of Arizona College of Engineering. Hahn, an engineer with more than two decades experience in government, national laboratories, and higher education, was recently named dean effective 1 July 2019. Hahn is a mechanical engineer specializing in thermal sciences and laser-based diagnostics, including renewable energy, biophotonics, and general laser-material interactions. He has published more than 100 archival journal papers and holds 10 patents. Hahn joins the university after a 20-year career at the University of Florida, where he served as chair of the Department of Mechanical and Aerospace Engineering since 2011. Hahn is a fellow of the Society for Applied Spectroscopy, the American Society of Mechanical Engineers, and the Optical Society of America. More details can be found at the following link: https://uanews.arizona.edu/story/hahn-named-dean-engineering.

Society for Applied Spectroscopy Training Courses

Are you using infrared spectroscopy, but feel that you are only scratching the surface? Does Raman spectroscopy confuse you and make you wonder where you can use it? Are you mystified when someone tells you that there is an enormous amount of information in infrared and Raman spectra? The Society for Applied Spectroscopy has the answers! To address these needs and many others the society is kicking off a training effort at SciX. We will be offering four courses geared to vibrational spectroscopy. They are:

A Practical Introduction to Infrared, Raman, and Near Infrared Spectroscopy: This course will provide an introduction to Raman, mid-infrared and near-infrared concentrating on why an absorption occurs, where an absorption occurs and the benefits and limitations of the techniques.

Searching Infrared and Raman Spectra: This course will provide an introduction to spectral searching. Among other topics it will cover how to do an efficient search, why the first "hit" may not be the right answer and how do you deal with a mixture or when the unknown is not in the database.

Problems with FT-IT Spectra and How to Avoid Them: Users of FT-IR spectrometers may have received little or no formal training in spectroscopy and therefore cannot distinguish between "good" and "bad" spectra. In this

course, we will show many of the problems that are commonly encountered with FT-IR spectra measured by inexperienced (and often experienced!) users and show how to avoid them.

Intro to Raman Spectroscopy and Imaging: You will learn the basics of applied Raman spectroscopy and imaging. Students will be taught the application of group theory to crystalline materials and how to apply those symmetry rules to perform Raman crystallography. The instructor will teach Raman spectroscopy and imaging at a practical level and cover topics to allow the student to immediately apply the material in the workplace.

Please see the SciX program at https://facss.org/short-courses for longer descriptions of these course and when they will be offered. We look forward to seeing you at SciX 2019!

Contributed by Ellen Miseo
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SAS UPR-M Student Chapter

The Mayaguez Campus of the University of Puerto Rico (UPR-M) currently maintains the first SAS Student Chapter in Puerto Rico. The chapter was inaugurated in 2018 under the mentorship of Dr. Samuel P. Hernández-Rivera, a physical chemistry professor at UPR-M Department of Chemistry. A strong connection with the student chapter of Optical Society of America (OSA), based at the Physics Department of UPR-M has been developed, in an effort to make a stronger impact in the science and engineering community of UPR-M. The mission of the SAS Student Chapter is to establish a strong relation between the students and professors of the Schools of Science and Engineering at UPR-M. The SAS Student Chapter strives to educate college students in the Southwestern Puerto Rico community in applications of spectroscopy and tries to extend these efforts to high school students to attract them into STEM-C careers.

For the 2018–2019 academic year, they have successfully organized five activities:

First Members Meeting: 5 February 2019

Webinar: Photonic Devices: 5 April 2019

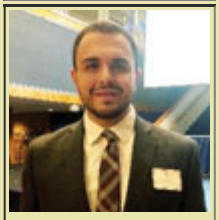
Zirconia Camp for Girls: 6 April 2019

Beyond the Optics Workshop Collaboration with OSA UPRM Chapter: 16 April 2019

International Day of the Light: OSA UPR-M and SAS UPR-M Student Chapters: 16 May 2019

Girls camp.

	Why did you join SAS and what do you hope to gain from SAS?	**What is your area of research?**	**What are your hobbies?**
	Stephen White, Ph.D. Student in the Asher Lab at the University of Pittsburgh		
	I joined SAS in honor of the late Dr. John Jackovitz. I hope that SAS will provide me additional networking opportunities within the organization for my future development as a scientist and an engineer.	My area of research is using spectroscopy, specifically UV resonance Raman spectroscopy and NMR spectroscopy, to determine the structures of proteins and protein-small molecule complexes that cannot be solved by more "traditional"	My current hobbies include fountain pens, writing pen pal letters, reading, building stained glass pieces, and enjoying time

		structural biology methods.	with my wife and dogs.
	Surojit Chattopadhyay, Professor at Institute of Biophotonics, National Yang Ming University		
	I came across SAS while submitting a paper. As nowadays dedicated societies for spectroscopy are few, I decided to join SAS with a hope to benefit from interactions within a focused audience. As I am new, I don't know how the society work, but I hope to initiate collaborations among interested members in the near future and learn the state of the art about Raman, and fluorescence spectroscopies from them.	My area of research is nanomaterials, and its application in the field of optics, photonics, energy, and biomedical.	Photography and music are my hobbies.
	Aaron Viggiano, undergraduate student at Washington and Jefferson College		
	I received an SAS membership as part of the Undergraduate Student Research Award which I received from the SAS of Pittsburgh. I hope to gain a good networking resource and learning tool through SAS.	I performed research analyzing polymorphs of the cancer drug erlotinib using solid state NMR.	My current hobbies include working for the technology department of a local school and sound and lighting design.
	Elliott Rittenberg, President, Infrared Imaging LLC		
	Our company is a distributor for manufacturers of infrared and hyperspectral imaging systems. I joined SAS to become better connected to the community, for access to information about developments in the field, and for networking opportunities.	I am not a researcher. My primary role is sales and marketing.	Bicycling, piano, community service, reading, fitness.
	Honglan Qi, Professor at Shaanxi Normal University, China		
	Working with fluorescence and electrogenerated chemiluminescence techniques, one of the ideal societies to be a part of is SAS and hence my interest in becoming one of its member. I would be looking forward to networking events of SAS and its travel awards, which are crucial for early career researchers like myself.	My research is analytical chemistry, focusing on fluorescence and electrogenerated chemiluminescence in biosensors and disease diagnostics.	Reading.
	Cheng Lin		
	We recently submitted an article to Applied Spectroscopy for publication consideration and I knew the chance to be a member of the SAS. I hope that the SAS provides a platform for research works exchange in spectroscopic area.	My research is focusing on photoacoustic spectroscopy and plasmonic optical fiber grating techniques for trace gas monitoring.	Watching movies, listening to music, reading books.

SAS Call for Nominations for Volunteer Service on the Executive Committee and Governing Board

Take your SAS membership to the next level and consider running for a SAS office in 2020. We are currently looking for members to run for President and Secretary, as well as at-large Governing Board Delegates. Terms for President and Secretary are three years, and terms for Governing Board Delegates are two years beginning January 2021.

1. Qualifications for President and Secretary: Only regular (non-student) members, of the Society may serve as elected officers. Nominees for elected office must have served, or be serving, in one of the following capacities: Executive committee elected or appointed member; journal editorial board member; delegate to the Governing Board; Regional, Technical, or Special Interest Section officer or elected board member of these; or chair of a Society committee. Appointed positions held during a Student Member's involvement with the Society counts toward this requirement. You must be able to attend both Pittcon and SciX for the length of the term, as well as participate in monthly conference calls. Some travel support will be available.

2. At-Large Governing Board Delegate Regular Members of the Society may serve as at-large delegates. There are no formal requirements other than an interest in Society business and a desire to help SAS grow. You must be able to attend SciX 2021 and 2022. Delegates are entitled to a $200 stipend for meeting attendance if needed.

Please note: Nominations are not automatically guaranteed to be on the ballot and are subject to review and acceptance by the SAS Nominating Committee who will notify you of your status. To submit your nomination, please email SAS' Executive Director with your name, contact info, desired position, and qualifications if applicable. Sign up to run!

New York Society for Applied Spectroscopy (NYSAS) Celebrates Student Award Winners!

On 13 July 2019 from 5:00pm–8:00pm, the NYSAS organization celebrated their student award winners at the annual celebration banquet. The banquet was held at Rutgers State University in the new Chemistry and Chemical Biology building on Bevier road in Piscataway, New Jersey. This year we celebrated the accomplishments of three winners:

The event featured entertainment by Josh Mark, a local guitarist/singer who did a great job at entertaining the group with contemporary rock tunes throughout the dinner portion of the meeting. A raffle was held midway through the event where a number of custom NYSAS USB drives and a power quality filter (i.e., surge protector) donated by ZeroSurge (ZeroSurge.com) was raffled off. The students brought posters of their work and there was plenty of opportunity to network with the students and guests. Debbie Peru was Master of Ceremony for the event and recognized the officers for their time and commitment to the organization. Mike Cutrera presented the students with a plaque and cash award. About 21 people attended the event included friends and family members of NYSAS. Everyone had a wonderful time. For more information about the NYSAS organization and a schedule of meetings please go to our website www.nysas.org.

Graduate Award: Jing Li, SUNY Binghamton

Undergraduate Awards: Philip Charles, Rensselaer Polytechnic Institute, and Alexander Green, SUNY Fredonia

Contributed by Debbie Peru debperu@outlook.com
and Howard Mark hlmark@nearinfrared.com

Post-Doctoral Associate Opening

The Engineering Research Center on Structured Organic Particulate Systems (C-SOPS) and has an opening for the position of postdoctoral associate. We seek a motivated individual, with a strong background process analytical technology (PAT). Experience with powder processing, multivariate analysis, statistics, and informatics are desirable.

Successful candidates will work in a fast-paced environment focused on furthering emerging manufacturing technology while assisting early adopters in commercial implementation-SOPS is a multi-university research center headquartered at Rutgers University with Purdue University, the New Jersey Institute of Technology, and the University of Puerto Rico at Mayaguez as core partners. The center's research mission is to develop a scientific foundation for optimal design of powder-based systems and develop science; and engineering methods for designing, scaling, optimizing, and controlling relevant manufacturing processes. This position will be based in the Department of Chemical and Biochemical Engineering, Rutgers, The State University of New Jersey.

Successful candidates should be able to work independently, have excellent communication skills and be able to work on collaborative projects, interacting and reporting to sponsors and publishing and presenting research

findings. These abilities should be clearly demonstrated in the applicant's CV and cover letter. Candidates should have a Ph.D. in engineering or related scientific fields. https://jobs.rutgers.edu/postings/96781

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In Memoriam: Richard P. Van Duyne 1945-2019

By Amanda J. Haes, University of Iowa

Richard (Rick) P. Van Duyne passed away on Sunday, July 28, 2019, after battling pulmonary fibrosis. Rick was born on October 28, 1945, in Orange, New Jersey. He attended and graduated from Rensselaer Polytechnic Institute with a B.S. in Chemistry in 1967. He then earned his Ph.D. in analytical chemistry at the University of North Carolina at Chapel Hill in 1971, under the direction of Charles N. Reilley. His graduate work focused on low-temperature electrochemistry and double potential step chronocoulometry. Immediately following his graduation in 1971, Rick began his independent career as a faculty member in the Chemistry Department at Northwestern University. He was promoted to Associate Professor then Full Professor in 1976 and 1979, respectively. More recently, Rick was the Charles E. and Emma H. Morrison Professor of Chemistry and held courtesy appointments in Applied Physics and Biomedical Engineering. He spent his entire career at Northwestern University and with the help of his wonderful colleagues and collaborators, was still publishing papers and mentoring a research group at the time of his passing.

Rick's research interests spanned chemistry, physics, and materials science, and he extended his fundamental experimental and theoretical research interests to applications in medicine and art conservation. In 2010, Rick proudly became an elected member of the National Academy of Sciences for his discovery of surface-enhanced Raman spectroscopy (SERS) and invention of ultrasensitive nanosensors based on localized surface plasmon resonances (LSPR).

His journey with plasmonics and SERS began with observations made in the mid-1970s where normal Raman signals increased dramatically and new vibrational bands observed when pyridine was adsorbed onto roughened silver electrodes. His first paper on this topic faced the tough peer-review process and was eventually published the *Journal of Electroanalytical Chemistry* and *Interfacial Electrochemistry* in 1977. The paper remains the most highly cited paper in this journal to date. In this paper, Rick attributed the increase in Raman signals, which were estimated to be by ~a million times, to what is now known as electromagnetic enhancement, a mechanism dependent on electric fields generated at the surface of the metal and is related to the properties of the underlying plasmonic substrate. In collaboration with long-time colleague and theoretician, Professor George Schatz, Rick and George were able to provide a comprehensive and definitive description of the SERS effect.

Rick and his group members extended their understanding of plasmonics to develop refractive based sensors that exhibited unexpectedly large (or small) but reproducible changes in their localized surface plasmon resonance wavelength upon molecule binding. In 2002, Rick noted that, "[w]hen you get something very different than what you expect, that's when science becomes fun." From this, the importance of nanostructure morphology, substrate, and local environment were systematically evaluated experimentally and were complemented by theoretical results garnered by Schatz and expertise from countless experimental collaborators. Many biological and chemical systems were interrogated using appropriate surface chemistries. Applications ranged from gas detection, Alzheimer's disease biomarker evaluation, substrate-cytochrome P450 binding, to glycoprotein-carbohydrate interactions. By extending these measurements to the single particle level, subtle changes in particle structure were correlated to variations in the LSPR lineshape. This understanding facilitated the optimization and design of plasmonic nanostructures for these measurements and other nanoparticle-based sensors that are used today.

In recent years, Rick continued to push limits in plasmonics and SERS as well as in other surface-enhanced spectroscopies including tip-enhanced Raman spectroscopy (TERS) and surface-enhanced femtosecond stimulated Raman spectroscopy (SE-FSRS). His scientific measurements and use of these advanced techniques led to the impressive and successful elucidation of structural information from single molecules. At the time of his passing, Rick's body of scientific work included 396 papers that were written in collaboration with over 530 co-authors. These papers have been cited nearly 83,000 times.

Throughout his career, Rick was recognized through a number of awards, distinctions, and honors. Notably, he became an elected member of the American Academy of Arts and Sciences in 2004, the National Academy of Sciences in 2010, and the American Institute for Medical and Biological Engineering in 2016. He was an honorary member of the Society of Applied Spectroscopy. Furthermore, numerous professional societies acknowledged Rick through various awards. These societies included the American Chemical Society (E. Bright

Wilson Award in Spectroscopy, National Fresenius Award, Nobel Laureate Signature Award for Graduate Education), American Physical Society (Earle K. Plyler Prize for Molecular Spectroscopy), Optical Society of America (Ellis R. Lippincott Award), Royal Society of Chemistry (Sir George Stokes Award, Theophilus Redwood Award, Spiers Memorial Award from the Faraday Division), Society for Electroanalytical Chemistry (Charles N. Reilley Award), and Society of Applied Spectroscopy (Charles Mann Award in Applied Raman Spectroscopy; Gold Medal Award from the New York Section of the Society for Applied Spectroscopy).

The impact of Rick's mentorship will live on as he worked tirelessly with and for his group members both during and after they moved on to other positions. Over 200 graduate students, postdoctoral fellows, undergraduates, and high school science teachers benefited from his generous mentoring as did countless other researchers and scholars. Van Duyne alumni currently hold positions in academia, industry, and a range of other positions all over the world. Over 40 of his group members have gone on to positions in academia—more than 20 of these are women. Those who had the opportunity to learn with and from him in the trenches, are grateful to have had Rick as a role model who cared more than what might seem typical for an academic, who openly shared his ideas and struggles, who provided honest feedback (often in red pen) that was somewhat feared at times but always appreciated, who offered kindness and praise throughout their careers, and who benefited from his interest in everyone individually so that he could support them as both scientists and human beings.

Rick will be remembered as a visionary and brilliant scholar whose creative scientific ideas pushed the status quo toward the development of new scientific measurements and techniques. New interdisciplinary fields were developed. Novel measurements in art conservation and medicine were performed. The impact of his scientific contributions and discoveries will continue to be realized. Rick will be also remembered for his dedication to the people he mentored as evidenced by the diversity and large number of scientists he encouraged and guided into STEM careers. He will be greatly missed by alumni, colleagues, friends, and most of all, by his wife, Jerilyn E. Miripol, who helped Rick find balance in his life through their shared love of art, music, and poetry.

Editor's Note: *Applied Spectroscopy* thanks Amanda Haes, who started in Rick's group in 1999 and earned her Ph.D. under his guidance in 2004, for her contribution.

The Society of Applied Spectroscopy (SAS) was saddened to hear of the passing of Professor Richard P. Van Duyne on July 28 at the age of 73. Rick was a truly ground breaking scientist who discovered surface enhanced Raman (SERS) and pioneered this technique along with tip-enhanced Raman (TERS) throughout his career. Rick was also known to be a remarkable mentor to his many students and colleagues. SAS, in collaboration with Sage Publishing, is pleased to announce The Richard Van Duyne Tribute Collection to honor this great scientist's work. This new collection of Rick's published work in *Applied Spectroscopy* is free to download at: https://journals.sagepub.com/topic/collections-asp/asp-6-the_richard_van_duyne_tribute_collection/asp.

SAS is also pleased to announce that to further honor Rick's great career, we are now working on a special Issue of *Applied Spectroscopy* dedicated to SERS and TERS to be published in 2020. The official call for papers will be issued in September. If you are interested in contributing to this special issue please contact Amanda Haes at amanda-haes@uiowa.edu.

Do you have something spectroscopy-related you want to discuss in the newsletter?
Or something that will help our membership such as career tips or application tips?
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