

FACSS PRESENTS

# SciX2021



## National Meeting

AES Electrophoresis Society

The Coblenz Society

North American Society for Laser-Induced  
Breakdown Spectroscopy (NASLIBS)

Society for Applied Spectroscopy (SAS)



## FINAL PROGRAM

**SEPTEMBER 26 - OCTOBER 1**

Rhode Island Convention Center - Providence, RI

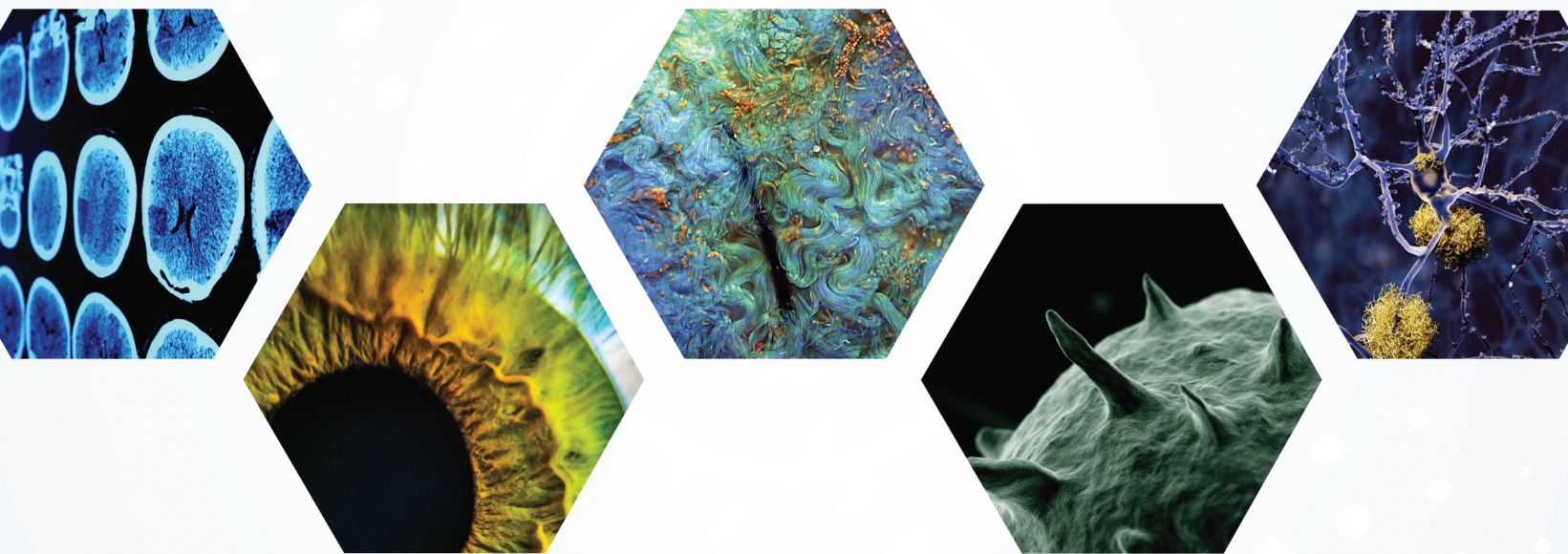
[SciXconference.org](http://SciXconference.org)



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### SciX Conference and FACSS International Office

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(856) 224-4266 | [facss@facss.org](mailto:facss@facss.org) | [scix@scixconference.org](mailto:scix@scixconference.org) | [www.scixconference.org](http://www.scixconference.org) | [www.facss.org](http://www.facss.org)

## WELCOME TO SciX 2021

On behalf of the Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), it is our pleasure to welcome you to the SciX 2021 Conference. This year marks our fourth time holding the conference in Providence, RI; the ideal location for a meeting on the east coast with a strong local scientific community and easy access for international travelers.

During these extraordinary times, the organizing team has gone above and beyond to create a world-class scientific program. This year's conference will feature a combination of in-person and pre-recorded technical presentations, a full exhibit floor, and an excellent lineup of short courses & workshops. As a bonus, FACSS will be offering all attendees access to an on-demand library of pre-recorded talks and posters from across the entire technical program after the conference.

From the earliest stages of the planning process, we decided that the technical focus of this year's meeting would be on translational spectroscopy. At the time, the trend towards portable and distributed analytical sensing technologies was already evident, but little did we know how relevant the topic would be during the COVID-19 pandemic. Program Chair Jean-François Masson has curated an outstanding technical program beginning with a keynote address from David Walt, a professor at Harvard Medical School, who has translated several groundbreaking diagnostic technologies from his lab at Harvard through multiple spin-off companies.

This year will also mark the first major change to the program format since the addition of the Friday session several years back. Plenary sessions have now been moved from the early morning to mid-day and relocated to a dedicated space adjacent to the exhibit hall. When this area is not being used for awards and plenary presentations, it will be used as a new vendor technology technical session. This move will provide a larger, more inviting space for the plenaries and make it easier for attendees to visit the exhibit floor to learn about all the new and exciting product developments over the past two years.

While this year's conference will require all attendees to be masked at all official SciX functions, that does not mean that FACSS is not still committed to fostering scientific collaborations through a host of networking events. Key among them being the pirate-themed Wednesday night gala. At the gala, prepare to cast away to Neverland for a fun and exciting night of pirate shenanigans. While there won't be any time-hungry crocodiles, looting, or pillaging at this year's gala, we hope you all join us in your finest pirate regalia from the period of your choice for a night of music, dancing, and the finest rum a pirate could want.

All of us in the FACSS organization would like to thank each and every one of you for contributing, whether virtually and in person, to this year's meeting. In addition, I personally would like to thank all of the SciX officers, FACSS executive team members, and the staff at the Talley Management Group for the countless hours they put into planning this year's meeting. Especially in light of the uncertainties of the past 18 months.

As we like to say, SciX is the "Right Size, Right Science, Right Conference." We hope that all of you enjoy this year's mix of scientific programming, short courses, cutting-edge technical exhibits, and career-building networking opportunities.

Robert V. Chimenti  
SciX2021 General Chair



**SciX 2021 General Chair**  
Robert Chimenti  
Rowan University



**SciX 2021 Program Chair**  
Jean-François Masson  
Université de Montréal



**SciX 2021 Exhibits Chair**  
Scott Rudder  
OptoSigma



**FACSS & SciX Marketing Chair**  
Karen Esmonde-White  
Kaiser Optical Systems



**SciX 2021 Workshops Chair**  
Annie Dowgiallo  
SRI International



**SciX 2021 Local Chair**  
Jason Dwyer  
University of Rhode Island



**SciX 2021 Awards Chair**  
Robert Lascola  
Savannah River National Laboratory



## FACSS Member Organizations

American Chemical Society Division of Analytical Chemistry  
 AES Electrophoresis Society  
 ANACHEM  
 Austrian Society of Analytical Chemistry  
 CLIRSPEC  
 The Coblentz Society  
 Council for Near Infrared Spectroscopy

Infrared and Raman Discussion Group  
 International Society of Automation - Analysis Division  
 North American Society for Laser-Induced Breakdown Spectroscopy  
 Royal Society of Chemistry Analytical Division  
 Society for Applied Spectroscopy  
 Society for Archaeological Sciences  
 Spectroscopical Society of Japan

## 2021 FACSS Executive Committee



**Governing Board Chair:** Chris Palmer  
*University of Montana*

**Governing Board Chair Elect:** Mike Carrabba, *Droplet Measurement Technologies*

**Past Governing Board Chair:** Fred LaPlant, *3M Corporate Research Analytical Laboratory*

**Secretary:** Gary Brewer, *ISA Analysis Division*

**Treasurer:** Ian Lewis, *Kaiser Optical Systems*

**Marketing Chair:** Karen Esmonde-White, *Kaiser Optical Systems*

## SciX 2021 Section Chairs

### 2021 AWARDS CHAIR and 2022 PROGRAM CHAIR

Robert Lascola  
 Savannah River National  
 Laboratory

### AES ELECTROPHORESIS

Lisa Holland  
 West Virginia University

Sue Lunte

University of Kansas

### ART & ARCHAEOLOGY

Andrew Zipkin  
 Arizona State University

### ATOMIC SPECTROSCOPY

Derrick Quarles Jr.  
 Elemental Scientific

Benjamin Manard

Oak Ridge National Laboratory

### BIOMEDICAL & BIOANALYTICAL

Karen Esmonde-White  
 Kaiser Optical Systems

Juergen Popp

Leibniz Institute of Photonic  
 Technology e.V. Jena

Fay Nicolson

Dana-Farber Cancer Institute &  
 Harvard Medical School

### CHEMOMETRICS

Peter Harrington  
 Ohio University

### CONTEMPORARY ISSUES IN ANALYTICAL SCIENCE & EARLY CAREER RESEARCHERS

Karen Esmonde-White  
 Kaiser Optical Systems

Rebecca Airmet  
 Airmet Editing

### MASS SPECTROMETRY

Kaveh Jorabchi  
 Georgetown University

### MOLECULAR

Curt Marcott  
 Light Light Solutions

Michael George  
 University of Nottingham

Bernhard Lendl  
 Technische Universität Wien

### NASLIBS

Francois Doucet  
 EMISSION

Alessandro De Giacomo  
 University of Bari

### PHARMACEUTICAL ANALYSIS

John Wasyluk  
 Bristol-Myers Squibb

Katherine Hollywood  
 Manchester Synthetic Biology  
 Research Centre, SYNBIOCHEM

### PROCESS ANALYTICAL

Xiaoyun (Shawn) Chen  
 Dow Chemical

Edita Botonjic-Sehic  
 PALL Corporation

### RAMAN

Duncan Graham  
 University of Strathclyde

Ian Lewis  
 Kaiser Optical Systems

Pavel Matousek  
 Rutherford Appleton Laboratory

### SECURITY AND FORENSICS

Robert Lascola  
 Savannah River National  
 Laboratory

Betsy Jean Yakes  
 U.S. Food and Drug  
 Administration

### SPECIAL SESSIONS

Jean-Francois Masson  
 University of Montreal

### SPSJ - SPECTROSCOPICAL SOCIETY OF JAPAN

Yukihiro Ozaki  
 Kwansei Gakuin University

### SURFACE PLASMON RESONANCE

Amanda Haes  
 University of Iowa

Emilie Ringe  
 University of Cambridge

*Thank you to all of our section  
 chairs and session chairs for all  
 of their work, particularly in the  
 face of so many unknowns due to  
 the ongoing impact of the  
 COVID-19 pandemic. Your  
 efforts are appreciated*

## GENERAL INFORMATION

**LOCATION** of all plenaries, symposia, workshops/short courses, and exhibits is the Rhode Island Convention Center.

**CONFERENCE REGISTRATION / INFORMATION DESK** is located on the 3<sup>rd</sup> floor outside the exhibit hall.

Sunday	3:00 pm – 8:00 pm
Monday	8:00 am – 6:30 pm
Tuesday, Wednesday, Thursday	8:00 am – 5:00 pm

**INTERNET ACCESS** is available in all meeting areas. Verify connectivity details at the registration desk.

**PRESENTERS** should check the interactive online program to verify the schedule of your talk or poster. Bring your slides to your session room on a USB flash drive 30 minutes prior to the **session** start. Format should be PowerPoint to run on a PC with Windows 10/MS Office 2016 and slide resolution should be 16:9. Speakers may NOT present from their own laptop. See the registration desk if you need to preview your slides.

**ORAL SYMPOSIA** are scheduled Monday through Thursday.

Morning Session	8:30 am – 10:10 am
Early Afternoon Session	1:30 pm – 3:10 pm
Late Afternoon Session	3:50 pm – 5:30 pm

### POSTER SESSIONS

**Sunday, Ballroom A (5<sup>th</sup> Floor)**

7:15 – 9:15 pm SAS Student Poster Session

Poster set up 5:30 – 6:00 pm, remove at 9:00 pm

*For SciX poster sessions: Poster presenters are required to attend their poster at BOTH the morning and afternoon sessions on their designated days. This will extend the time for discussion and judging for student awards.*

Posters must remain up all day on your designated day - early removal is not permitted. Posters not removed by 4 pm will be placed at the registration desk and discarded if not claimed by the end of the conference.

**Please check the interactive online program for final poster hours and poster numbers.**

**SHORT COURSES / WORKSHOPS** offer a variety of introductory and fundamental topics. Onsite registration is available at the registration desk – space permitting. Deeply discounted rates available for students. See the interactive online program for all course offerings.

**EXHIBITS** information is available on page 8. Hours are:

Monday (Opening Reception)	5:30 pm – 7:30 pm
Tuesday	10:00 am – 4:30 pm
Wednesday	10:00 am – 4:30 pm

### EXHIBITOR TECHNOLOGY & PRODUCT ORAL SESSIONS

Tuesday, 2:30 pm – 3:30 pm, *Exhibit Hall D*

**LUNCH** is on-own on Monday – Thursday from 12:00 pm – 1:30 pm. There will be concession stands in the exhibit hall on Tuesday and Wednesday with lunch available for purchase.

**BREAKS** coincide with coffee breaks and poster viewing sessions.

Monday breaks, *Ballroom A*

8:00 am – 8:30 am, 10:10 am – 10:45 am, 3:10 pm – 3:50 pm

Tuesday and Wednesday breaks, *Exhibit Hall C*

8:00 am – 8:30 am, 10:10 am – 10:45 am, 3:10 pm – 3:50 pm

Thursday breaks, *Ballroom A*

8:00 am – 8:30 am, 10:10 am – 10:45 am, 3:10 pm – 3:50 pm

**COMPANION REGISTRATION** includes the Sunday Evening Welcome Mixer, Monday Exhibit Hall Opening Reception, and Wednesday Night event. Cost is \$125 and companions may be added at registration.

**SPECIAL EVENTS** included with registration (badge required for all events).

**Welcome Mixer and SAS Sponsored Student Poster Session**

*Sunday, 7:15 pm, Ballroom A (5<sup>th</sup> Floor)*

**Exhibit Opening and Reception**

*Monday, 5:30 pm, Exhibit Hall C (3<sup>rd</sup> Floor)*

**SciX 2021 Gala**

*Wednesday, 6:30 pm, Ballroom A (5<sup>th</sup> Floor)*

*Ahoy ye mateys for a pirate-themed party!*

**INTERACTIVE ONLINE PROGRAM** includes the most current program information and is updated as changes happen. Scan below; see the registration desk if you need help logging in.



## CONFERENCE CODE OF CONDUCT

The Federation of Analytical Chemistry and Spectroscopy Societies (FACSS) and the SciX Conference organizers are dedicated to providing a professional, pleasant and harassment-free conference experience for everyone, regardless of gender, gender identity, gender expression, sexual orientation, disability, physical appearance, race, ethnicity, nationality, age, religion or any other basis prohibited by law. We do not tolerate unprofessional behavior or harassment of conference participants in any form. Language or behavior that is offensive or unwelcoming to others is not appropriate at any FACSS-sponsored event. Disruptive or unprofessional behavior, including talking, use of cell phones, and unsanctioned photography/video/screen recording or any other form of digital capture is not permitted in any sessions or anywhere in a virtual conference interface. Conference participants violating these rules may be sanctioned or expelled from the conference without a refund at the discretion of the conference organizers.

### General:

- An official name badge must be visible at all times.
- No smoking, including the use of e-cigarettes, in any conference areas.
- Participants at FACSS or SciX networking events where alcoholic beverages are served must drink responsibly.
- Participants must not be under the influence of illegal drugs or other unauthorized, mind-altering or intoxicating substances while attending FACSS or SciX events. This policy does not prohibit the possession and proper use of lawfully prescribed drugs taken in accordance with the prescription.
- No advertising materials or organized marketing efforts are permitted outside of the Exhibit Hall without the express authorization of the conference management, Exhibits Chair or Workshops Chair. Only official exhibitors may display in the Exhibit Hall. No instrument demonstrations or distribution of any type of literature outside the Exhibit Hall without the express authorization of the conference management, Exhibits Chair or Workshops Chair.
- In virtual settings where participants have a platform to be heard and/or seen by other attendees, advertising and organized marketing efforts are prohibited unless arranged and/or authorized by conference management, Exhibits Chair or Workshops Chair.
- No touching/opening/reverse engineering of exhibitor equipment without their express permission.
- No unauthorized removal of exhibitors' materials or promotional items from the exhibit hall.

### While in oral or poster sessions and award ceremonies:

- All devices including cell phones must be silenced.
- Do not talk or otherwise interrupt the presenter.
- Do not take photographs or videos of PowerPoint presentations or posters, or use screen recording or any other form of digital capture.
- Do not distribute product literature or literature promoting other conferences.
- Do not demonstrate products (by presenters or attendees).
- Do not use powered or operational instruments.
- Do not use compressed gases or flammable/toxic chemicals.

### Expected Behavior throughout the Conference:

- Respectfulness and consideration of others and of the facilities

### Unacceptable Behavior:

- Physical or verbal abuse of anyone attending or involved with the conference
- Harassment, intimidation or discrimination in any form; Examples of harassment are provided below

### *Harassment includes, but is not limited to:*

- Unwelcome or inappropriate verbal comments related to gender, gender identity and expression, sexual orientation, disability, physical appearance, race, age, or religion
- Sexual images in public spaces
- Deliberate intimidation, stalking, or following
- Unwelcome photography or recording
- Sustained disruption of talks or other events
- Inappropriate physical contact
- Unwelcome sexual attention
- Advocating for, or encouraging, any of the above behavior

Exhibitors, sponsor or vendor booths, or similar activities are also held to the community standards described in this Code of Conduct. In particular, exhibitors should not use sexualized images, activities, or other material.

### Enforcement

Participants must follow this Code of Conduct at all physical and virtual conference venues and conference-related social activities. Participants asked to stop any behavior in violation of this Code of Conduct must comply immediately. If a participant engages in behavior in violation of this Code of Conduct, conference organizers retain the right to take any actions to keep the event a professional and welcoming environment for all participants. This includes warning the offender or expulsion of the offender from the conference without a refund. Conference organizers may take action to redress anything designed to, or with the clear impact of, disrupting an event or making the environment hostile for any participants.

### Reporting

FACSS/SciX are actively engaging in developing guidance for leadership, volunteers and staff to help monitor for behavior in violation of this code of conduct and to intervene as appropriate. That said, there must also be a mechanism for attendees to report such behavior. If you experience or observe unprofessional conduct, harassment, or other Code of Conduct violations, please report it as soon as possible. Make a report during regular conference and event hours – (CONTINUED ON NEXT PAGE)



- In person: Contact a volunteer in t-shirt or leaders and staff with ribbons on badges.
- Via email: [report@scixconference.org](mailto:report@scixconference.org)
- Voice or Text: +1 (856) 494-6418

To ensure your report is managed properly, volunteers and staff will alert the FACSS Governing Board Chair and the FACSS Account Executive (or their designees), who will arrange to receive the details of your report in a safe environment where you cannot be overheard. Once safe, you will be asked to state what happened. This can be upsetting, but will be handled as respectfully as possible, and you may bring someone to support you. You won't be asked to confront anyone, and no one will be told who you are. The FACSS/SciX team can help you contact hotel/venue security, local law enforcement, or local support services; provide escorts; or otherwise assist you to feel safe for the duration of the conference. If you are not comfortable reporting, anonymous reporting is also possible. While this

limits our ability to follow-up, we still encourage anonymous reporting over not reporting an issue at all.

### Emergency Contacts

If you feel you are in danger, observe someone else or are yourself considering harm to yourself or someone else, or if it is after hours and you do not receive a response via one of the reporting mechanisms above, you should contact local law enforcement, hotel or event center security, local hotlines, or emergency services as appropriate. FACSS/SciX officers and staff are not available at all hours and are not equipped or trained to respond to emergencies or situations involving violence or other physical altercations.

- Emergencies: 9-1-1
- National Domestic Violence Hotline: 1 (800) 799-7233
- National Suicide Prevention Lifeline: 1 (800) 273-8255
- Crisistextline.org: Text HOME to 741741

## COVID-19 PRECAUTIONS

All attendees are bound by the FACSS SciX Terms of Attendance and Code of Conduct (available at [scixconference.org](http://scixconference.org)) to adhere to the following policies. Please act responsibly!



**Masks are required at all times** in all SciX and SciX-sponsored events where a SciX badge is required. At events where food and beverages are served, masks may only be removed while actively eating and drinking.



Please remember to wash your hands frequently with soap and water. Keep your distance from other attendees. Limit hand-shakes and hugging to reduce possible transmission.



If you experience any symptoms of COVID-19 (cough, fever, shortness of breath, sudden loss of smell or taste, other flu-like symptoms) and you feel it is an emergency situation, call 9-1-1. In a non-emergency situation, exit the RICC, return to your hotel room and contact the hotel front desk to connect with a local healthcare provider before attempting to seek treatment or testing.



For individuals seeking testing (e.g. after a known exposure, before leaving Providence), there is a free testing site attached to the RICC.

**Ticket Booth**  
1 Sabin Street  
Providence, RI

**Hours of Operation:**  
Monday–Friday 9AM-5PM  
Saturday–Sunday 9AM-3PM

**PLEASE BE SMART AT SCIX TO RETURN HOME  
SAFELY TO YOUR FAMILY AND FRIENDS**

## PROGRAM SPONSORS

### CHAMPION

#### **Agilent Technologies**

*Supported Sections: Atomic, Forensics, Raman*

#### **Bristol-Myers Squibb**

*Supported Section: Pharmaceutical Analysis*

#### **Kerith Foundation**

*Supported Sections: All*

### ADVOCATE

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*Supported Sections: Atomic, Chemometrics, Mass Spectrometry*

#### **Royal Society of Chemistry**

*Supported Section: Awards*

#### **TOFWERK**

*Supported Section: Atomic*

#### **Wasatch Photonics**

*Supported Sections: Biomedical & Bioanalytical, Forensics, Raman*

### FRIEND

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*Burgener Research, Inc. – Atomic*

*Elsevier – Forensics*

*IRsweep – Pharmaceutical Analysis*

*Nu Instruments – Atomic*

*Photothermal Spectroscopy Corp – Molecular/IR*

*RedWave – Chemometrics*

*RSC Analyst - Raman*

*RSC JAAS – Atomic, LIBS*

*Sartorius – Pharmaceutical Analysis*

*SciAps, Inc. – Art & Archaeology*

*Si-Ware – Forensics*

*Society for Applied Spectroscopy – Chemometrics*

*Society for Archaeological Sciences – Art &*

*Archaeology The Family of Theodore C. Rains – Atomic*

*Thermo Fisher Scientific – Atomic*

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## MEDIA PARTNERS

The Analytical Scientist  
Applied Spectroscopy  
BioPhotonics, A Photonics Media Publication  
European Pharmaceutical Review  
ICP Winter Conference  
Laser Focus World  
Pittcon  
Spectroscopy Magazine



## SOCIETY AND COMMITTEE MEETINGS

### FACSS/SciX

#### ALL FACSS/SciX EVENTS HELD IN RICC ROOM 557

**Sunday, September 26**

1:00 pm - 3:00 pm  
3:00 pm - 5:00 pm  
5:00 pm - 6:15 pm

FACSS Long Range Planning Meeting (Federation)  
SciX Long Range Planning Meeting (Conference)  
SciX 2022 Northern Kentucky: Budget/General Planning

**Tuesday, September 28**

12:15 pm - 1:30 pm

SciX 2022 Northern Kentucky: Program Planning Meeting

**Wednesday, September 29**

12:00 pm - 1:30 pm  
3:00 pm - 4:00 pm

SciX 2023 Sparks General Planning  
FACSS Budget Committee and Finance Committee

**Thursday, September 30**

7:00 am - 9:00 am  
12:00 pm - 2:00 pm  
6:30 pm

Executive Committee Meeting (*for the Executive Committee only*)  
Governing Board Meeting (lunch will be provided)  
Governing Board Chair Reception (delegates and invitees)

### COBLENTZ SOCIETY

**Monday, September 27**

7:00 am - 9:00 am

Coblentz Annual Member Meeting and Breakfast, *Omni Hotel, Narragansett Ballroom A*

### SOCIETY FOR APPLIED SPECTROSCOPY

**Sunday, September 26**

7:15 pm - 9:15 pm

SAS Student Poster Session, *Ballroom A (5<sup>th</sup> floor, RICC)*

**Monday, September 27**

9:00 am - 11:00 am  
8:00 pm

SAS Membership/Marketing Committee, *Omni Hotel, Waterplace Ballroom II*  
Student Event, *Union Station Brewery (off-site)*

**Tuesday, September 28**

7:00 pm - 8:00 pm  
8:00 pm

SAS Award Presentations, *Ballroom B-C (5<sup>th</sup> floor, RICC)*  
SAS Members' Wine and Cheese Reception, *Ballroom A (5<sup>th</sup> floor, RICC)*

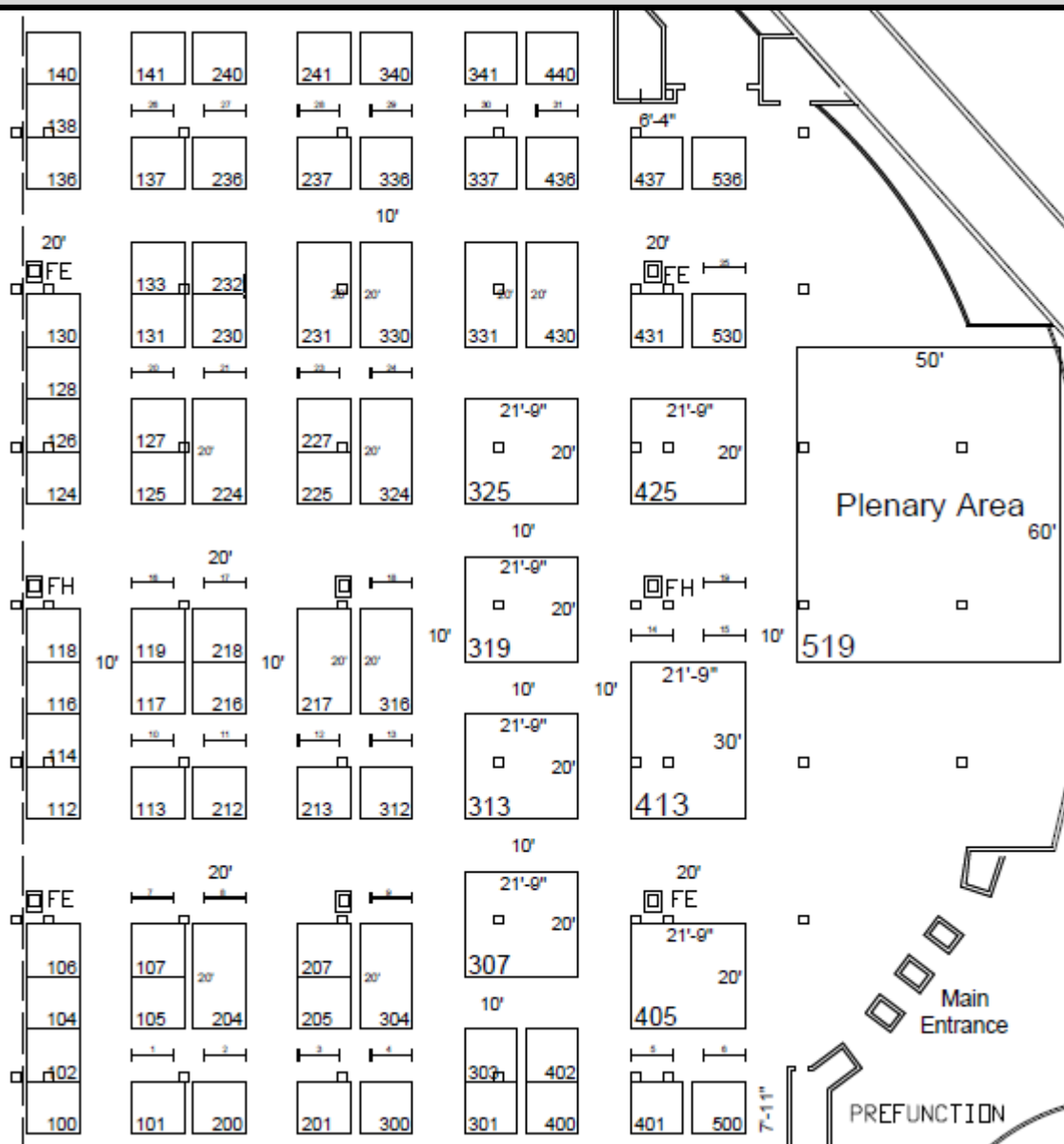
### NASLIBS

**Monday, September 27**

5:30 pm - 7:30 pm

NASLIBS Board Meeting, *Meeting Room 557 RICC*

# EXHIBITORS



Check out the interactive online program for full company details

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## FACSS THOMAS B. HIRSCHFELD SCHOLAR AWARD

*The FACSS Thomas B. Hirschfeld Scholar Award recognizes students who best exemplify the extraordinary creativity of the award's namesake, and the recipients and their work will be seen as potentially defining the future practice of analytical chemistry. There are two recipients in 2021.*



### Grant Myres

Grant J. Myres is a fifth-year graduate student at the University of Utah. Grant earned a B.A. in chemistry from Luther College in 2017. In his undergraduate research under the direction of Olga Michels, Grant studied the effects of chemical modifications to photosensitizer scaffolds and the impact of these modifications on the association affinity with human serum albumin (HSA) using fluorescence spectroscopy. Following graduation, Grant moved out west to pursue a Ph.D in analytical chemistry in the lab of Joel M. Harris at the University of Utah. Grant's research interests are focused on the development and applications of Raman spectroscopy to investigate and quantify biomolecular recognition interactions at solid/liquid interfaces.

In Grant's thesis research, he has developed a quantitative, label-free, and structurally informative heterogeneous assay using confocal-Raman microscopy to probe reactions of DNA immobilized on the interior surfaces of individual porous silica particles. This development has enabled the quantitative detection of differences in target strand length, base-content, and conformation. This methodology has also revealed cation-dependent changes in interfacial DNA aptamer structure, which has implications in providing fundamental insight into the chemistry that governs the response of DNA aptamer-based biosensors. Grant's future research involves investigating the association of small-molecule therapeutics with immobilized duplex-DNA and characterizing both association affinities and primary sequence-specificity while simultaneously gaining insight into how the association reactions modulate both small-molecule and DNA structural conformations.

Grant currently has 2 publications and has presented his work at 7 national conferences and 2 invited seminars. Since starting graduate school, Grant has won several awards for both research and teaching: University of Utah Teaching Assistant of the Semester Award (2019), Society of Applied Spectroscopy Student Poster Award (2019, 2020), and a FACSS Student Poster Award (2019).



### Nicolás Morato

Nicolás Morato is a Ph.D. candidate in Analytical Chemistry at Purdue University under the mentorship of Prof. R. Graham Cooks. Nicolás was born in Bogotá, Colombia, where he attended Universidad de los Andes and obtained two bachelor's degrees, one in Chemistry (2017) and one in Industrial Engineering (2018), with cum laude and summa cum laude distinctions, respectively. During his undergraduate studies he worked under the supervision of Prof. Chiara Carrazzone investigating the intra-species variation in the venoms and alkaloid extracts of several Colombian specimens, and with Prof. Ivan Mura on the stochastic modelling of biochemical processes. Before starting his graduate career, Nicolás was a Summer Undergraduate Fellow at Purdue University (2017) working with Prof. Jonathan Wilker on the characterization of oyster adhesive, as

well as an Instructor (2018) in the Department of Chemistry at Universidad de los Andes.

During his graduate studies, Nicolás' research has focused on the development of ambient ionization methods for the rapid and simple analysis of complex samples, avoiding sample preparation and separation steps which are commonplace in chemical analysis. His initial efforts were oriented towards forensic applications such as in situ drug testing, whereas his current research is mostly related to high throughput analysis utilizing desorption electrospray ionization (DESI). Some of his work in the latter area has involved the development of label-free quantitative enzymatic assays, the rapid profiling of microorganisms, and the screening of organic reactions to study catalysis and microdroplet phenomena. Nicolás' work has resulted in more than 10 peer-reviewed publications and several honors including the Charles H. Viol Memorial Fellowship, the Eastman Summer Fellowship in Analytical Chemistry, and the ACS Division of Analytical Chemistry Graduate Fellowship.



## FACSS STUDENT AWARD

*The prestigious FACSS Student Award is given to the student who has furthered the state-of-the-art in their chosen field(s) and in so doing, advanced the understanding of important scientific or societal questions. The recipient will have a strong research record and be identifiable as an emerging leader in analytical chemistry.*

### Vanessa Cupil-Garcia



Vanessa Cupil-Garcia is a 4th year Ph.D. Candidate in Dr. Tuan Vo-Dinh's Group in the Department of Chemistry at Duke University. She was born in Tabasco, Mexico and came to the United States as a child. She graduated summa cum laude from Meredith College with degrees in chemistry and biology and an international studies minor. The Golden Door Scholars Program funded her undergraduate studies. She conducted a summer of research at the Georgia Institute of Technology under Dr. Stefan France where she synthesized indole carboxylates and worked on the carbon hydrogen functionalization of naphthalene diimide. She also worked at the Oregon Health and Science University (OHSU) on quantifying the genetic variability in mitochondrial supercomplexes in D2 and B6 mice strains in Dr. Kari Buck's laboratory. Her research at Duke University under the guidance of Dr. Vo-Dinh focuses on integrating nanotechnology and chemistry to

develop diagnostic and therapeutic tools. She is currently synthesizing inorganic and organic nanomaterials for the treatment of cancers combined with immune checkpoint inhibitor drugs. She is also adapting inverse molecular sentinel sensors (iMS) for microRNA detection in plants for bioenergy purposes. During her time at Duke she has received the Kathleen Zielek Fellowship, the Duke Nanoscience Program Fellowship, and the Fitzpatrick Foundation Scholar. Her work has resulted in multiple peer-reviewed publications that she has presented at various local and national conferences.

She also mentors Latinx students as they pursue higher education and values scientific outreach. She has spearheaded multiple in person outreach programs, and during the pandemic helped move forward two projects enabling virtual outreach and take-home STEM kits. In her role as a volunteer with Siembra NC, she schedules COVID-19 vaccine appointments for non-English speakers.

## FACSS STUDENT AND TOMAS HIRSCHFELD SCHOLAR AWARDS CALL FOR 2022 APPLICATIONS

FACSS is proud to support the development of the next generation of leaders in analytical science. Pre-doctoral students presenting at the conference are encouraged to submit applications for the FACSS Student Award and the Tomas Hirschfeld Scholar Award. Both awards recognize research excellence but highlight the different ways that this may be achieved. Recipients receive complimentary registration and financial support to attend the SciX conference.

**Look for information online in January 2022 at [scixconference.org](https://scixconference.org).** To be considered for either award, students must submit an abstract for oral presentation at SciX (submission opens later winter/early spring 2022), then submit the following as a single PDF file:

- The application form (please check back in early 2022 for next year's application form)
- Two letters of nomination, including one by the student's mentor
- A copy of the candidate's résumé
- A copy of the candidate's graduate transcript
- Copies of reprints and/or preprints of research accomplished

## FACSS INNOVATION AWARD

The FACSS Innovation Award is given to the most innovative and outstanding new research advancements debuted orally at the SciX Conference. All program areas are included. Only research findings presented for the first time in the public domain qualify for entry. Work based on submitted papers not yet published electronically or in print at the time of abstract submission also qualifies. All attendees are eligible for the award irrespective of educational level or professional vocation. Papers submitted for SciX will be considered for these awards – authors indicate during the submission process that they wish to be considered. Finalists present at the SciX conference in an exclusive plenary session on Thursday afternoon, with the award winner(s) selected and announced on Friday morning to conclude SciX 2021.

### 2021 FACSS INNOVATION AWARD SYMPOSIUM

Thursday | 3:50pm – 5:20pm | Ballroom B/C (5th Floor, RICC)

*Talks are 20 minutes each with 10 minutes immediately following for Q&A*

- |         |   |
|---------|---|
| 3:40 PM | Presentation of the FACSS Distinguished Service Award   |
| 3:50 PM | <b>EASI: A New Paradigm for Mass Spectral Identifications</b><br><u>Glen Jackson</u> <sup>1</sup> , Samantha Mehnert, J. Tyler Davidson <sup>3</sup> , <sup>1</sup> <i>West Virginia University</i>   |
| 4:20 PM | <b>Ultra-high-throughput LIBS analysis of PGE-bearing drill cores</b><br><u>Marie-Chloé Michaud Paradi</u> <sup>1</sup> , François Doucet <sup>2</sup> ; Kheireddine Rifai <sup>3</sup> , Lütü Özcan <sup>4</sup> , François Vidal <sup>5</sup> , <sup>1</sup> <i>Université de Montréal</i> , <sup>2</sup> <i>ELEMISSION inc.</i> , <sup>3</sup> <i>ELEMISSION inc.</i> , <sup>4</sup> <i>ELEMISSION inc.</i> , <sup>5</sup> <i>ELEMISSION inc.</i>      |
| 4:50 PM | <b>On-the-fly Raman image microscopy by reinforcement machine learning</b><br><u>Tamiki Komatsuzaki</u> <sup>1</sup> , Koji Tabata <sup>2</sup> ; Hiroyuki Kawagoe <sup>3</sup> , James Nicholas Taylor <sup>4</sup> , Kentaro Mochizuki <sup>5</sup> , Jean-Emmanuel Clement, Yasuaki Kumamoto <sup>7</sup> , Atsuyoshi Nakamura <sup>8</sup> , Yoshinori Harada <sup>9</sup> , Katsumasa Fujita <sup>10</sup> , <sup>1</sup> <i>Hokkaido University</i> |
| 5:20 PM | SESSION CONCLUDES   |

## FACSS CHARLES MANN AWARD

*For achievements in the field of Applied Raman Spectroscopy*



**Roy Goodacre**

Roy is Professor of Biological Chemistry in the Department of Biochemistry and Systems Biology within the Institute of Systems, Molecular and Integrative Biology (ISMIB) at the University of Liverpool. He is the Chair of the Institute's Research and Impact Committee, Deputy Head of Department, and also a co-director of the Centre for Metabolomics Research.

A long-term UV Raman spectrometer failure led to a change of direction in Roy's Raman research and in 2004 his group showed for the first time that surface enhanced Raman scattering (SERS) could be developed for robust bacterial identification (paper). This led to a series of studies in that area and his group went on to show that quantitative analysis with SERS is possible only when correct experimental design is used along with the application of appropriate multivariate chemometrics. Other Raman strands included online monitoring of microbial fermentations, microbial metabolism and understanding microbiome structure, fidelity in protein biopharmaceuticals within process analytical technology, as well as handheld Raman and SORS for onsite food security analysis. In 2019 he spent the summer in the Australian Outback measuring pigments from Aboriginal Rock Art.

Roy is a Founder and currently a Director of the Metabolomics Society (2005–15; 2020–22) and a Director of the Metabolic Profiling Forum. Finally, he's a committee member of Royal Society of Chemistry's Analytical Division Council (ADC) and is a Trustee of the Analytical Chemistry Trust Fund.

## FACSS DISTINGUISHED SERVICE AWARD

*For exceptional, long-term service to the FACSS organization and the SciX Conference*



**Doug Gilman**

Doug Gilman attended his first FACSS Conference in 1992 in Philadelphia and gave his first oral presentation at a scientific conference as a Ph.D. student at FACSS 1993 in Detroit. Mike Carrabba and Mark Hayes recruited Doug for his first volunteer assignment at FACSS 2000 in Nashville – presiding at a session called “Chemical Speciation”. Attending FACSS, presenting at FACSS, and volunteering at FACSS escalated from there. Doug was Program Chair at FACSS 2006 at Disney World. He agrees with other FACSS veterans who state that this is the most demanding job at FACSS and the job most central to the conference. During the 3-year span of the 1-year Program Chair job, he was present for early discussions about renaming and rebranding the FACSS Conference. In 2008, Doug was asked if he would agree to run for Governing Board Chair. What he didn’t know

was the 1-year term had been increased to 2 years. A 1-year term that actually lasted 4 years had expanded to 8 years. Doug was Governing Board Chair for FACSS 2010 in Raleigh and for the 2011 Reno meeting where the FACSS Conference was rebranded as SCiX. In addition to helping shepherd the complex rebranding effort, Doug was “in the room” when the FACSS Innovation Awards and the closing Friday morning session were created. After over 15 years of nearly continuous and always rewarding service to FACSS, Doug’s behind the scenes involvement wound down. After completing his Ph.D. in Chemistry at Penn State (sitting next to Mark Hayes) and a postdoc, Doug was a faculty member at the Tennessee and LSU for 24 years. In 2021, Doug left “professoring” and moved to Charlotte, NC, when his better half, Indu Kheterpal (also an analytical chemist), started a new role there. He is spending his turn as the trailing spouse putting both his academic and FACSS experience to good use, writing grants at a nonprofit in Charlotte called Camino. Doug and Indu’s two children, Rohin and Priya are in college at LSU and Alabama, respectively.



**Greg Klunder**

Greg Klunder is currently a staff scientist working in the Forensics Science Center at Lawrence Livermore National Laboratory. As a grad student working for Charles Boss at North Carolina State University, Greg attended his first FACSS in 1988 in Boston. Through the networking opportunities at FACSS, he met Rick Russo who offered him a post-doc opportunity at the Lawrence Berkeley Laboratory in California. He then moved to LLNL where he has since been working in the Forensic Science Center and working with other programs at the Laboratory. His research has spanned numerous analytical disciplines including laser spectroscopy, atomic spectroscopy, separations, mass spectrometry, and VisNIR, FTIR and Raman spectroscopy.

Greg has served FACSS/SciX in several capacities over the years.

- Forensics Section Chair (2004, 2011-2019)
- Atomic Spectroscopy Section Chair (2008)
- FACSS Awards chair (2007 Memphis)
- FACSS Program Chair (2008 Reno)
- FACSS Past Program Chair (2009 Louisville)
- FACSS General Chair (2011 Reno)
- FACSS Governing Board Chair Elect Elect (2011)
- FACSS Governing Board Chair Elect (2012-2013)
- FACSS Governing Board Chair (2014-2015)
- FACSS Past Governing Board Chair (2016-2017)
- FACSS Past Past Governing Board Chair (2018-2019)

In addition to these roles, he’s also served on the Executive Committee, as a poster judge, member of the long-range planning and budget committees. As an avid cyclist, he also started the pre-SciX bike rides which provides a fun healthy networking event prior to the conference and will hopefully resume next year.



## SOCIETY FOR APPLIED SPECTROSCOPY AWARDS

### SAS BARBARA STULL GRADUATE STUDENT AWARD

*Recognizing graduate students for outstanding research in spectroscopy.  
Presented in honor and memory of longtime SAS staff member and colleague Barbara L. Stull.*



#### **Jeremy Schultz**

*Recognizing outstanding research efforts around chemically imaging single molecules using tip-enhanced Raman spectroscopy (TERS).*

Jeremy Schultz is a PhD student in Chemistry at the University of Illinois at Chicago. He received his Bachelor of Arts in Chemistry from Northwestern University in 2014, where he was fortunate to take a course taught by Prof. Richard Van Duyne, who discovered surface-enhanced Raman spectroscopy. The ability to obtain Raman spectra of a single molecule fascinated him, as this represents the potential to study chemistry and nanostructures at the spatial limit, that of one individual species. As a result, following two years working as an analytical chemist in industry, he began his PhD studies with Asst. Prof. Nan Jiang. His work involves the development and application of a cryogenic ultrahigh vacuum scanning tunneling microscope coupled with tip-enhanced Raman spectroscopy (TERS).

Jeremy uses this unique tandem technique to perform simultaneous nanoimaging and nanospectroscopy to study molecules, nanostructures, and low-dimensional materials on surfaces with supreme spatial resolution, the ångström-scale. This work has resulted in five first author and twelve total publications. His work has been recognized by awards in different scientific communities. He received the Wayne B. Nottingham Prize in the 81<sup>st</sup> Physical Electronics Conference 2021 and also received a Graduate Research Award from the American Vacuum Society (AVS) and the Nanometer-scale Science and Technology Division Graduate Student Award at the AVS 66<sup>th</sup> International Symposium and Exhibition along with others. He received a Best Poster Award at the 26<sup>th</sup> International Conference on Raman Spectroscopy in 2018 in Jeju, Korea. He recently published a review in *Applied Spectroscopy* that examines the development and growing applications of TERS.

### SAS ATOMIC TECHNICAL SECTION STUDENT AWARDS

*Recognizing outstanding student research in the area of Atomic Spectroscopy*



#### **Kevin Finch**

Kevin Finch is a current 4<sup>th</sup> year Ph.D. candidate at Texas Tech University (TTU) studying under the guidance of Prof. Dr. Gerardo Gamez. Prior to attending graduate school, he earned a dual major B.Sc. degree at Western New Mexico University in Silver City, NM, USA where he graduated cum laude with honors in Chemistry and Applied Mathematics. During this time, he performed proteomic research on tarantula hawk-wasp venom using novel mass spectrometry techniques with Prof. Dr. Shawn White and collaborated with Prof. Dr. Jennifer Brodbelt who has a research group based at The University of Texas at Austin (UT Austin). His current research involves laser scattering and optical emission spectroscopy diagnostics to elucidate the fundamental parameters of various chemical analysis plasmas (e.g. glow discharge, dielectric barrier discharge, etc.) under several common operating conditions. One of the achievements he is most proud of is the design, construction, and characterization of a novel transmission-type triple grating spectrograph to allow for the improved diagnostics of low-density plasmas, as are commonly used for chemical analysis. His research has resulted in 6 peer-reviewed publications (2 first-author and 4 co-author) along with a pair of 2nd-place poster awards (one in the atomic spectroscopy poster section at SciX in 2019 and the other in the analytical chemistry poster division at TTU in 2020). He was also recently recognized by being the 2021 recipient of the Edward Steers Bursary Award by the Association of British Spectroscopists, which provides travel funding to attend a recognized scientific meeting or visit a place of learning internationally. In addition, he has received the Ming Sun Family Graduate Research Scholarship, the Ginny Shen Lin Endowed Scholarship, and an Outstanding Teaching Assistant Award for General Chemistry, all given by the TTU Department of Chemistry and Biochemistry in 2020. Furthermore, his dedication to scientific advancement was highlighted in 2019 by being the recipient of the Love of Learning Award, given by the honor society Phi Kappa Phi. In his spare time, he enjoys hiking, backpacking, fishing, hunting, and exploring nature's beauty that is all around us.



**Sabrina Funke**

Sabrina Funke is a current third year Ph.D. candidate in Analytical Chemistry in the research group of Prof. Dr. Uwe Karst at the University of Münster, where she also earned her B.Sc. degree in 2016 and her M.Sc. degree in 2018. During her master studies, Sabrina carried out a five months research internship at the University of Technology in Sydney under the guidance of Prof. Philip Doble. Her research was directed towards sensitivity improvements in immunohistochemistry-assisted applications of laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS). In her current work, Sabrina focuses on the development and application of molecular and elemental imaging techniques. Using LA-ICP-MS, she specifically targets the investigation of gadolinium retention within healthy organisms caused by gadolinium-based MRI contrast agents. The challenging aspects of this work are the balance between spatial resolution and detection sensitivity and the performance of accurate quantification, considering extremely wide dynamic ranges in imaging techniques. To address these challenges, Sabrina's work concentrates on the hyphenation of high-resolution laser ablation with high-sensitivity mass spectrometry and approaches different ways of data processing to improve accuracy in quantitative analysis.



**Sarah Meyer**

Sarah Meyer is a third year PhD student at the University of Technology Sydney (UTS), Australia. Under the supervision of Distinguished Professor Philip Doble, she is investigating the underlying chemical principles of radioresistance in cancer cells using immuno-mass spectrometry and elemental bio imaging. Sarah completed both her bachelor's (2016) and master's degree (2018) in Chemistry at the University of Münster, Germany in the group of Professor Uwe Karst. In 2017, Sarah was a visiting researcher at UTS where she conducted fundamental research on the effect of sensitivity when downscaling liquid chromatography column dimensions for inductively coupled plasma-mass spectrometry (ICP-MS) detection. In 2019 she commenced her PhD studies at UTS and joined the "Atomic Medicine Initiative" founded by Distinguished Professor Philip Doble. Sarah is devoted to developing novel and improved methods to understand the relationship between manganese and radioresistance in cancer cells and uses antibody-nanoparticle conjugates to identify and map manganese transporters in the tumor microenvironment. Her work on providing optimized methods for the characterization of upconversion nanoparticles by single-particle (SP) ICP-MS was awarded the "paper of the month" by the Faculty of Science at UTS.



**Stefan Wagner**

Stefan Wagner is currently a research associate with the Chair of General and Analytical Chemistry at the Montanuniversität Leoben, Austria, while concomitantly finalizing his Ph.D. studies in Analytical Chemistry under the supervision of Prof. Dr. Thomas Prohaska at the University of Natural Resources and Life Sciences Vienna (BOKU), Austria. Prior to his graduate studies, Stefan received a B.Sc. (2014) and M.Sc. (2017) degree in Environmental Sciences from BOKU, both passed with distinction. During his Ph.D. studies, he has specialized in method development and validation of diffusive gradients in thin films (DGT), a gel-based passive sampling technique, in combination with laser ablation- and multi collector inductively coupled plasma mass spectrometry, as well as planar fluorescent sensors, so-called planar optodes. The combined techniques are employed for the targeted analysis of elements and isotope ratios in bioavailable fractions of nutrients and contaminants in soil, along with chemical imaging of solutes in multidisciplinary applications ranging from terrestrial biogeochemistry to materials science and biomedical research. The analytical innovativeness of his work has been recognized with two best student talk awards at the 2018 ICP-User Meeting in Berlin, Germany, and the 2019 ASAC Forum in Linz, Austria, as well as one best poster award at the 2019 European Winter Conference on Plasma Spectrochemistry in Pau, France. In 2020, Stefan was further invited to give a talk at the TrisKem International User meeting to provide his expert knowledge on the DGT technique. In the future, he plans to pursue his scientific career and therefore aims at applying for an international postdoc grant upon successful completion of his Ph.D. studies in 2021.

## SAS LESTER W. STROCK AWARD

*Established by the SAS New England section to recognize an author or authors of an outstanding paper or series of papers.*



### Uwe Karst

*Recognizing contributions to the field of analytical atomic spectrometry, research across multiple disciplines, including areas such as medical, pharmaceutical, and environmental, and 39 papers on understanding Gd-based contrast agents from both a medical and environmental aspects.*

Uwe Karst holds the Chair of Analytical Chemistry at the University of Münster, Germany, since 2005. Previously, he was appointed as Chair of Chemical Analysis at the University of Twente, The Netherlands, from 2001 until 2005. He is author of more than 350 publications in peer-reviewed scientific journals.

Uwe's research interests cover different aspects of mass spectrometry and hyphenated techniques, ranging from electrochemistry/mass spectrometry for the simulation of the oxidative metabolism of drugs to metal speciation analysis and elemental as well as molecular mass spectrometric bioimaging.

## SAS APPLIED SPECTROSCOPY WILLIAM F. MEGGERS AWARD

*Recognizing the author(s) of an outstanding paper(s) appearing in Applied Spectroscopy.  
Special thanks to Dr. Peter R. Griffiths for his generous sponsorship of the Meggers Award.*

*Presented to*

**Vartkess Ara Apkarian, Joonhee Lee, Nicholas Tallarida, and Laura Rios**  
*for*

***"The Raman Spectrum of a Single Molecule on an Electrochemically Etched Silver Tip"***  
**Applied Spectroscopy Volume 74 Issue 11 Page(s) 1414-20**

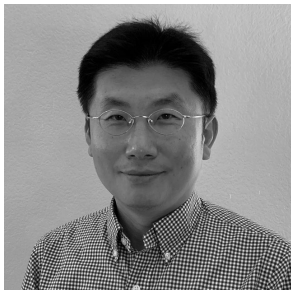
### Vartkess Ara Apkarian



V. Ara Apkarian is the Distinguished Professor of Chemical Physics at the University of California, Irvine and a Foreign Member of the National Academy of Sciences of Armenia. After obtaining BS and PhD degrees in Chemistry from USC and Northwestern, respectively, and following a postdoctoral fellowship at Cornell, he joined the Chemistry Faculty at UCI in 1983. He has served as the founding co-Director of the Chemical and Materials Physics (ChAMP) program at UCI, as Chairman of the Department of Chemistry (2004-2007), and as Director of the National Science Foundation Center for Chemistry at the Space-Time Limit (2007-2020).

His principle scientific contributions are in photophysics, ultrafast dynamics and nonlinear optics, quantum dynamics, plasmonics and spectro-microscopy. His work has appeared in ~200 peer-reviewed publications. His scholarly contributions and service have been recognized with awards, among them: Fellow of the American Physical Society (1994), the Humboldt Prize (1996), the ACS Award in Experimental Physical Chemistry (2014), and he holds an Honorary Doctorate from the University of Jyväskylä, Finland (2016).

### Joonhee Lee



Dr. Joonhee Lee obtained his PhD in surface physics at Yonsei University, Korea in 2006, and moved to the United States to start his postdoctoral research at the University of California, Irvine. He continued to work in Irvine as project scientist and assistant researcher until 2019. He has been running his own research group in the department of physics at the University of Nevada, Reno since he started as an assistant professor in August of the same year. His research focus is to combine scanning tunneling microscopy and laser spectroscopy to visualize molecular and lattice vibrations associated with important chemical reactions and emergent physical phenomena such as superconductivity.

## WILLIAM F. MEGGERS AWARD (continued)



**Laura Rios**

Laura Rios is currently an assistant professor of physics at California Polytechnic State University in San Luis Obispo CA. Laura received a B.A. in Chemistry from Oberlin College in 2012, and a Ph.D. in Chemistry from University of California, Irvine in 2017. At UC Irvine, Laura studied single molecule dynamics on surfaces using a scanning tunneling microscope in ultrahigh vacuum (UHV-STM) and Raman spectroscopy, and dabbled in computational investigations. Laura was awarded an NSF Graduate Research Fellowship during her graduate studies.

Laura went on to study physics education research (PER) in a postdoctoral appointment at the University of Colorado Boulder, focusing on assessment of lab course-specific learning goals and broadening participation of marginalized students in STEM.

In her current work, Laura combines her love of experimentation and instruments with learning science (e.g., experiential learning theory) to realign assessment structures with learning goals for upper-division physics laboratory courses. Her research builds upon a fundamental assumption that lab courses offer a unique learning environment to develop the skills for empirical inquiry, and should thus reflect the authentic practices of experimental physics.

In addition to her scholarly pursuits, Laura serves on the Executive Committee of the American Physical Society Forum on Education and the Committee on Physics in Undergraduate Education for the American Association of Physics Teachers.

In her free time, Laura enjoys the typical California fare: surfing and tacos.



**Nicholas Tallarida**

Nicholas Tallarida received his PhD in 2017 from the University of California Irvine under the guidance of Professor Ara Apkarian. During his time at UCI, he conducted research on combining optical spectroscopy techniques with scanning probe microscopy. Specifically, he focused on merging tip-enhanced Raman spectroscopy (TERS) with scanning tunneling microscopy (STM). Through the development of a TERS-optimized STM tip manufacturing approach, atomic resolution was achieved with Raman spectroscopy, enabling chemical analysis at the sub-molecular level. After finishing his PhD, he accepted a NASA Postdoctoral Fellowship at the Jet Propulsion Laboratory (JPL), working on the development of optical spectroscopy instruments, including Raman spectrometers and a flow cytometer,

for future planetary science and life-detection NASA missions. Since becoming a full-time JPL employee in 2019, he has been working on the development of various types of optical and laser spectroscopy instruments. Furthermore, he aided in the testing and validation of the PIXL instrument on NASA's Perseverance Mars rover. After the rover's successful landing in February 2021, he has been an active member of PIXL's surface operations engineering team, working to ensure the successful and safe operation of the instrument.

*Presented for the best paper published in Applied Spectroscopy in 2020 on the topic of Laser Induced Breakdown Spectroscopy.*

*Presented to*  
**Daniel Diaz, Alejandro Molino Ochoa, and David W. Hahn**  
*for*

***“Laser-Induced Breakdown Spectroscopy and Principal Component Analysis for the Classification of Spectra from Gold-Bearing Ores”***

**Applied Spectroscopy Volume 74 Issue 1 Page(s) 42-54**



**Daniel Diaz**

Daniel Diaz holds a Postdoctoral position at the Department of Aerospace and Mechanical Engineering, University of Arizona where he participates in various research efforts at the Laser-based Diagnostics Laboratory since 2020. He is a mechanical engineer from Universidad Nacional de Colombia – Sede Medellín, and obtained his Ph.D. in Engineering from the same university in 2017. Dr. Diaz did a post-doctorate between 2017 and 2020 at the Department of Mechanical and Aerospace Engineering at the University of Florida where he performed research related to laser ablation, and the analysis of solids and aerosols with laser-induced breakdown spectroscopy. His experience is in thermal sciences, materials engineering, laser-based diagnostic tools, and laboratory and industrial heating systems. Currently, he contributes to research projects related to the characterization of high-temperature environments in molten salt reactors and battery fires with laser-based diagnostic tools, as well as modeling the transport and fate of gases and aerosols. Dr. Diaz teaches undergraduate heat transfer.



**Alejandro Molino Ochoa**

Alejandro Molina is professor in Departamento de Procesos y Energía de la Facultad de Minas de la Universidad Nacional de Colombia - Sede Medellín. He is a chemical engineer from the Universidad Pontificia Bolivariana and obtained his Ph.D. in Chemical and Fuel Engineering from the University of Utah in 2002. He did a post-doctorate between 2003 and 2006 at the Combustion Research Facility at Sandia National Laboratory in Livermore, California where he conducted research related to laser diagnostics, coal combustion in oxygen-enriched environments, and glass production. In 2006 he became an associate professor at the Faculty of Mines where he is currently a tenured professor. His research areas revolve around the analysis of reactive flows using computational fluid dynamics (CFD) and laser diagnostics. He is a member of the Bioprocesses and Reactive Flows research group where he contributes to different fields of research that seek to improve the performance of the local industry. He has directed projects in the areas of oil exploration and refining, characterization of soils through laser induced breakdown spectroscopy, virtual laboratories for teaching chemical engineering, and CFD analysis applied to the improvement of industrial processes. Currently he is part of research projects related to the prevention of accidents due to fires and explosions and the optimization of plants to recycle spent lead-acid batteries. He is in charge of the undergraduate courses in Chemical Reaction Engineering and Introduction to Chemical Engineering. At graduate level he teaches different courses such as CFD, Process Intensification and Fire Dynamics.



**David Hahn**

David W. Hahn is the Craig M. Berge Dean of the College of Engineering, and Professor and Eminent Scholar at the Department of Aerospace and Mechanical Engineering, University of Arizona. He has more than two decades of experience in higher education and with national agencies and laboratories, and he is a champion of diversity in engineering. Dr. Hahn joined the University of Arizona after a 20-year career at the University of Florida, where he served most recently as chair of mechanical and aerospace engineering. Under his leadership, the university built a 4,000-square-foot student design center, his department grew to the largest on campus in terms of student enrollment, and the female student population in mechanical and aerospace engineering increased to 20%, about 50% above the national average. He was the Herbert Wertheim College of Engineering 2007-2008 Teacher/Scholar of the Year and 2009-2010 Advisor/Mentor of the Year, and he received the UF Society of Women Engineers 2016-2017 Outstanding Support of Women in Engineering Award. Dr. Hahn is a fellow of the American Society of Mechanical Engineers, the Optical Society and Society for Applied Spectroscopy. Dr. Hahn began his research career as an NRC postdoctoral associate in the electro-optics branch of the U.S. Food and Drug Administration Center for Devices and Radiological Health. He then spent four years at Sandia National Laboratories, first as a postdoctoral researcher and then as a member of the technical staff. He studied mechanical engineering at Louisiana State University, graduating with a bachelor's degree in 1986 and a doctorate in 1992. In 2014 he received the Alumni Achievement Award from his home department.

## SAS HONORARY MEMBERSHIP AWARD

*Recognizing those individuals who have made exceptional contributions to spectroscopy*



**Rina Dukor**

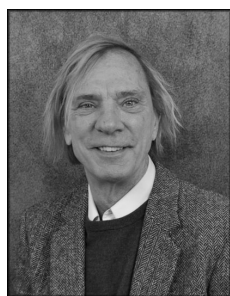
*Recognizing Dr. Rina K. Dukor for her many years advocating for Vibrational Optical Activity (VOA) and helping to take this type of spectroscopy outside of the academy and into industry as well as her creation of a successful company, BioTools, that is on the cutting edge of industrial spectroscopy.*

Rina Dukor is the President & CEO of BioTools. Rina received Ph.D. in physical chemistry from University of Illinois, Chicago in 1991. Upon graduation, she joined Amoco (now Abbvie) and while in industry pioneered the introduction of aqueous IR spectroscopy to the biopharmaceutical industry and development of reflection infrared micro- spectroscopy for cancer diagnostics. And by bringing VCD to the market, Rina helped cement the use of VCD by major pharmaceutical companies. Rina

has co-authored over 50 peer-reviewed papers; several review chapters and is a holder of four patents. She is a recipient of several prestigious scientific Awards and serves on academic and commercial Boards including the Board of Visitors for LAS College at UIC and Scripps Florida. Rina began to volunteer for the Society during her graduate school education and over the last 20 plus years has served the Society in many capacities including President, Board Member, Focal Point Editor & numerous committees.

## SAS EMERITUS MEMBERSHIP AWARD

*Recognizing those individuals who have made exceptional contributions to spectroscopy*



**Stephen Bialkowski**

*Recognizing Dr. Stephen E. Bialkowski for his tireless dedication to the Society and to the field of spectroscopy, both through research and education.*

Stephen Edward Bialkowski received his Ph.D. from the University of Utah in 1978, did postdoctoral research at the National Bureau of Standards, and started his university faculty career in 1980 at Michigan Technological University before moving to Utah State University in 1983. His interests include molecular spectroscopy, quantum electrodynamics, digital and optical signal processing. He authored about 120 papers and a monograph on photothermal spectroscopy, the 2<sup>nd</sup> edition has two coauthors. His patent on all optical computing was issued in 1986.

He is fascinated by the quantum, photon, nature of light and has addressed the implications of photons in many of his publications. The interface between analytical and physics earned him adjunct faculty status recognition in the Physics and Electrical Engineering departments at Utah State University. He mentored and directed research for graduate students outside of chemistry. He was awarded the Utah Academy of Science's William Gardener Prize for the promotion of science and support of local photonics industry within the state.

His most recent research is on photon momentum transfer at dielectric interfaces. He has been an active member of SAS since the 80s, serving several terms as local section chairman, planning symposia, and acting as the web editor. He published 19 papers in *Applied Spectroscopy*, the most recent in 2020. He continues activity in science in collaborative research, by teaching through distance education and serving as Editor in Chief of Critical Reviews in Analytical Chemistry.



## *Recognizing individual members for their outstanding service to the field of spectroscopy and the Society for Applied Spectroscopy.*



**Christian Huck**

Christian Huck obtained his doctorate in chemistry in 1998 from the University in Innsbruck, Austria, where he continued to work as an assistant professor until the habilitation in 2006. In 2013, he received a call as a full professor to the University of Stuttgart, Germany and in 2015, a call to the University of Innsbruck, where he is currently vice-head of the Institute of Analytical Chemistry and Radiochemistry and head of the spectroscopy unit. From 2014 until 2017 he was a visiting professor at Kwansei-Gakuin University in Sanda, Japan, in the laboratory of Professor Yukihiro Ozaki. Christian has published more than 300 peer-reviewed manuscripts resulting in an h-index of 52 based on more than 10000 citations. Beside several numerous awards he was also the receiver of 2018 Tomas

Hirschfeld Award. In his research he is mainly focusing on vibrational spectroscopic technologies (NIR, MIR, Raman) for life and material science in combination with separation technologies. Currently, he is editor-in-chief for *Spectrochimica Acta A* (Elsevier) and NIR news (Sage) as well as associate editor for several analytical journals including JNIRS.

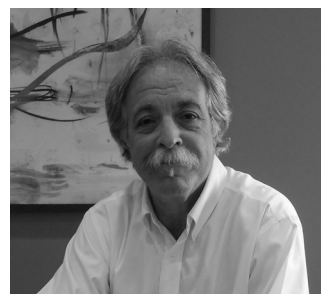


**Ellen Miseo**

Ellen V. Miseo, holds a Ph. D physical chemistry and concentrated on optical spectroscopy and instrument development. Her primary interest is in new applications of spectroscopic and imaging techniques. During her career, she has evaluated new technologies, developed new instrumentation, commercialized new techniques and anticipated new trends in the industry. Initially as a scientist at Arthur D. Little, Inc. she developed her skills in both spectroscopy and commercial products including foods and strategies to apply these skills to traditional and non-traditional problems. When she moved to Bio-Rad's Digilab division she was the product manager and champion for a new infrared imaging technology. When the business was acquired by Varian (later Agilent) she moved into a technical expert role, mentoring new people and

providing technical expertise across the entire spectroscopy product line. At Hamamatsu she extended those skills into the OEM spectroscopy area. Her accomplishments include development of equipment as well as foreseeing customer trends and adapting to them. On moving to TeakOrigin she has gotten the opportunity to combine her interests in food and spectroscopy.

Dr. Miseo is actively involved in a number of professional societies related to spectroscopy. She is currently the president of the Coblenz Society and in 2014 she was elected to the Executive Committee of the Society for Applied Spectroscopy to serve as president in 2016. She currently chairs the education committee for SAS. She has taught training courses on spectroscopy within a corporate training framework, at conferences and as on-line courses.



**Lawrence Ziegler**

Professor Lawrence Ziegler received his Ph.D. in Chemistry from Cornell University in 1978 (advisor: A. C. Albrecht) where he carried out Raman experimental and theoretical studies. After an NIH Postdoctoral Fellowship (advisor: Bruce Hudson) at the University of Oregon, and an NRC Research Associateship at NRL, he held appointments of Assistant Professor and Professor in Chemistry at Northeastern University. In 1991 he moved to Boston University where he is currently Professor of Chemistry, an Associate Division Head of the BU Materials Science & Engineering program and a member of the BU Photonics Center. Professor Ziegler served as Chemistry Department Chair from 2012 -2019. He was a pioneer in the development of UV resonance Raman,

resonance hyper-Raman, and resonance rotational Raman scattering for applications including the study of short-time chemical reaction dynamics. Current research interests include the characterization of ultrafast solvation dynamics in dense and supercritical fluids via 2DIR, plasmonically enhanced coherent vibrational spectroscopy, and the development of surface enhanced Raman spectroscopy for bioanalytical applications including rapid infectious disease diagnostics, blood aging, cancer detection and forensics. He was co-Organizer of the 22<sup>nd</sup> International Conference on Raman Spectroscopy (Boston, August 2010) and is currently Senior Associate Editor for the *Journal of Raman Spectroscopy*.

## SAS UNDERGRADUATE STUDENT AWARDS

*Given to junior or senior undergraduate students for outstanding research in spectroscopy*



### **Aldo Hernandez**

*Recognizing work in developing a new application for a currently existing plasma-based atomic emission technique and work on developing glow discharge optical emission spectroscopy (GDOES) for the elemental mapping of nanoparticles.*

Aldo Hernandez is a recent Texas Tech University alumnus who completed his Bachelor of Science in Chemistry in May 2021 with a minor in philosophy. His work falls under the broad umbrella of analytical chemistry with a focus in atomic spectroscopy and statistical analysis. He has tackled the problem of low information throughput some techniques have in studying nanoparticles. Under the guidance of his mentor: Dr. Gerardo Gamez at Texas Tech, Aldo worked on the implementation of glow discharge optical emission spectroscopy (GDOES)- an already existing elemental mapping technique- on nanomaterial analysis, with the goal of showcasing the improved throughput in the orders of magnitude compared with competing techniques. As a recent graduate, Aldo hopes to apply his knowledge in analytical chemistry and instrumentation on future career prospects.



### **Laurin Lux**

*Recognizing work in FT-IR Imaging and analyses.*

Laurin Lux is a student of Analytical Chemistry and Data Science at Technische Universität Wien. In his bachelor studies of Technical Chemistry he was working in the research group of Dr. Bernhard Lendl. Among other projects he was researching on ultrasonic particle manipulation combined with Raman sensing and changes of protein secondary structures monitored by QCL-spectroscopy. At the moment he is a Marshall Plan research scholar at Beckman Institute at University of Illinois Urbana-Champaign in the research group of Dr. Rohit Bhargava. In the chemical imaging and structures laboratory he is working on the determination of the limit of detection for IR imaging data. In this environment he can combine his passion for data processing with statistics and chemical sample preparation.



### **Robert Spiers**

*Recognizing work in chemometrics with a current focus on calibration sample selection to improve model predictions.*

Robert Spiers is in his fourth year of studying Physics at Idaho State University, and two years into pursuing undergraduate research in chemometrics with Dr. John Kalivas. Spiers works on developing novel chemometric processes to model the relationship between the near infrared (NIR) spectra for samples and their corresponding constituent amounts (analyte). Spiers' first project provided a successful and robust mechanism to perform both model updating and model selection via model diversity and prediction similarity (MDPS)

to new sample and measurement conditions without any target reference values. His second project deals with identifying matrix matched subsets from libraries of tens of thousands of samples (local modeling). Both these projects aim to make quantitative sample analysis simple, rapid, and accurate for consumer and industrial applications.

## SAS EARLY CAREER INTEREST GROUP TRAVEL GRANT

*Travel support for Early Career Scientists (within 5 years of earning a terminal degree) to SAS' National meeting during SciX. Awarded to Early Career scientists who demonstrate merit in the field of spectroscopy and/or those who demonstrate financial need.*



**Julia Gala de Pablo**

Dr Julia Gala de Pablo studied a BSc in Physics and a BSc in Biochemistry at the University Complutense of Madrid (Spain). In 2015, she moved to the University of Leeds (UK), defending her PhD in Raman spectroscopy of live single colorectal cancer cells in 2019. She is currently a JSPS postdoctoral fellow at the University of Tokyo in Goda-lab working in Fourier-Transform Coherent anti-Stokes Raman Scattering for flow cytometry and sorting.



**Rupali Mankar**

Rupali Mankar is a postdoctoral fellow at the University of Houston. She holds a Ph.D. from the University of Houston. Her research focuses on combining IR spectroscopy and machine learning to improvise spectroscopy for clinical translation. She was awarded a postdoctoral fellowship award by the National Laboratory of Medicine (NIH-NLM) for her Biomedical Informatics and Data Science field. In her Ph.D. work, she has automated osteosclerosis (one type of bone marrow fibrosis) and currently working on overcoming the diffraction-limited spatial resolution of IR imaging for comprehensive evaluation of bone marrow fibrosis.

## 2021 SAS SERVICE AWARDEES



**Richard Crocombe**  
President-Elect 2019  
President 2020  
Past President 2021



**Ewelina Miztek-Morabito**  
Student Representative 2020-2021

## SAS COBLENTZ SOCIETY CLARA CRAVER AWARD

*The Coblentz Society has created an award to recognize young individuals who have made significant contributions in applied analytical vibrational spectroscopy. The Craver Award is presented annually to an outstanding young molecular spectroscopist whose efforts are in the area of applied analytical vibrational spectroscopy. The candidate must be under the age of 45 on January 1st of the year of the award. The work may include any aspect of infrared (NIR, MIR, or Far), and/or THz, and/or Raman spectroscopy in applied analytical vibrational spectroscopy. The nominees may come from an academic, government lab, or industrial backgrounds. Click [here](#) for information on the Coblentz Society Craver Award.*



**Zachary Schultz**

Zachary D. Schultz, Ph.D., is an associate professor at The Ohio State University. Prof. Schultz earned his B.S. degree from The Ohio State University in 2000 and Ph.D. from the University of Illinois at Urbana-Champaign in 2005. He performed his doctoral studies under the supervision of Prof. Andrew Gewirth using infrared-visible sum frequency generation spectroscopy to characterize electrochemical interfaces. As a graduate student, he was recognized with an ACS Division of Analytical Chemistry Graduate Fellowship (2004). Upon completing his Ph.D., he was awarded a National Research Council Postdoctoral Fellowship to conduct research at the National Institute of Standards and Technology (USA). His research at NIST was performed largely in collaboration with Ira Levin at the National Institutes of Health (USA). Following his postdoctoral training at

NIST, Dr. Schultz continued as a research fellow with Dr. Levin at NIH using vibrational spectroscopy and microscopy to study biomembrane systems. Dr. Schultz was awarded an NIH Pathway to Independence Award in 2008. Dr. Schultz began his independent career as an assistant professor of chemistry and biochemistry at the University of Notre Dame in 2009 and was promoted with tenure to associate professor in 2015. In January of 2018, Prof. Schultz moved his research program to Ohio State. Prof. Schultz was named a Cottrell Scholar by Research Corporation for Science Advancement in 2013 and elected a fellow of the American Association for the Advancement of Science (AAAS) in 2019. Prof. Schultz has served on the Analytical Chemistry Editorial Advisory Board's Features Panel and is currently on the Editorial Advisory board of Luminescence (Wiley) and Analytical Methods (RSC). Prof. Schultz served on the ACS Exams Institute committee to prepare the 2017 ACS Instrumental Analysis Exam. He currently serves on the governing board of the Coblentz Society, where his activities have included chairing the Student Awards Committee. Prof. Schultz has organized numerous symposia and sessions at Pittcon, SciX, and ACS meetings; and has served on the program committees of the International Conference for Advanced Vibrational Spectroscopy, the International Conference of Enhanced Spectroscopy, and the Tip-Enhanced Raman Scattering meetings. Prof. Schultz's research focuses on developing innovative approaches utilizing the unique interactions between light and nanostructured materials for near field imaging, ultrasensitive label-free spectroscopic detection, and controlling chemical reactions.

## Headshot a Little... Outdated??

Come to booth 536  
on Tuesday from  
10 am - 1 pm!  
Free for members;  
nominal charge for  
non-members.

**Coblentz**  
SOCIETY



## COBLENTZ SOCIETY WILLIAM G. FATELEY STUDENT AWARD

*The William G. Fateley Student Award is given by the Coblentz Society annually to recognize outstanding contributions to vibrational spectroscopy during a current Ph.D. program. William G. (Bill) Fateley was among the first winners (1965) of the Coblentz award and worked tirelessly to promote the Pittsburgh Conference and FACSS. Author of more than 350 publications and recipient of numerous other awards, he returned to his alma mater, Kansas State University, as chairman of his department in 1972 and served there until his retirement 1997 and beyond. He served as the Editor of Applied Spectroscopy for 20 years and served as mentor to a generation of spectroscopists.*



**Paulina Koziol**

Paulina Koziol is currently in her third year of PhD studies of Biophysics at the Faculty of Physics, Astronomy and Applied Computer Science of Jagiellonian University in Krakow. She received bachelor's and master's degrees in Medical Physics from AGH University of Science in Krakow. After MSc studies, Paulina worked for a year as a research technician within a project led by Prof. Tomasz P. Wrobel and focused on the development of histopathological models for cancer detection based on IR imaging and machine learning. Successful cooperation encouraged her to enroll in a PhD program in October 2018, under T. P. Wrobel's supervision. During her studies she continues working on classification models, mostly focusing on pancreatic cancer, including translation from FT-IR to a faster QCL modality. She has also done extensive work on denoising influence on IR spectroscopic data quality and classification results. This research resulted in a series of optimization-themed publications for both FT-IR and QCL imaging. Currently, her work interest is leaning towards implementing polarized infrared light to determine macromolecular orientation and level of ordering, mainly for fibrous tissue, which may play a significant role in cancer microenvironment.

Paulina is an author of ten publications, including three as first author. She has received several awards and stipends, including a prestigious START stipend from the Foundation for Polish Science and a stipend under the Iwanowska Programme from the Polish National Agency for Academic Exchange NAWA covering six months internship in Prof. Rohit Bhargava's group at the University of Illinois at Urbana-Champaign.

Apart from her studies, Paulina works at the SOLARIS National Synchrotron Radiation Centre in Krakow, where she is a part of a team of beamline scientists constructing the Solaris Advanced IR (SOLAIR) beamline. She is also PI of her own research grant from the National Science Centre Poland entitled "Improving 3D macromolecule orientation determination based on polarized IR chemical imaging by optimization of scattering removal algorithms".

## COBLENTZ SOCIETY STUDENT AWARDS

*For many years, the Coblentz Society has recognized outstanding young scientists pursuing studies in vibrational spectroscopy with Coblentz Student Awards. Awardees receive a copy of the Society's Desk Book of Infrared Spectra, a certificate, SciX registration, and a year's membership in the Society. The winner's faculty advisors, institution, and anticipated graduation date appear in the Society's Newsletter and website.*



**Isabella Goodenough**

Isabella Goodenough is a graduate research assistant earning her PhD in physical and analytical chemistry with a focus in vibrational spectroscopy of complex nanoporous materials at Temple University in Philadelphia, Pennsylvania. She is involved in a collaborative project between the University of Pittsburgh and Temple University, which seeks to develop superior sorbents capable of capturing and degrading hazardous chemical agents, such as chemical warfare agents and toxic industrial chemicals. The ultimate goal of this work is to design protective equipment for military, industrial and civilian personnel using multifunctional, porous-hybrid nanomaterials, which couple Metal-Organic Framework (MOF) scaffolds and non-noble metal plasmonic nanoparticles. To date,

Isabella's role in this project has been to develop a fundamental insight on the interactions of the MOF scaffolds with select target analytes using in situ FTIR techniques under ultra-high vacuum conditions in order to understand the adsorption, transport and desorption phenomena in MOF-analyte systems. In addition, she uses vibrational probe molecules to understand the nature and distribution of defects in these materials.

Outside of the laboratory, Isabella serves as the Chair of the Philadelphia Younger Chemists' Committee (YCC) and is a founding member of the Eastern US YCC partnership. Her mission is to build a network of motivated young professionals that will empower and unite chemists in the community. She is passionate about pursuing social justice through community engagement and strives to advance accessibility, representation, and equality in STEM disciplines. In the future she hopes to expand the boundaries of leadership and teamwork to influence positive change and to inspire diversity and inclusion.

## COBLENTZ SOCIETY STUDENT AWARDS (continued)



### Christopher Warkentin

Chris Warkentin is currently a Ph.D. candidate in experimental physical chemistry at the University of Minnesota. Prior to his academic career, he found work building trails in the Appalachian Mountains, restoring wetlands in the Midwest, establishing a sustainable farm, and managing a custom construction shop. These experiences informed his interest to pursue a career in sustainability and his eventual return to collegiate studies at Indiana University South Bend. Here his research career began, exploring a range of interests in chemistry and physics. As a SMART Research Fellow, under the advisement of Dr. Grace Muna, he developed nickel-palladium modified glassy carbon electrodes for the electro-analytical detection of steroid hormones in local surface waters. In 2017, he earned a BS in Chemistry with minors in Physics and Mathematics from IUSB and moved to Minneapolis to pursue his doctoral degree in Chemistry at the University of Minnesota under the advisement of Dr. Renee Frontiera. While pursuing his Ph.D., he obtained his master's degree in Chemistry in 2018.

Today, his research interests center on using surface-enhanced Raman spectroscopy (SERS) to investigate the dynamics of plasmon-driven chemistry in a variety of plasmon-molecule systems. A better understanding of plasmon-molecule interactions could aid in the rational design of new plasmon-based green catalysts for more sustainable chemical production and solar energy generation. Chris' work uses ultrafast (ps) time-resolved SERS and steady-state (ms) SERS in order to understand both the fast energy-transfer dynamics that occur on the timescale of plasmon decay and the slower reaction kinetics that result from the cumulative effects of continuous irradiation. His research, in collaboration with theorists and material scientists, has revealed new insights into nanoscale spatial control of plasmon-driven processes, ultrafast plasmon-induced charge transfer, and upconversion applications with new plasmonic materials.

Chris has earned a number of awards during his tenure at the University of Minnesota, where he is currently an Institute on the Environment Renewable Energy Commercialization Fellow. He is an active member of the Analysis and Compliance committee for the Departments of Chemistry and Chemical Engineering and Materials Science Joint Safety Team and involved with various student groups within the department. Outside of the lab, Chris enjoys hiking, fishing, gardening, and playing with his 11-month old son, Oliver.

## SPECTROSCOPY MAGAZINE EMERGING LEADER IN MOLECULAR SPECTROSCOPY



### Bhavya Sharma

Bhavya Sharma received her PhD from the University of Pittsburgh in 2011. She has become a leader in the area of neurochemical detection with various forms of Raman spectroscopy, including surface-enhanced Raman spectroscopy (SERS) and spatially offset Raman spectroscopy (SORS). She has developed novel Raman spectroscopy methods for neurochemical detection, including surface-enhanced spatially offset Raman spectroscopy (SESORS). Her group has demonstrated detection of neurochemicals through the skull, down to nanomolar concentration ranges. Additionally, she is developing methods to demonstrate direct detection of molecules, such as cortisol, for the first time by combining SERS and multivariate analysis.

Sharma is a strong proponent of integrating under-represented minorities in undergraduate and graduate research. She has mentored 28 undergraduate students in research in 5.5 years, including 18 female students and 8 ethnic minorities. She has also mentored 6 female graduate students (out of 7 total). She teaches a one-month summer course for highly talented high school students titled "Introduction to Nanotechnology." Approximately half of the ~70 students she has taught over the last 3 years are underrepresented minorities or will be first-generation college students.

Sharma has published 26 papers and given more than 40 oral and poster presentations at scientific conferences. She is a reviewer for multiple journals and received an Outstanding Reviewer award for the journal *Analyst* in 2018. She is also active with the Coblenz Society, serving on multiple award committees, and was a member of the program committee for the OSA Optical Sensors Conference for 2018–2019. She also has been active in organizing scientific sessions at various conferences, including Pittcon, the SPIE's Defense + Commercial Sensing Symposium, and SciX.



## ANACHEM AWARD

*The ANACHEM Award 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.*



**Mark Meyerhoff**

Mark E. Meyerhoff is currently Philip J. Elving Professor of Chemistry in the Department of Chemistry at the University of Michigan, Ann Arbor. He received his Ph.D. from the State University of New York at Buffalo in 1979, working with Professor Garry A. Rechnitz. Following a short post-doctoral stint at the University of Delaware (also with Prof. G. A. Rechnitz), he joined the faculty at Michigan as an Assistant Professor in the Fall of 1979. He was promoted to associate professor in 1985, and to full professor in 1990.

Professor Meyerhoff's primary research interests are in the field of analytical chemistry, particularly the development of new ion-, gas-, and bio-selective electrochemical/optical sensors suitable for direct measurements of clinically important analytes in physiological samples. He also has a very active research program in the area of biomaterials, especially the development and characterization of novel nitric oxide (NO) releasing/generating polymeric materials for biomedical applications. These advanced NO release materials are being examined as potent antithrombotic and bactericidal coatings for a wide range of medical devices. He and his collaborators have authored more than 390 original research papers on these and other topics over the past 41 years since beginning his independent academic career at Michigan.

Professor Meyerhoff received the University of Michigan's Faculty Recognition Award in 1990, the ACS-Division of Analytical Chemistry Award in Electrochemistry in 2003, the Society for Electroanalytical Chemistry's Reilley Award in 2006, the University of Michigan's Outstanding Graduate Mentoring Award in 2006, the University of Michigan's Distinguished Faculty Achievement Award in 2011, the Ralph Adams Award in Bioanalytical Chemistry from the Pittsburgh Conference on Analytical Chemistry in 2014, the ACS Award in Analytical Chemistry in 2020, and the Association of Analytical Chemistry ANACHEM award in 2021.

## ROYAL SOCIETY OF CHEMISTRY SIR GEORGE STOKES AWARD



**Tuan Vo-Dinh**

Dr. Vo-Dinh is R. Eugene and Susie E. Goodson Distinguished Professor of Biomedical Engineering, Professor of Chemistry, and Director of the Fitzpatrick Institute for Photonics at Duke University. After high school in Vietnam, he pursued studies in Europe, receiving a B.S. in physics at EPFL-Lausanne, Switzerland (1970) and a Ph.D. in physical chemistry at ETH-Zurich, Switzerland (1975). Before joining Duke University in 2006, he was Director of the Center for Advanced Biomedical Photonics and a Corporate Fellow, one of the highest honors for distinguished scientists at Oak Ridge National Laboratory (ORNL). His main research goal is focused on developing advanced technologies to protect the environment and human health. His research has centered on the development, integration and application of biophotonics, molecular spectroscopy, molecular biology and nanotechnology for biomedical diagnostics, photoimmunotherapy, precision medicine, and global health.

Dr. Vo-Dinh has received seven R&D 100 Awards for Most Significant Advance in Research and Development; the Gold Medal Award, Society for Applied Spectroscopy (1988); the Languedoc-Roussillon Award (France) (1989); the Scientist of the Year Award, ORNL (1992); the Thomas Jefferson Award, Martin Marietta Corporation (1992); two Awards for Excellence in Technology Transfer, Federal Laboratory Consortium (1995, 1986); the Lockheed Martin Technology Commercialization Award (1998); the Distinguished Inventors Award, UT-Battelle (2003); the Distinguished Scientist of the Year Award, ORNL (2003); the Exceptional Services Award, U.S. Department of Energy (1997); the Award for Spectrochemical Analysis, American Chemical Society (2011); and the Sir George Stokes Award, Royal Society of Chemistry, United Kingdom (2019). He has authored over 500 publications, is a Fellow of the U.S. National Academy of Inventors and holds over 58 patents.

## AES LIFETIME ACHIEVEMENT AWARD



**Juan Santiago**

Juan G. Santiago received his MS and PhD in Mechanical Engineering from the University of Illinois at Urbana-Champaign in 1995. He holds the Charles Lee Powell Foundation endowed professorship at Stanford and serves as the Vice Chair of the Mechanical Engineering Department. His research includes the development of microsystems for on-chip biochemical analysis, two-phase flow devices, and capacitive deionization methods. Applications of this work include molecular diagnostics, cell analyses, electronics cooling, and the production of drinking water. He is a Fellow of the American Physical Society, a Fellow of the American Society of Mechanical

Engineering, and a Fellow of the American Institute for Medical and Biological Engineering. He serves as the Editor-in-Chief of the new journal *Flow* published by Cambridge University Press. He currently serves as an Associate Editor of the journal *Microfluidics and Nanofluidics*. He has served on the Editorial Advisory Board of the journal *Analytical Chemistry* and as Associate Editor of the journal *Lab on a Chip*. He is a co-founder of several companies in the microfluidics area. Santiago has given more than 32 keynote and named lectures and more than 150 additional invited lectures. As one measure of impact, his work is cited about 1500 times per year (Google Scholar h index of 79). He has graduated 32 PhD students and advised eight postdoctoral researchers, and 34 of these lab alumni have continued in microfluidics research (18 are professors at major universities). He has authored and co-authored over 200 archival publications and 250 conference papers, and he is a named inventor in 60 issued patents (25 of which are currently licensed).

## AES MID-CAREER AWARD

*Recognizes exceptional contributions to the field of electrophoresis, microfluidics, and related areas by an individual who is currently in the middle of their career.*



**Nathan S. Swami**

Nathan Swami serves as Professor of Electrical & Computer Engineering at the University of Virginia, with joint appointments in Chemistry and the Cancer Center departments. His research group specializes in development of label-free microfluidic devices for biofabrication, biophysical single-cell isolation for phenotypic analysis and for integration with nanoconfinement to enable signal amplification for biomolecular sensing. Prior to University of Virginia, he served on the scientific staff of the MEMS group at Motorola Labs and at Clinical Microsensors, Inc., a Caltech start-up interfacing microelectronics to bio-analysis. He seeks to impact diagnostic systems within point-of-care and resource-poor settings for enabling precision medicine. More information on his research is at: <https://scholar.google.com/citations?user=iS12HRMAAAJ&hl=en>.

## PREVIOUS FACCS BOARD AND MEETING CHAIRS

<b>1973</b>	Jeannette Grasselli	Governing Board Chair	<b>1985 - Philadelphia</b>	Robert Barford	Governing Board Chair
<b>1974 - Atlantic City</b>	James White	Governing Board Chair		Fred Corcoran	General
	George Heinz	General		Matthew Klee	Program
	James White	Program		Marshall Fishman	Arrangements
	Edward Ruffing	Exhibit		Peter Keliher	Exhibit
<b>1975 - Indianapolis</b>			<b>1986 - St. Louis</b>	Ronald Schroeder	Governing Board Chair
	James Holcombe	Governing Board Chair		Marshall Fishman	General
	Gerald Wallace	General		Alexander Scheeline	Program
	James Holcomb	Program		Terry Hunter	Arrangements
	Edward Ruffing	Exhibit		Edward Brame	Exhibit
<b>1976 - Philadelphia</b>			<b>1987 - Detroit</b>	Patricia Rouse Coleman	Governing Board Chair
	Edward Brame	Governing Board Chair and General		David Coleman and L. Felix Schneider	General
	Edward Dunlap	Program		John S. Beaty	Program
	Douglas Robinson	Arrangements		Edward Brame	Exhibit
	Edward Ruffing	Exhibit	<b>1988 - Boston</b>	James Cavanaugh	Governing Board Chair
<b>1977 - Detroit</b>				Frank Plankey and John S. Beaty	General
	Edgar Peck	Governing Board Chair		Roger Gilpin	Program
	Mitch Kapron and James Burns	General		Edward Brame	Exhibit
	Jeannette Grasselli	Program	<b>1989 - Chicago</b>	Alexander Scheeline	Governing Board Chair
	L. Felix Schneider	Arrangements		Paul Bourassa	General
	Edward Ruffing	Exhibit		Robert G. Michel	Program
<b>1978 - Boston</b>				Edward Brame	Exhibit
	James Williamson	Governing Board Chair	<b>1990 - Cleveland</b>	Nancy Miller-Ihli	Governing Board Chair
	Paul Lublin	General		Charles Belle	General
	James Cosgrove	Program		Steven Hughes	Program
	James Cornwell	Arrangements		Edward Brame	Exhibit
	Edward Ruffing	Exhibit	<b>1991 - Anaheim</b>	David Coleman	Governing Board Chair
<b>1979 - Philadelphia</b>				Richard Deming and Constance Sobel	General
	Peter Keliher	Governing Board Chair		James Holcombe	Program
	Douglas Robinson	General		Edward Brame	Exhibit
	Philip LeFleur	Program	<b>1992 - Philadelphia</b>	Karmie Galle	Governing Board Chair
	Sydney Fleming	Arrangements		Matthew Klee	General
	Edward Ruffing	Exhibit		Barry Lavine	Program
<b>1980 - Philadelphia</b>				Edward Brame	Exhibit
	L. Felix Schneider	Governing Board Chair	<b>1993 - Detroit</b>	Robert Watters	Governing Board Chair
	Sydney Fleming	General		L. Felix Schneider and David Coleman	General
	Theodore Rains	Program		Julian Tyson	Program
	Robert Barford	Arrangements		Mildred Barber	Exhibit
	Edward Ruffing	Exhibit	<b>1994 - St. Louis</b>	Paul Bourassa	Governing Board Chair
<b>1981 - Philadelphia</b>				Terry Hunter	General
	Jack Katon	Governing Board Chair		John Koropchak	Program
	Robert Barford	General		Mildred Barber	Exhibit
	Mary Kaiser	Program	<b>1995 - Cincinnati</b>	Jon W. Carnahan	Governing Board Chair
	James Cavanaugh	Arrangements		Joseph A. Caruso	General
	Peter Keliher	Exhibit		Richard F. Browner and R. Kenneth Marcus	Program
<b>1982 - Philadelphia</b>				Mildred Barber	Exhibit
	Sydney Fleming	Governing Board Chair	<b>1996 - Kansas City</b>	Rachael Barbour	Governing Board Chair
	James Cavanaugh	General		O. Karmie Galle	General
	Andrew Zander	Program		William Fateley	Program
	Matthew O'Brien	Arrangements		Scott McGeorge	Exhibit
	Peter Keliher	Exhibit			
<b>1983 - Philadelphia</b>					
	Mary Kaiser	Governing Board Chair			
	Matthew O'Brien	General			
	John Lephardt	Program			
	D. Bruce Chase	Arrangements			
	Peter Keliher	Exhibit			
<b>1984 - Philadelphia</b>					
	Theodore Rains	Governing Board Chair			
	D. Bruce Chase	General			
	Patricia Rouse Coleman	Program			
	Fred Corcoran	Arrangements			
	Peter Keliher	Exhibit			

<b>1997 - Providence</b>			
Mildred Barber	Governing Board Chair		
Chris Brown	General		
John Olesik	Program		
Scott McGeorge	Exhibit		
<b>1998 - Austin</b>			
John Graham	Governing Board Chair		
David Laude	General		
Isiah Warner and Linda McGown	Program		
Scott McGeorge	Exhibit		
<b>1999 - Vancouver</b>			
Robert G. Michel	Governing Board Chair		
Michael Blades	General		
Ronald Williams	Program		
Scott McGeorge	Exhibit		
<b>2000 - Nashville</b>			
John Koropchak	Governing Board Chair		
Arlene Garrison	General		
Michael Carrabba	Program		
Scott McGeorge	Exhibit		
<b>2001 - Detroit</b>			
David A. Laude	Governing Board Chair		
David Coleman and L. Felix Schneider	General Co-Chairs		
David J. Butcher	Program		
Scott McGeorge	Exhibit		
<b>2002 - Providence</b>			
Michael Carrabba	Governing Board Chair		
Robert G. Michel	General		
Mark A. Hayes	Program		
Scott McGeorge	Exhibit		
<b>2003 - Fort Lauderdale</b>			
Ronald Williams	Governing Board Chair		
Rina Dukor	General		
James Rydzak	Program		
Scott McGeorge	Exhibit		
<b>2004 - Portland</b>			
Michael Blades	Governing Board Chair		
David Trimble	General		
George Agnes	Program		
Scott McGeorge	Exhibit		
<b>2005 - Quebec City, Canada</b>			
Mark Hayes	Governing Board Chair		
Denis Boudreau	General		
Paul Farnsworth	Program		
Scott McGeorge	Exhibit		
<b>2006 - Orlando</b>			
Diane Parry	Governing Board Chair		
Christine Wehlburg	General		
S. Douglas Gilman	Program		
Mike Carrabba	Exhibit		
<b>2007 - Memphis</b>			
James Rydzak	Governing Board Chair		
Paul Bourassa	General		
Ian R Lewis	Program		
Mike Carrabba	Exhibit		
<b>2008 - Reno</b>			
Gary Brewer	Governing Board Chair		
John Hellgeth	General		
Greg Klunder	Program		
Mike Carrabba	Exhibit		
<b>2009 - Louisville</b>			
Becky Dittmar	Governing Board Chair		
Jessica Jarman	General		
Curtis Marcott	Program		
Mike Carrabba	Exhibit		
<b>2010 - Raleigh</b>			
S. Douglass Gilman	Governing Board Chair		
David J. Butcher	General		
André J. Sommer	Program		
Mike Carrabba	Exhibit		
<b>2011 - Reno</b>			
S. Douglass Gilman	Governing Board Chair		
Greg Klunder	General		
Pavel Matousek	Program		
Mike Carrabba	Exhibit		
<b>2012 - Kansas City</b>			
Ian R. Lewis	Governing Board Chair		
Brandye Smith-Goettler	SciX General		
Steven Ray	SciX Program		
Mike Carrabba	SciX Exhibits		
<b>2013 - Milwaukee</b>			
Ian R. Lewis	Governing Board Chair		
Fred LaPlant	SciX General		
Mike George	SciX Program		
Mike Carrabba	SciX Exhibit		
<b>2014 - Reno</b>			
Greg Klunder	Governing Board Chair		
Luisa T. M. Profeta	SciX General		
José R. Almirall	SciX Program		
Mike Carrabba	SciX Exhibit		
<b>2015 - Providence</b>			
Greg Klunder	Governing Board Chair		
Edita Botonjic-Sehic	SciX General		
Glen P. Jackson	SciX Program		
Mike Carrabba	SciX Exhibit		
<b>2016 - Minneapolis</b>			
Steven Ray	Governing Board Chair		
Mary Kate Donais	SciX General		
Alexandra Ros	SciX Program		
Mike Carrabba	SciX Exhibit		
<b>2017 - Reno</b>			
Steven Ray	Governing Board Chair		
Becky Dittmar	SciX General		
Matthieu Baudelet	SciX Program		
Mike Carrabba	SciX Exhibit		
<b>2018 - Atlanta</b>			
Fred LaPlant	Governing Board Chair		
Mark Henson	SciX General		
Karen Esmonde-White	SciX Program		
Mike Carrabba	SciX Exhibit		
<b>2019 - Palm Springs</b>			
Fred LaPlant	Governing Board Chair		
Mark Hayes	SciX General		
Garth Simpson	SciX Program		
Mike Carrabba	SciX Exhibit		
<b>2020 - Virtual (in lieu of Sparks)</b>			
Chris Palmer	Governing Board Chair		
Linda Kidder Yarlott	SciX General		
Mary Kate Donais	SciX Program		
Mike Carrabba	SciX Exhibit		

## PROGRAM-AT-A-GLANCE

### SUNDAY, SEPTEMBER 26

6:15 pm – 7:15pm      Keynote: Measuring Scientific Impact; David Walt, Harvard University, *Ballroom B/C, RICC 5<sup>th</sup> Floor*  
 7:15 pm – 9:15 pm      Welcome Mixer and SAS Sponsored Student Poster Session, *Ballroom A, RICC 5<sup>th</sup> Floor*

### MONDAY, SEPTEMBER 27

7:00 am – 9:00 am      Coblenz Members Meeting/Breakfast, *Omni Hotel, Narragansett Ballroom A*  
 8:00 am                  Coffee, *Ballroom A, RICC 5<sup>th</sup> Floor*  
**8:30 am – 10:10 am      Oral Symposia RICC 5<sup>th</sup> Floor**  
                                  21ATOM05: Ramon M. Barnes and His Impact on Spectrochemical Analysis, 553  
                                  21BIM03: Vibrational Spectroscopy for Cancer Screening and Diagnostics, 556  
                                  21FORENS01: Nuclear Forensics, 552  
                                  21IR01: Nanoscale IR I, 554  
                                  21LIBS02: Consolidation of LIBS Methodology, 550  
                                  21RAM10: Applications of SERS I, 558  
                                  21SPECIAL03: Remote Teaching Chemistry, 551  
                                  21SPSJ01: NIR Spectroscopy, 555  
 10:10 am – 10:45 am      Break, *Ballroom A, RICC 5<sup>th</sup> Floor*  
**10:45 am – 12:00 pm      Awards and Plenary Session, Ballroom B/C, RICC 5<sup>th</sup> Floor**  
                                  10:45 am      Welcome and Award Presentations  
                                  11:00 am      ANACHEM Award; Mark Meyerhoff, University of Michigan  
                                  11:30 am      Coblenz Society Clara Craver Award; Zachary Shultz, The Ohio State University  
 12:00 pm – 1:30 pm      Lunch on own  
**1:30 pm – 3:10 pm      Oral Symposia RICC 5<sup>th</sup> Floor**  
                                  21ATOM01: Medical & Pharma, 553  
                                  21AWD04: ANACHEM Award Symposium Honoring Mark Meyerhoff, 551  
                                  21BIM04: Nanotheranostics: Diagnosis and Treatment of Disease using Nanomaterials, 556  
                                  21IR03: Nanoscale IR II, 554  
                                  21LIBS03: LIBS Analytical Applications I, 550  
                                  21RAM07: Industrial Raman, 552  
                                  21RAM12: Application of SERS II, 558  
                                  21SPSJ03: DUV Spectroscopy, 555  
 3:10 pm – 3:50 pm      Break, *Ballroom A, RICC 5<sup>th</sup> Floor*  
**3:50 pm – 5:30 pm      Oral Symposia RICC 5<sup>th</sup> Floor**  
                                  21ATOM02: Single Cell and Nanoparticle ICP-MS, 553  
                                  21AWD08: Coblenz Society Clara Craver Award Symposium Honoring Zachary Schultz, 551  
                                  21FORENS02: Food Forensics, 552  
                                  21IR04: Evanescent Wave Sensing: New Developments and Applications, 555  
                                  21LIBS01: Deep Dive in LIBS Principle, 550  
                                  21PMA04: Structure Elucidation of Chiral and Biological Molecules, 554  
                                  21RAM11: Raman Sensing, 558  
 5:30 pm – 7:30 pm      Exhibit Hall Opening Reception, *Hall C, RICC 3<sup>rd</sup> Floor*



## PROGRAM-AT-A-GLANCE

### TUESDAY, SEPTEMBER 28

8:00 am	Coffee, <i>RICC 5<sup>th</sup> Floor</i>
<b>8:30 am – 10:10 am</b>	<b>Oral Symposia, <i>RICC 5<sup>th</sup> Floor</i></b>
	21AES01: AES Lifetime Achievement Award Symposium Honoring Juan Santiago, 555
	21ATOM04: Unique Plasma-based Sources for Chemical/Isotopic Analysis, 553
	21BIM05: Evolving Technologies for Clinical Applications, 558
	21IR02: Advances in Photothermal Spectroscopy, 554
	21LIBS05: Microanalysis Using LIBS, 550
	21PAT02: PAT Pharma/Biotech, 556
	21RAM02: SERS, 552
	21SPECIAL02: Spectroscopy-based Sensors for COVID-19, 551
10:00 am – 4:30 pm	Exhibit Hall Open, <i>Hall C, RICC 3<sup>rd</sup> Floor</i>
10:10 am – 10:45 am	Poster Session and Exhibits Break, <i>Hall C, RICC 3<sup>rd</sup> Floor</i>
<b>10:45 am – 12:00 pm</b>	<b>Awards and Plenary Session, <i>Exhibit Hall Plenary Area, RICC 3<sup>rd</sup> Floor</i></b>
10:45 am	Award Presentations
11:00 am	FACSS Charles Mann Award for Raman Spectroscopy; Roy Goodacre, University of Liverpool
11:30 am	SAS Lester W. Strock Award; Uwe Karst, University of Münster
12:00 pm – 1:30 pm	Exhibits Viewing (lunch available for purchase), <i>Hall C, RICC 3<sup>rd</sup> Floor</i>
<b>1:30 pm – 3:10 pm</b>	<b>Oral Symposia, <i>RICC 5<sup>th</sup> Floor</i></b>
	21AES04: Electrophoretic Bioanalytical and Pharmaceutical Analyses, 555
	21AWD03: FACSS Charles Mann Award Symposium Honoring Roy Goodacre, 551
	21BIM01: Biophotonics Technologies Fighting Infections at the Point of Care, 556
	21IR06: Advances in Photothermal Spectroscopy II, 553
	21LIBS04: LIBS Analytical Applications II, 550
	21PAT03: PAT for Industrial R&D, 554
	21RAM05: Raman Microscopy, 552
	21SPR01: Sensing and Actuating Chemistry, 558
3:10 pm – 3:50 pm	Poster Session and Exhibits Break, <i>Hall C, RICC 3<sup>rd</sup> Floor</i>
3:20 pm – 4:20 pm	Technology & Product Oral Sessions, <i>Exhibit Hall Plenary Area, RICC 3<sup>rd</sup> Floor</i>
<b>3:50 pm – 5:30 pm</b>	<b>Oral Symposia, <i>RICC 5<sup>th</sup> Floor</i></b>
	21ATOM07: New Trends in Atomic Spectroscopy Analysis, 553
	21AWD05: SAS Lester W. Strock Award Symposium Honoring Uwe Karst, 551
	21BIM02: Translation of Multimodal Imaging Technologies into Clinical Routine, 556
	21IR05: Probing Orientation/Anisotropy by Infrared Spectroscopy, 555
	21LIBS06: LIBS in Environmental and Heritage Science, 550
	21PMA07: End-to-end Analytical Development in Cell and Gene Therapy, 554
	21RAM04: Clirspec Biomedical Raman Session, 552
	21SPR02: Plasmonic Sensors, 558
7:00 pm – 8:00 pm	SAS Award Presentations, <i>Ballroom B/C, RICC 5<sup>th</sup> Floor</i>
8:00 pm	SAS Members' Wine and Cheese Reception, <i>Ballroom A, RICC 5<sup>th</sup> Floor</i>



## PROGRAM-AT-A-GLANCE

### WEDNESDAY, SEPTEMBER 29

8:00 am	Coffee, <i>Outside Session Rooms, RICC 5<sup>th</sup> Floor</i>
<b>8:30 am – 10:10 am</b>	<b>Oral Symposia, <i>RICC 5<sup>th</sup> Floor</i></b>
	21AES02: Electrokinetic Fundamentals, 555
	21ATOM03: Laser Ablation, 553
	21CHEM01: Bringing it All Back Home: Data Integration Through Chemometrics, 556
	21FORENS03: Forensic Analysis in the Lab and at the Crime Scene, 552
	21MASS01: Rapid Hydrogen-Deuterium Exchange Mass Spectrometry for Structural and Mixture Analysis, 551
	21PAT01: PAT Biopharma, 550
	21PMA02: Advanced Spectroscopy for Biopharmaceutical Characterisation: Using Multidimensional Fluorescence and Light Scattering Techniques for Protein Characterisation, 554
	21RAM09: Applications of Raman Microscopy, 558
10:00 am – 4:30 pm	Exhibit Hall Open, <i>Hall C, RICC 3<sup>rd</sup> Floor</i>
10:10 am – 10:45 am	Poster Session and Exhibits Break, <i>Hall C, RICC 3<sup>rd</sup> Floor</i>
<b>10:45 am – 12:00 pm</b>	<b>Awards and Plenary Session, <i>Exhibit Hall Plenary Area, RICC 3<sup>rd</sup> Floor</i></b>
10:45 am	Award Presentations
11:00 am	AES Electrophoresis Mid-Career Award; Nathan Swami, University of Virginia
11:30 pm	SAS and Applied Spectroscopy William F. Meggers Award; Vartkess Apkarian, University of California, Irvine
12:00 pm – 1:30 pm	Exhibits Viewing (lunch available for purchase), <i>Hall C, RICC 3<sup>rd</sup> Floor</i>
<b>1:30 pm – 3:10 pm</b>	<b>Oral Symposia, <i>RICC 5<sup>th</sup> Floor</i></b>
	21AES03: Emerging Leaders in Electrophoresis, Electrokinetics, and Related Applications, 555
	21AWD07: SAS and Applied Spectroscopy William F. Meggers Award Symposium, 551
	21CHEM05: Current Applications of Chemometrics, 556
	21CTP/EARLY01: We, the Scientists: Strategies to Support Diversity, Equity, and Inclusion, 558
	21MASS02: Ionization in Mass Spectrometry: Fundamentals and New Applications, 550
	21PMA03: Innovating PAT in Bioprocessing, 554
	21RAM06: Spatially Offset Raman Spectroscopy, 552
3:10 pm – 3:50 pm	Poster Session and Exhibits Break, <i>Hall C, RICC 3<sup>rd</sup> Floor</i>
<b>3:50 pm – 5:30 pm</b>	<b>Oral Symposia, <i>RICC 5<sup>th</sup> Floor</i></b>
	21ATOM06: ICP-MS/MS and Advanced Applications using ICP-MS, 553
	21AWD06: AES Mid-Career Award Symposium Honoring Nathan Swami, 551
	21CHEM04: Chemometrics for Food and Drug Analysis, 556
	21IR08: Advances in Gas Sensing, 558
	21LIBS07: LIBS: A Versatile Analytical Tool, 555
	21PAT04: Advances in On-Line Process Analysis, 550
	21PMA06: Small Molecule and Metabolic Screening, 554
	21RAM01: Emerging Raman Spectroscopy Breakthroughs, 552
6:30 pm	SciX 2021 Gala (badge and ticket required), <i>Ballroom A, RICC 5<sup>th</sup> Floor</i>





## PROGRAM-AT-A-GLANCE

### THURSDAY, SEPTEMBER 30

8:00 am	Coffee, <i>RICC 5<sup>th</sup> Floor</i>
<b>8:30 am – 10:10 am</b>	<b>Oral Symposia, <i>RICC 5<sup>th</sup> Floor</i></b>
	21ART01: Student Research in Archaeological Chemistry, 555
	21AWD02: Spectroscopy's Emerging Leader in Molecular Spectroscopy Award Symposium Honoring Bhavya Sharma, 551
	21CHEM03: Chemometric Opportunities in the Forensic Sciences, 556
	21PAT05: To be announced, 550
	21PMA05: Industrial Applications of Vibrational Spectroscopy, 554
	21RAM08: Biomedical and Bioanalytical Raman Spectroscopy, 558
	21SPECIAL01: Spectrochimica Acta Atomic Spectroscopy Award, 553
	21SPECIAL04: Analytical Molecular Spectroscopy: Honoring the Contributions of Robert W. Hannah, 552
10:10 am – 10:45 am	Break, <i>RICC 5<sup>th</sup> Floor</i>
<b>10:45 am – 12:00 pm</b>	<b>Awards and Plenary Session, <i>Ballroom B/C, RICC 5<sup>th</sup> Floor</i></b>
10:45 am	Award Presentations
11:00 am	Spectroscopy's Emerging Leader in Molecular Spectroscopy Award; Bhavya Sharma, University of Tennessee
11:30 am	Royal Society of Chemistry Sir George Stokes Award; Tuan Vo-Dinh, Duke University
12:00 pm – 1:30 pm	Lunch on Own
<b>1:30 pm – 3:10 pm</b>	<b>Oral Symposia, <i>RICC 5<sup>th</sup> Floor</i></b>
	21ART02: Archaeological, Geochemical, and Remote Sensing Applications in the Search for Pleistocene Landscapes of New England, 555
	21AWD01: RSC Sir George Stokes Award Symposium Honoring Tuan Vo-Dinh, 551
	21CHEM02: Chemometric Theory in Practice, 556
	21FORENS04: Analytical Chemistry of Nuclear Materials, 558
	21IR07: Advances in Determination of Molecular Orientation and Interactions by Infrared Spectroscopy, 553
	21PMA01: Manufacturing of the Future: Innovative PAT Tools and Advanced Process Control, 554
	21RAM03: IRDG Raman Spectroscopy Session, 552
	21SPSJ02: VUV/FUV Spectroscopy, 550
3:10 pm – 3:50 pm	Break, <i>RICC 5<sup>th</sup> Floor</i>
<b>3:50 pm – 5:30 pm</b>	<b>FACSS Innovation Award Finalists Plenary Session</b>

### FRIDAY, OCTOBER 1

7:30 am	Continental Breakfast, <i>RICC 5<sup>th</sup> Floor</i>
<b>7:45 am – 10:00 am</b>	<b>Closing Plenary Session: Data Science Meets Measurement Science</b>
7:45 am	Announcement of 2021 FACSS Innovation Award Winner
8:00 am	The Trowel and Error Experiences of a Spectroscopist Doing Field Archaeology Mary Kate Donais, Saint Anselm College
8:20 am	Title To Be Announced Karl Booksh
8:40 am	SHERLOC: Looking for Clues in Jezero Crater Luther Beegle, Jet Propulsion Laboratory, California Institute of Technology
9:10 am	Roundtable on Concepts of Field-Deployable Spectroscopy
9:30 am	SciX 2022: Matthieu Baudelet, SciX 2022 General Chair, Robert Lascola, SciX 2022 Program Chair



## NOTES

## NOTES

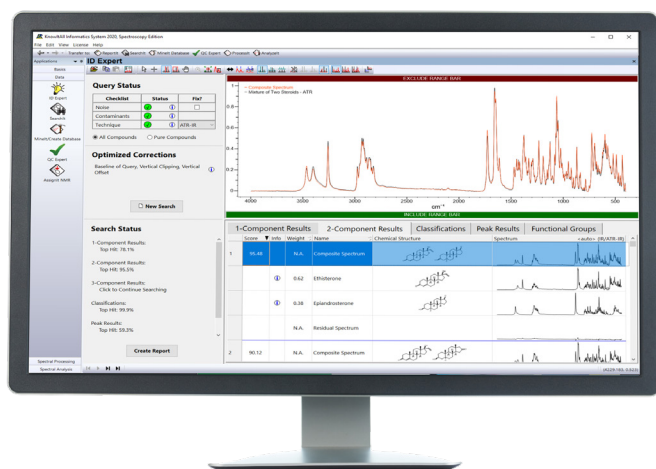
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