Adopt-A-Vet(eral) Valentines Drive

Join with the ACS Women Chemists Committee and the University of Pittsburgh ACS Student Affiliates, as we look to bring a little love to the patients at the VA Hospital in Oakland. Last year we delivered 300 valentine gift bags, and 300 is the goal again for this year!

It costs approximately $8 per gift bag. We take care of all the purchasing, assembling, and delivery of the gifts. Please consider contributing to this event and bringing a little love to those we owe so much to. Collection will be taken through 2/14/18.

Please consider making a donation to help fill the bags. Information on how to donate via PayPal or via check is available on the Upcoming Events page of our website: www.pghWCC.org. Feel free to contact Michelle Ward at michelle.ward@pitt.edu for more information as well.
There is a growing interest in monitoring levels of biologically active compounds in living systems in their natural environments. These efforts are a significant departure from conventional ‘sampling’ techniques, where a portion of the system under study is removed from its natural environment, and the compounds of interest extracted and analyzed in a laboratory environment. There are two main motivations for exploring these types of investigations. The first one is the desire to study chemical processes in association with the normal biochemical milieu of a living system, and the second one is the lack of availability or impracticality of removing suitable samples from a living system, frequently because of size. In the presentation, I will describe the use of solid-phase microextraction (SPME) for in vivo sampling of endogenous compounds, drugs and metabolites in the tissue of freely moving animals as well as humans, which eliminates the need for tissue withdrawal in order to obtain quantitative analytical information. In comparison to the established in-vivo technique of microdialysis, such chemical biopsy probe provides the advantages of reduced matrix effect improved spatial resolution, improved extraction of hydrophobic species and large molecular species and better compatibility with LC-MS because of elimination of salts and associated ionization suppression effects associated with large amounts of phospholipids extracted. In contrast, in-vivo microdialysis provides better temporal resolution and capability of semi-continuous monitoring in almost real-time. The chemical biopsy in-vivo SPME method was evaluated in collaboration with medical staff at Center for Addiction and Mental Health, Toronto General and Toronto Western Hospitals. Up-to-date the technique was demonstrated useful during lung and liver transplantation, brain function monitoring during deep brain stimulation and drug administration, in vivo lung perfusion for local chemotherapy, and more recently, brain tumor metabolomic study. The study demonstrates feasibility of the method to extract wide range of metabolites, what allowed differentiating studied individuals and determining potential biomarkers of organ function. Also, the technique proved to be capable to monitor

Abstract and Bio Continued on Page 12
The Spectroscopy Society of Pittsburgh
February Meeting

Wednesday, February 21, 2018
held at Duquesne University

5:30 PM Technology Forum Speaker’s Presentation Power Center Ballroom Section C
5:30 PM Social Hour – Power Center Fides Shepperson Suite
6:45 PM Dinner – Power Center Ballroom Section C
8:00 PM Business Meeting – Power Center Ballroom Section C
8:15 PM Technical Program Speaker’s Presentation – Power Center Ballroom Section C

http://www.ssp-pgh.org/ and click on SSP Monthly Meeting “More Info” link

Dinner Reservations: Please register on-line at http://www.ssp-pgh.org to make dinner reservations NO LATER THAN February 13, 2018 at noon. Dinner will cost $10 ($5 for students) and checks must be made payable to the SSP. This month’s Main Entrée: Meat Lasagna (will not contain pork). Vegetarian Entrée: Vegetable Lasagna. If you have any dietary restrictions, please indicate them when you RSVP.

Parking: The Duquesne University Parking Garage is located on Forbes Avenue. Upon entering the garage, receive parking ticket and drive to upper floors. Pick up a parking chit at the dinner or meeting.

TECHNOLOGY FORUM - 5:30 PM

Sally Chopping
Acting for Business

“Non-Verbal Communication for Job Interviews and Presentations”

At a job interview or presentation the words you use are only half the picture. The other half is all the non-verbal messages you send out through your body language and voice tone. The non-verbal’s will determine whether you build empathy and appear confident or fail completely.

In this seminar you will learn what to do and what to avoid so that you project the right image and make people eager to listen to your ideas. You will gain an appreciation of what goes into great body language and leave with methods you can put to use immediately to improve the way you communicate.

Biography: Sally Chopping is the President of “Acting for Business”, a company that shows business people how to use acting techniques to unlock their potential and become powerful presenters. Her clients include Toyota Motor Corporation, CONSOL Energy and the Air National Guard. Her advice about public speaking has been quoted in the Wall Street Journal and the Pittsburgh Post-Gazette and she has appeared on Channel II News as their body language expert.

TECHNICAL PROGRAM - 8:15 PM

Dr. Russ Algar, Department of Chemistry, University of British Columbia, Vancouver, BC Canada

“Florescence Resonance Energy Transfer”

Abstract and Bio Continued on Page 11
Tropical Tree Seeds Provide Sustainable Water Filtration

Sand blended with an extract from Moringa tree seeds removes bacteria from drinking water

By Deirdre Lockwood

Researchers have designed a simple drinking water filtration method using sand combined with the extract of seeds from a tree commonly found in equatorial regions. A small prototype filter completely removed bacteria from water in which the concentration of Escherichia coli was more than 100,000 times as great as that of wastewater (Environ. Sci. Technol. Lett. 2017, DOI: 10.1021/acs.estlett.7b00490). The researchers hope to develop the design into an easy, inexpensive, and sustainable way for households and communities in the developing world to clean their water.

The seeds of the tree Moringa oleifera have positively charged, water-soluble proteins that attract particles and kill bacteria; researchers suspect the proteins protect the seeds from microbes. For generations, people have used pulverized seeds as a coagulant to precipitate particulates out of water, says Stephanie Butler Velegol of Pennsylvania State University. But this doesn’t work well for purifying drinking water because the seeds release unwanted organic matter into the water. Now Velegol, Manish Kumar, and their colleagues have designed a simple filtration approach using the seeds to clean water more effectively.

A few years ago, the team developed a way to avoid the release of organic matter by mixing ground-up Moringa seeds in water, and then combining the resulting liquid with sand (Langmuir... Continued on Page 5
Intel ISEF Pittsburgh Seeking Judges and Volunteers

The Intel International Science and Engineering Fair (ISEF), the world’s largest pre-college science competition, is returning to Pittsburgh in 2018 at the David L. Lawrence Convention Center. This competition brings together 1700 students in grades 9-12 from 75 countries, regions and territories. These are the best and brightest in the world, having won at local, regional, state and national fairs to get here. Twenty percent of competitors hold patents or published papers.

We need your help! Approximately 1000 judges in 22 categories, covering the whole of science and engineering. Judges are required to have a B.A., B.S. or a master’s degree with a minimum of six years related professional experience OR a Ph.D., M.D., or equivalent. Senior level graduate students may also qualify. If in doubt apply, and credentials will be reviewed. Judges are expected to be available from Tuesday afternoon (register no later than 5:00 PM) May 15 through Wednesday evening May 16, 2018 to complete their judging assignments. Judge training is available. Parking and all meals are provided free.

Judging at Intel ISEF is wonderful. The students consistently rank talking with the judges as the high point of their experience. The opportunity to meet these students is a tremendous experience for you. The positive energy in the exhibit hall with the students is inspiring!

Judging is also a great opportunity to network with fellow judges – over 1000 professionals from around the region and around the world. The students are our future leaders and workers for industry, universities and research facilities – it’s an opportunity to meet your future students, colleagues and employees. You will also advance STEM education, and promote good will. Intel ISEF was held in Pittsburgh in 2012 and 2015, and was a huge success. Join us to help make the 2018 fair even better. Become a judge. It’s easy. Go to https://student.societyforscience.org/grand-award-judges – click Apply to be a Grand Awards Judge at Intel ISEF 2018 in Pittsburgh!

Don’t want to judge? Volunteer to help. There are all kinds of jobs to do, including being an interpreter in any of 20 languages. Go to: https://student.societyforscience.org/volunteers to learn more. Questions? Email: Judging@societyforscience.org

Congratulations are in Order Again for Pittsburgh Local Section's Michael Mautino

2018 Local Section Outreach Volunteer of the Year

Congratulations to ACS Pittsburgh Section Michael Mautino. He has been named 2018 Local Section Outreach Volunteer of the Year! This award was established by ACS National to recognize the immeasurable outreach efforts made by local section volunteers. Congratulations, Mike, and thanks for all you do!

Tropical Tree Seeds

Continued from Page 4

2012, DOI: 10.1021/la2038262). The seed proteins stuck to the sand, while the organic matter could be washed away. The resulting “sticky sand” clarified water and killed bacteria similarly well to the seed proteins alone.

In the new study, the team, including a group of Penn State undergraduates led by graduate student Boya Xiong, packed the sticky sand into filter columns about 1 cm in diameter and 5-10 cm high, and testing the columns with extract from different amounts of seed to optimize performance. In experiments with 1-µm-diameter polystyrene particles, which have about the same size and charge as bacteria, they found that the sticky sand caught 99.99% of particles, compared with 13.55% for sand alone. The sticky sand also removed 108 viable E. coli cells per milliliter. They estimate that a household-scale filter 1 meter tall and 5 cm in diameter that provides 10 L of water per day would require 0.2 kg of seeds per year, whereas a Moringa tree produces about 480 kg of seeds per year.

The team still has to scale up the filter to sizes that could be used by households and communities. But they estimate that a 1-meter-tall, 70-cm-diameter filter could provide clean water for 1,000 people per day. They also plan to check whether sticky sand can remove viruses and nanoparticles. Once they have a proven design, they plan to work with contacts in Rwanda to test it in an actual community water supply. They envision that eventually families and communities could make simple filters with local resources alone. Xiong says friends from Trinidad, India, Sri Lanka, and Tanzania have all mentioned having a Moringa tree in their backyard.

Continued on Page 11
JOB SEARCHING FOR CHEMICAL TECHNICIANS

Presented by
The Society for Analytical Chemists of Pittsburgh
The American Chemical Society, Pittsburgh Section
The Spectroscopy Society of Pittsburgh

Friday, February 9, 2018

Pre-Registration is Required for this Free Event

HARBOR GARDENS, STUDENT SERVICES AREA CONFERENCE ROOMS
Bidwell Training Center, 1650 Metropolitan Street, Pittsburgh, PA 15233
412-323-4000

FREE ON STREET PARKING IS AVAILABLE

PROGRAM

8:30 A.M. Registration
9:00 A.M. MANAGING AN EFFECTIVE JOB SEARCH
Lisa Balbes, Ph.D.
Balbes Consultants LLC
Career Consultant, American Chemical Society

12:00 Noon INFORMAL LUNCH WITH QUESTION AND ANSWER SESSION

1:30 P.M. CLOSE

If you have a resume, bring it to the workshop

To Pre-Register for the Job Searching for Chemical Technicians Workshop
Send an email to Logan Miller (814-657-0722)
at:
miller.logant@gmail.com

Your email must include your full name, complete contact information including address, phone number and email address.
JOB SEARCHING FOR STEM PROFESSIONALS

Presented by
The Society for Analytical Chemists of Pittsburgh
The American Chemical Society, Pittsburgh Section
The Spectroscopy Society of Pittsburgh
Bayer School Association of Graduate Students, Duquesne University

Saturday, February 10, 2018

Pre-Registration is Required for this Free Event

Mellon Hall of Sciences, Duquesne University
600 Forbes Ave, Pittsburgh, PA 15282
724-882-4358

Parking is Available in Forbes Ave. Garage (Bring Ticket to Registration Table)

PROGRAM

8:30 A.M. Registration
9:00 A.M. MANAGING AN EFFECTIVE JOB SEARCH
          Lisa Balbes, Ph.D.
          Balbes Consultants LLC
          Career Consultant, American Chemical Society

12:30 PM NETWORKING LUNCH

1:00 PM Resume Review and Personal Consultation

3:30 P.M. CLOSE

Please bring resume and/or CV to participate in the afternoon program
(Undergraduates without a resume may participate in afternoon group resume review)

To Pre-Register for the Job Searching for STEM Professionals Workshop
Send an email to Logan Miller (814-657-0722)
at:
duqplu@duq.edu

Your pre-registration must be received by Tuesday, February 6, 2018 and include your full name and complete contact information including address, phone number, email address and whether or not you expect to participate in the resume/CV review. Academic registrants – please include University affiliation/department.
After the mapping of the human genome many different questions still exist to make important connections between human genetic makeup and health. One area of interest that has evolved to answer these questions is the “exposome”. The exposome has been defined as the measure of all the exposures of an individual in a lifetime and how these exposures relate to health. When we think of this concept, it is easy to begin to catalogue the many chemical entities encountered by an individual through the body’s exogenous environment, but what about the endogenous environment?

The biological mechanisms that dictate life processes produce a multitude of chemical entities that can be catalogued as the endogenous exposome. These substances come in the form of reactive oxygen and nitrogen species, sugar fragments, nucleic acid damage products and lipid oxidation products. Through the use of analytical chemistry heavily supported with organic chemistry, our laboratory identifies biological molecules that can be attributed to the internal exposome using site specifically modified substrates that can be photochemically activated under biologically relevant conditions to decompose to small molecule fragments which are by-products of cellular respiration, metabolism and aging just to name a few. In this presentation a broad overview of the use of analytical methods and organic synthesis of modifications of several nucleic acids will be presented and their utilization in the structural elucidation of molecules which make up the endogenous exposome.

SCHEDULE OF EVENTS
6:00pm Seminar - Eberly Science & Technology Building – Room 110
7:00pm Reception - Eberly Science & Technology Building – Room 115

Department of Chemistry & Physics, California University of PA
250 University Avenue, California PA 15419-1394
For questions regarding parking and to RSVP please contact DeAnne Pavelko (pavelko@calu.edu) 724-938-4147, by Monday, February 5th, 2018.

An RSVP is not required but will help us plan for the reception.
American Chemical Society
Pittsburgh Section

Student Travel Grant Application

www.pittsburghacs.org

<table>
<thead>
<tr>
<th>Application Deadline</th>
<th>Travel Completion Date</th>
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</thead>
<tbody>
<tr>
<td>December 1st</td>
<td>June 30th (subsequent year)</td>
</tr>
<tr>
<td>June 1st</td>
<td>December 31st (same year)</td>
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Name of Applicant: ________________________________________________

Name of Institution: ________________________________________________

___ Undergraduate Student / Year:

___ Graduate Student / Year:

Mailing Address to Receive Payment if Awarded: ________________________________

Email: ____________________________ Phone: ____________________________

PI: ________________________________

ACS Membership No.*:

*If you do not know your ACS number, please email hlujzwa@shimadzu.com to receive it by email.

Meeting Location: __________________________ Meeting Date: ________________

Project Title: _______________________________________________________

___ Paper Presentation ___ Poster Presentation

*Please attach a copy of your project abstract to the application.

Has your project been accepted? Yes No

*Attach documentation regarding acceptance if received at point of application.

Will this be your first presentation at an ACS national or regional meeting? Yes No

If no, please list conferences at which you have presented: ________________________________
Purpose of grant: _____________________________________________________________

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Other funding sources (if any): ________________________________________________

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Personal Statement of anticipated benefits of meeting attendance _________________________

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Has the applicant received a travel grant from the ACS Pittsburgh Section in the past? Yes No

If your application was selected, the Pittsburgh Section of the ACS would like you to write a short
(one page) description of your activity upon completion of the conference for publication in our monthly newsletter, The Crucible, and on our website. The description is due within 30 days of the meeting attended. Photos are welcomed and encouraged.

I am willing to complete this report: Yes No

Signature: ___________________________________________________________________

Date: _____________________________

Send completed hard-copy applications and supporting documentation to:

   Pittsburgh Section ACS Travel Grants
   Heather Juzwa
   321 Winners Circle
   Canonsburg, PA 15317

Electronic copies of completed applications should be sent to hljuzwa@shimadzu.com and heather_sapko@hotmail.com. Be sure to place “Pittsburgh Section ACS Travel Grants” in the subject line.
Bioanalysis encompasses a wide range of quantitative measurements of biomolecular targets and on biological systems, spanning from in vitro diagnostics to cellular imaging. Nanomaterials have had significant impact in this field because their unique and often size-dependent properties can provide new capabilities and opportunities. This presentation will summarize some of our recent and ongoing research in this area, focusing on two topics in particular: brightly luminescent quantum dots (QDs), which are semiconductor nanocrystals smaller than 10 nm in size; and Förster resonance energy transfer (FRET), which is generally limited to length scales less than 10 nm. The development and characterization of materials, fundamental spectroscopy, and proof-of-concept applications in bioanalysis will be highlighted through examples such as smartphone-based assays, multifunctional concentric FRET probes, photonic logic probes, and more.

Biography:

Russ Algar completed his B.Sc. (2005), M.Sc. (2006), and Ph.D. (2010) degrees at the University of Toronto, Canada. He then spent two years as a postdoctoral researcher at the Centre for Bio/Molecular Science Engineering, U.S. Naval Research Laboratory, in Washington, D.C., before moving to UBC as a Canada Research Chair (Tier 2) in Bio/Chemical Sensing.

At UBC, Algar leads a research group that focuses on the development, spectroscopy and applications of non-traditional fluorescent materials for bioanalysis. Examples of these materials include quantum dots, luminescent lanthanide complexes, and polymer nanoparticles. Areas of special interest include new strategies and devices for point-of-care diagnostics; multifunctional fluorescent probes toward studying cell signaling processes; photonic logic; novel energy transfer configurations; understanding and controlling the interactions between nanoparticles and biological molecules; and the development of new chemistries to support the foregoing research.

Algar and his coworkers have authored more than 90 indexed publications that have accrued more than 3475 citations, 11 book chapters, and co-edited a book. He has been honored as a Michael Smith Foundation for Health Research Scholar, a 2017 Alfred P. Sloan Foundation Research Fellow in chemistry, the 2017 winner of the Fred Beamish Award in analytical chemistry from the Canadian Society for Chemistry, and the 2017 Emerging Leader in Molecular Spectroscopy award.

Volunteers Needed!

There are a number of volunteer opportunities in the Pittsburgh ACS section! If you are interested in volunteering, please contact Heather Juzwa at hljuzwa@shimadzu.com!
level and distribution of drugs over the time of surgery. The coated microfibre can be directly coupled to analytical instrumentation, such as mass spectrometer, permitting to obtain close to real-time results thus allowing for immediate action at the operation table. In the similar way to biopsy needle, chemical biopsy SPME device can be also placed in the organ through the skin by using guide cannula or via endoscope. Introduction of one of the available calibration approaches and reduced level of matrix effect characteristic to SPME makes the method fully quantitative.

**BIOGRAPHY:** The primary focus of Professor Pawliszyn’s research program is the design of highly automated and integrated instrumentation for the isolation of analytes from complex matrices and the subsequent separation, identification and determination of these species. The primary separation tools used by his group are Gas Chromatography, Liquid Chromatography and Capillary Electrophoresis coupled to variety of detections systems, including range of mass spectrometry techniques. Currently his research is focusing on elimination of organic solvents from the sample preparation step to facilitate on-site monitoring and in-vivo analysis. Several alternative techniques to solvent extraction are investigated including use of coated fibers, packed needles, membranes and supercritical fluids.

Dr. Pawliszyn is exploring application of the computational and modeling techniques to enhance performance of sample preparation, chromatographic separations and detection. The major area of his interest involves the development and application of imaging detection techniques for microcolumn chromatography, capillary electrophoresis and micro chip separation devices. Professor Pawliszyn has supervised 45 PhD and 64 MS students and he is an author of over 650 scientific publications and a book on Solid Phase Microextraction. His Hirsch Index (H-index) is 88. He is a Fellow of Royal Society of Canada and Chemical Institute of Canada, editor of Analytica Chimica Acta, Trends in Analytical Chemistry and a member of the Editorial Board of Journal of Separation Science and Journal of Pharmaceutical Analysis. He initiated a conference, “ExTech”, focusing on new advances in sample preparation and disseminates new scientific developments in the area, which meets every year in different part of the world. He received the 1995 McBryde Medal, the 1996 Tswett Medal, the 1996 Hyphenated Techniques in Chromatography Award, the 1996 Caledon Award, the Jubilee Medal 1998 from the Chromatographic Society, U.K., the 2000 Maxxam Award from Canadian Society for Chemistry, the 2000 Varian Lecture Award from Carleton University, the Alumni Achievement Award for 2000 from Southern Illinois University, the Humboldt Research Award for 2001, 2002 COLACRO Medal, 2003 Canada Research Chair, in 2006 he has been elected to the most cited chemists by ISI, in 2008 he received A.A. Benedetti-Pichler Award from Eastern Analytical Symposium, 2008 Andrzej Waksmundzki Medal from Polish Academy of Sciences, 2008 Manning Principal Award, 2010 Torbern Bergman Medal from the Swedish Chemical Society, 2010 Ontario Premier’s Innovation Award, 2010 Marcel Golay Award, 2010 ACS Award in Separation Science and Technology, 2011 PittCon Dal Nogare Award, 2012 E.W.R. Steacie Award, 2013 CIC Environmental Research and Development Award, 2013 CIC LeSueur Memorial Award, 2015 Maria Skłodowska-Curie Medal from Polish Chemical Society, 2015 Halász Medal Award from the Hungarian Society for Separation Sciences, 2017 Pittsburgh Conference Analytical Chemistry Award, the 2017 Eastern Analytical Symposium Award for Outstanding Achievements in the Fields of Analytical Chemistry and 2018 ACS Award in Chromatography. He presently holds the University Professor, Canada Research Chair and Natural Sciences and Engineering Research Council of Canada Industrial Research Chair in New Analytical Methods and Technologies.

**Job Opportunity**

The Asher Group at the University of Pittsburgh is seeking a scientist, engineer, postdoctoral researcher to work in the areas of UV resonance Raman spectroscopy instrumentation development and explosives detection. Areas of interest include analytical and physical chemistry and chemometrics with experience in areas such as Raman spectroscopy, photonic crystal materials, and laser instrumentation development, etc. We are developing standoff Raman detection instrumentation and methodologies and pioneering methods for hyperspectral imaging in the deep UV. Expect to have exciting scientific adventures, within an interdisciplinary research environment.

Please respond with a CV and three letters of reference to:

Professor Sanford A. Asher
Department of Chemistry
University of Pittsburgh
219 Parkman Avenue
Pittsburgh, PA 15260
Email: asher@pitt.edu
**Society for Analytical Chemists of Pittsburgh**

Dues Only $20.00 Call the SACP Administrative Assistant at 412-825-3220 Ext. 212 Right Now!

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Stay up-to-date on all the happenings of the Pittsburgh Section ACS

**Section’s Website:**

[www.pittsburghacs.org](http://www.pittsburghacs.org)

**Facebook Page:**

Pittsburgh Section of the American Chemical Society

**Linked In:**

Pittsburgh Section of the American Chemical Society

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**Volunteers Needed!**

There are a number of volunteer opportunities in the Pittsburgh ACS section! If you are interested in volunteering, please contact Heather Juzwa at hljuzwa@shimadzu.com!

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**Crucible Deadline**

The deadline for items submitted to The Crucible is the 15th of the month prior to publication.

For example, all items for the March 2018 issue must be to the editor by February 15, 2018.

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**The Crucible**

The Crucible is published monthly, August through May. Circulation, 2,500 copies per month. Subscription price, six dollars per year. All statements and opinions expressed herein are those of the editors or contributors and do not necessarily reflect the position of the Pittsburgh Section.

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The Crucible
A newsletter of the Pittsburgh Section of the American Chemical Society

124 Moffett Run Rd.
Aliquippa, PA 15001

Change of Address
If you move, notify the American Chemical Society, 1155 Sixteenth Street, N.W., Washington, D.C. 20036.
To avoid interruption in delivery of your CRUCIBLE, please send your new address to Traci Johnsen, 124 Moffett Run Rd., Aliquippa, PA 15001. Allow two months for the change to become effective.

Pittsburgh Area Calendar

Monday, February 5
Society for Analytical Chemists of Pittsburgh
“In-vivo Application of SPME”
Janusz Pawliszyn, University Professor and Canada Research Chair, University of Waterloo
Duquesne University, Pittsburgh, PA

Friday, February 9
Job Searching for Chemical Technicians
“Managing an Effective Job Search”
Lisa Balbes, Ph.D., Balbes Consultants LLC, Career Consultant, American Chemical Society
Harbor Gardens, Student Services Area Conference Rooms, Bidwell Training Center, 1650 Metropolitan St., Pittsburgh, PA

Saturday, February 10
Job Searching for Chemical Professionals
“Managing an Effective Job Search”
Lisa Balbes, Ph.D., Balbes Consultants LLC, Career Consultant, American Chemical Society
Mellon Hall of Sciences, Duquesne University, 600 Forbes Ave., Pittsburgh, PA

Monday, February 12
Pittsburgh ACS “On the Road” Mildred E. Perry Memorial Lecture
“The Elucidation of the Internal Exposome”
Dr. Amanda C. Bryant-Friedrich, Dean, College of Graduate Studies, Associate Professor of Medicinal and Biological Chemistry, The University of Toledo, Toledo OH
Department of Chemistry & Physics, California University of PA, 250 University Avenue, California PA

Wednesday, February 21
The Spectroscopy Society of Pittsburgh
Technology Forum
“Non-Verbal Communication for Job Interviews and Presentations”
Sally Chopping, President, Acting for Business

Technical Program
“Florescence Resonance Energy Transfer”
Dr. Russ Algar, Department of Chemistry, University of British Columbia, Vancouver, BC Canada
Duquesne University, Pittsburgh, PA