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Donald MacLean 2019 recipient of the California Section Petersen Award. Presented by Chair, Patrick Lee

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WCC April Meeting Report

Our Women Chemists Committee had the pleasure to host Dr. Claire Komives, professor of Chemical Engineering at San Jose State University, at the USDA in Albany on April 27, 2019, to present her talk on “Snakebite in Rural Tropical Regions of Developing Countries and Potential Novel Therapies”.

Dr. Komives described that while in the US about 10-15 lethal snakebites occur on humans per year, namely from Western Diamond rattlesnakes and coral snakes, the number of human victims from snakebites in tropical developing countries like India or Nigeria is estimated to be over 100,000, due to bites from snakes like cobras and vipers. Day laborers in rural areas and farm workers, often the main bread winners of families, are particularly frequent victims. Antibody treatments obtained from the blood of horses that had been injected with the snake venoms are effective treatments for human victims. But the treatments have to be applied within a short time of the snakebite. In addition these antibody-based antivenoms are very costly and available only at hospitals, frequently beyond the reach of victims. Many international research groups work on developing new strategies to counteract the destructive and deadly consequences of snakebites.

Opossums are immune to snakebites. When bitten by venomous snakes their bodies form protein antibodies. It has been

found that the first 15 N-terminal amino acids maintained the activity of the complete antibody protein, and that even just the first 10 amino acids are capable of neutralizing the toxins. Mice that were given Diamondback rattlesnake venom together with the respective peptide survived.

Chemically synthesized peptides can be produced in bioreactors and are much less costly than antibodies obtained by injecting horses and other large animals. The process of chemically synthesizing the peptide antivenoms is also faster and more desirable than involving large animals, and quality control is easier.

Traditional Indian medicine uses tamarind seed extract as an antidote with considerable success. Potential vaccination methods against snakebites are strongly explored as well. Intense research on suitable and affordable snakebite antidotes, most importantly in tropical countries, and stockpiling of antidotes for quick and affordable applications is crucial.

The lively questions and answer session following Dr. Komives’ talk showed the great interest that the topic stimulated. The audience included a large group of students from Los Medanos Community College as well. Questions, discussions with the speaker, and networking were continued during the lunch that followed the talk. The event was an instructive and enjoyable meeting.

Margareta Sequin

EchiTab-Plus-ICP	Lethality (LD ₅₀ , mg/kg)	ED ₅₀ (mg/venom)	Minimum dose for 100% survival (mg/venom)
<i>E. ocellatus</i>	0.64 (0.42-0.99)	17.5 (9.4-24.5)	21
<i>B. asperus</i>	0.70 (0.50-0.90)	27.4 (13.9-34.3)	24
LTNF-11	Lethality (LD ₅₀ , mg/kg)	ED ₅₀ (mg/venom)	Minimum dose for survival (mg/venom)
<i>E. ocellatus</i>	4.8 (3.0-7.5)	0.18 (0.14-0.23)	0.2
<i>B. asperus</i>	1.2 (ND)	0.45 (0.33-0.78)	0.78

EchiTab-Plus-ICP: Segura et al., Toxicon 55 (2010) 369-374

LTNF-11: this work

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The California Section hosted several successful events these past two months. First was a dinner and discussion with the ACS president, Bonnie Charpentier on April 18th. This was an opportunity for the mem-

bers from the California Section and the Silicon Valley Section to voice priorities for ACS in the coming years. We hope to make this dinner an annual event to provide members the opportunity to meet current ACS presidents and to provide input to shape the focus of ACS.

Next, on April 25th was the "Chemistry & AI" panel discussion in San Francisco sponsored by CalACS ACS Computers in Chemistry section, as well as Novartis' BIOME. We were fortunate to have excellent panelists to facilitate the discussion. Special thank you to Eric Martin from Novartis, Gavin Jones from IBM, and Michael Keiser from UCSF! Special thank you to the organizer, Alicia Taylor from California ACS who organized this very successful event. We will be following up with similar events on this theme in the Fall. If you have specific topics in this field in mind or have speaker suggestions, please contact us at office@calacs.org or tweet to @CaliforniaACS.

The WCC and CalACS hosted a meet-

ing at the USDA regarding snakebites by Claire Komives on April 27th. This was another very successful event thanks to many members who organized this discussion. Thank you to USDA scientist Charles Lee for being the official host at the government lab!

The Chemistry Olympiad was carried out at Santa Clara University. We hosted a total of 16 students and the participants had the opportunity to win monetary prizes from our section based on their performance of this event. Thank you to all of you who helped running the event as well as Eileen Nottoli who coordinates the local section's Olympiad.

On May 18th, we recognized 50, 60, and 70-year ACS members and you can read about this event as well as additional award recipients in this issue of the *Vortex*.

We have also started organizing a Bay Area Chemistry Symposium with the Silicon Valley ACS as well as various Bay Area biotech and pharmaceutical companies. The date is November 8th at the new Merck auditorium in South San Francisco. Speakers will include Professors Carolyn Bertozzi from Stanford, Richmond Sarpong from UC Berkeley, and Bill Degrad from UCSF. This should be an exciting opportunity to network as well as to learn about the exciting science being carried out in our local sections. Stay tuned for registration details.

Patrick S. Lee Ph.D.



All 50-60-70 Year Members with Marinda Wu and Patrick Lee



70 Year Members--Bill Delucchi, Edwin Tallyn with Marinda Wu and Attila Pavlath



*PFAS: PFOA, and
PFOS
(Part 6)*

Bill Motzer

Per- and poly-fluoroalkyl substances (PFAS) were used in many household and industrial products because they have rather unique fire-resistant physical and chemical properties. Industrial manufacturing and product releases (e.g., in aqueous fire-fighting foams or AFFF) to the environment has caused significant water cycle impacts by direct or indirect means through nonpoint sources (i.e., surface water runoff and groundwater infiltration), or through point sources (i.e., firefighting training grounds, industrial facilities, and municipal and industrial wastewater treatment plant effluent), and even from atmospheric deposition (e.g., particulate fallout or precipitation). A recent (2019) study of PFAS collected from 25 U.S. drinking water treatment plants detected PFAS in all 50 collected samples. Summed concentrations of 17 analyzed PFAS ranged from 1.0 to 1,102 ng/L with median total PFAS concentrations of 21.4 ng/L in source water and 19.5 ng/L in treated drinking water.

Because of rather sensitive analytical detection limits for U.S. Environmental Protection Agency (EPA) Method 537 (in the ng/L range) and the ubiquitous presence of PFAS in the environment, special care must be taken when collecting all water samples. This can be accomplished by following laboratory supplied protocols and by excluding and/or avoiding specific sampling equipment with substitution of other equipment. Currently, only two of the 97 EPA listed PFAS chemicals are required for analyses using EPA Method 537. These are perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS). Recommended sampling protocols are listed below:

PFAS Surface Water and Groundwater Sampling Protocols

Products to avoid when sampling:

- Post-It® notes

- Blue ice or chemical ice packs
- Waterproof field books, plastic clip boards, and spiral bound notebooks
- Equipment with Teflon™ (e.g., bailers, tubing, and parts in pumps such as Teflon tape)
- Low-density polyethylene (LDPE) or glass sample containers with Teflon-lined lids
- Waterproof labels for sample bottles
- Sunscreens and insect repellents
- Sharpies and other indelible inks

Allowed sampling products:

- Regular ice in Ziploc® bags
- Record on loose notebook paper, aluminum or Masonite clipboards, or electronically
- Use high density polyethylene containers (HDPE) and caps
- Paper labels with clear tape
- Products that are 100% natural, DEET
- Ballpoint pens
- Use nonpowdered nitrile gloves

Additional water sampling requirements and suggestions:

- (1) Do not composite samples (i.e., combine, mix or blend).
- (2) Collect samples in laboratory approved Nalgene™ containers (Figure 1) which have the appropriate laboratory added preservative reagents. The raw water sample should be filled just to the bottom of the neck and capped. The sample is then thoroughly mixed with the preservative by upending the closed container several times. Sample trip blanks should also be collected; these are used in assessing quality assurance/control (QA/QC).
- (3) Samples should be collected with low laminar (non-agitated) flow. When collecting tap water remove the faucet's

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(continued from page 5)

aerator and screen and allow water to flow for about five minutes.

- (4) Avoid cross contamination by non-handling of certain plastic food packaging (e.g., takeout food cartons with PFAS, microwave popcorn bags), and foods and beverages before sampling. Wear nitrile gloves.
- (5) Cool with bagged ice to less than 6 °C but not greater than 0 °C (samples must not be frozen). Immediately ship to the laboratory to arrive within 48 hours. The maximum sample holding time is 14 days from time of collection.
- (6) Complete a chain-of-custody form (generally supplied by the laboratory).
- (7) When in doubt consult with the laboratory. (Note: in California use a laboratory with Environmental Laboratory Accreditation Program (ELAP) certification; for more information see: https://www.waterboards.ca.gov/drinking_water/certlic/labs/index.html).

Environmental PFAS contamination and the appropriate analytical methods and collection techniques are new and evolving. What is also new are forensic techniques used to determine possible PFAS sources and these will be discussed in the final part of this series.

Note – Current Regulatory Updates:

In a draft April 25, 2019 interim recommendation, the U.S. EPA proposed cleanup of PFAS polluted groundwater exceeding 70 ng/L for PFOA and PFOS. (In 2016, the U.S. EPA had established a nonbinding health advisory for drinking water at 70 ng/L for PFOA and PFOS.) The recommendations are for groundwater supplies that are current or potential drinking water sources. Although this concentration is not a legally enforceable level it would apply to States

that have no enforceable standards.

On May 3, 2019, over 180 countries, including the U.S. and China, agreed to ban production and use of PFOA and its salts under the Stockholm Convention on Persistent Organic Pollutants. Exceptions were allowed for use of AFFF, except in training exercises when AFFF contained both PFOA and PFOS. Exceptions to the ban also included use of PFOA-related chemicals in pharmaceutical production (i.e., perfluorooctyl iodide, which can degrade to PFOA), semiconductor manufacturing, worker protection textiles, medical devices and film photographic coatings. A more complete description of these bans and their exceptions are in the May 13, 2019 issue of Chemical and Engineering News (v. 97, n. 19, p. 5).

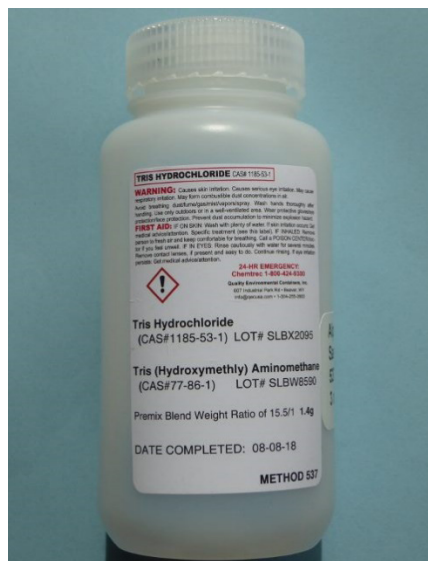


Figure 1: Example of PFAS sample bottle with appropriate reagent preservative.



The Walter B. Petersen Award

This award honors the memory of Walter B. Petersen by recognizing a person who has made significant contributions over a period of years to the well being of the California Section. Walter B. Petersen was noted for his many years of outstanding service to the Section. He held numerous section offices and was Chair of the California Section in 1969. He authored a popular column in the VORTEX entitled "Personals by Petersen" that covered news of promotions, awards and general

information about Section members.

Thus it is in his honor, with recollection of his high standards of service, that we recognize others who have given significantly to the advancement of the California Section. This award was established in 1982 and is supported by the California Section.

Nominees must be a member, a former member, or an affiliate of the Section.

This year's recipient is Donald MacLean.



Lloyd Ryland Outstanding High School Chemistry Teacher Award

Purpose: To recognize, encourage, and stimulate outstanding teachers of high school chemistry in the California Section of the American Chemical Society.

The Ryland Award consists of a cash award of \$500 to the teacher and \$500 to the teacher's high school chemistry department and a certificate. This year's recipient of the award is Brian Hopper of Hoopa Valley High School in Hoopa, The award is usually presented at the Awards Luncheon but Brian was unable to attend..



Marinda Wu, Past ACS President, presents the P3 Award to Mark Frishberg

US National Chemistry Olympiad

The California Section participates in the Chemistry Olympiad with high schools in our Section. The National Chemistry Olympiad is an annual competition among the top high school chemistry students in the United States. The top twenty students taking the National Olympiad can attend the two-week Study Camp and from that group, four students will be selected to represent the United States at the International Olympiad which is held in July.

This year Anugrah Chemparathy and Michael Han both from Dougherty Valley High School were two of the 20 finalists.

Chemistry Olympiad Section Program

Thanks to many, our Section had a successful Chemistry Olympiad at Santa Clara University. We had a total of 15 students who participated at Santa Clara and one student who participated at another location. Dr. Linda Brunauer spent considerable time making sure that the event was a success, and thanks to Al Verstuft, Wally Yokoyama, Bryan Balazs and Charlie Gluchowski who provided invaluable help.

If we are lucky enough to have one of our students get High Honors, we will give them a check for \$100. Students getting honors will get \$50.

Separately, we received one nomination of an Exceptional High School Student – Connor Harris of Enterprise HS in Redding – and we will be sending him a certificate and a check for \$100. and a thank you letter to the teacher.

Eileen Nottoli

Gifts & Donations

As noted in the reports from Eileen Nottoli and Alex Madonik, the Section has many outreach programs to help support science and chemistry in our community schools. You can help support the programs including the work with the High School Chemistry Teachers programs through your donations. Call or email and find out how your valued contribution can be used.

Lou Rigali, LR101898@aol.com



60 Year Members-- Harold Redsun, Fred Giarusso, Zeld Penton with Past Presidents Marinda Wu and Attila Pavlath.



50 Year Members--Joe Stetter, Ellen Prager, Dwight Merrill, Allen Letsome, Andrew Ho, Peyton Jacob, III, Ralph Knights, and Allen (AI) Verstuyft with Past Presidents Marinda Wu and Attila Pavlath.

Cal ACS Outreach Events in May

Family Science Night at United for Success Academy
Thursday, May 2nd, 2019, 4:30 PM to 6:00 PM
2101 35th Ave, Oakland CA 94601

Kitayama Elementary School Science Fair
Wednesday, May 8th, 2019, 5:00 PM to 7:00 PM
1959 Sunsprite Dr, Union City, CA 94587

Family Science Night at Rodeo Hills Elementary School
Thursday, May 9th, 2019, 6:00 PM to 8:00 PM
545 Garretson Ave, Rodeo CA 94572

Alex Madonik 510-872-0528 alexmadonik@

FAMILY SCIENCE NIGHT MAY 2

FSN on May 2nd was a success, with about the 75 students in attendance, and a variety of hands-on activities presented by UFSA faculty.

Bryan Balazs led off with his chemistry "magic" show, Chevron's Slime Team was a hit as always, and Dan Calef assisted me and three of my College of Alameda students in several hands-on activities, including "Chemistry Makes Scents" and the Iodine Clock Reaction.

Students hunted for elements on our Periodic Table beach blanket and took home pocket Periodic Tables to celebrate IYPT 2019.

Alex Madonik



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