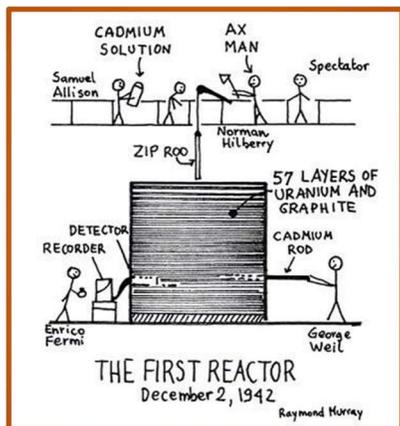


THE OCTAGON



RADIOCHEMISTRY 101:

Basic Concepts and Terminology,
Historical Perspective
and Dispelling a Few Myths

Robert J. Artz,
ACS Emeritus Member

Lehigh Valley ACS Webinar
Thursday, January 14, 2021; 7:00 p.m.



Zoom link: <https://american-chemical-society.zoom.com/j/86579276535?pwd=dTgzbnRaTXZUM0ZpUVVJdZU1VVovZz09>

Can you answer the following questions (no fair consulting the internet) ...

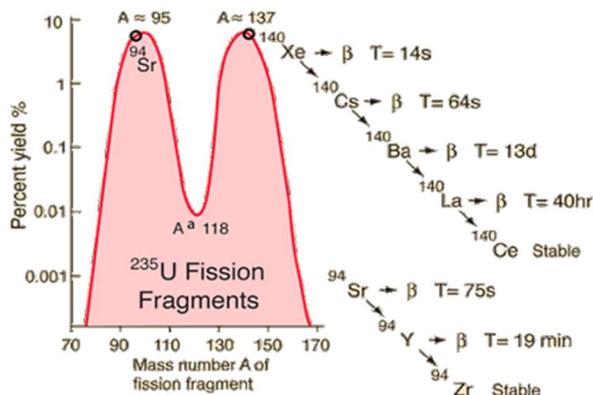
What does 'S.C.R.A.M' stand for?

"You have four relatively low-level radioactive cookies: one is an alpha particle, the second is a beta particle, the third is a gamma ray, and the fourth is a neutron. You must eat one, put one in your pocket, keep one in your hand, and throw one away. Which is which?"

If not (or even if you can!), join our January webinar as Bob Artz takes us on a fascinating journey through the development of the fundamental science behind radioactivity, nuclear reactions and nuclear energy production! We'll learn about the early contributions of Marie Skłodowska Curie and many others in the early 20th century to the new sciences of radiochemistry, nuclear particles and nuclear stability; then see how those basic concepts were applied to controlling nuclear fission reactions and to the construction of nuclear reactors by Enrico Fermi and colleagues. Along the way, we'll uncover the roots of some common terminology (and a few misconceptions) about nuclear energy and, finally, look at a very powerful tool called gamma spectroscopy and how it is used to safeguard operation of today's nuclear power plants. A short LVACS section business meeting will follow the webinar.

LVACS Emeritus Member Robert Artz graduated from Kutztown University of Pennsylvania and received a master's degree from Bowling Green State University. In addition to working in the energy field with Met Ed and then as Senior Nuclear Chemist at Oyster Creek Nuclear Station, he has taught science at LCCC and at Ocean County College, Toms River, New Jersey.

CONTACT: Nigel Sanders, nigel53.sanders@gmail.com



LVACS Events Calendar

January 2021

Section Meeting (Virtual Format)
"Radiochemistry 101"
Speaker: Robert Artz
Thursday, January 14th / 7:00 pm
Zoom online meeting:

<https://american-chemical-society.zoom.com/j/86579276535?pwd=dTgzbnRaTXZUM0ZpUVJJdzU1VWovZz09>

CONTACT: Nigel Sanders [nigel53.sanders@gmail.com]



February 2021

Section Meeting (Virtual Format)
"A hatred that still haunts
undergraduate organic chemistry
150 years later"

Speaker: David Lewis, Univ. of Wisconsin/Eau Claire
Thursday, February 18th / 7:00 pm
Online link TBA

CONTACT: Roger Egolf [rae4@psu.edu]



March 2021

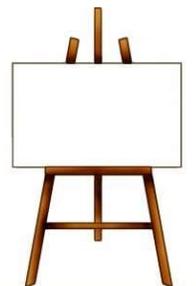
Section Meeting (Virtual Format)
"Signing for Safety"
Cedar Crest College CCC Signs ASL Club
Date/Time/Link TBA

CONTACT: Jeanne Berk [jrberk@cedarcrest.edu]



April 2021

Section Meeting (Virtual Format)
"Annual Undergraduate Poster Session"
Abstract submission/Venue/Date/Time TBA
CONTACT: Nigel Sanders [nigel53.sanders@gmail.com]



DID YOU KNOW...??

LVACS now has a YouTube channel: <https://www.youtube.com/channel/UCHO2OIchPLDnKITOeXNRRZO>

We will soon be launching a new Diversity page for our website <https://www.lvacs.org> initially featuring the latest on our After-School Chemistry Partnership (see page 4). Visit the site often for the latest LVACS updates and news!

CONTACT: Nigel Sanders, LVACS secretary and newsletter editor, nigel53.sanders@gmail.com

Also In This Issue...

3. LVACS Fall 2020 **Elections Results** Announced; Standing Committees seek new members

4. **LVACS granted ACS Award** for Diversity, Inclusion and Respect project, "LVACS After-School Chemistry Partnership"

5-6. **Ellen H. Swallow Richards:** Early Environmental Chemist and Advocate for Women in Chemistry

7. Reading Science Center had COVID-limited grand opening; PSU/Berks Chapter to be on BCTV

8. ACS Spring 2021 Meeting is virtual

9. Princeton Chem-STEM program presents "Go ahead, ask a chemistry grad!" to middle/high school students

10. First Call for 2021 LVACS Awards

11. 2021 Executive Committee

☒ LVACS FALL 2020 ELECTION RESULTS ANNOUNCED

The Lehigh Valley ACS Section announces our newly-elected 2021 Officers and Councilors: Chair-Elect, Lindsey Welch; Secretary, Nigel Sanders; Treasurer, Lorena Tribe; Councilor, Kelley Cafilin and Alternate Councilor, Mike Bertucci. They will join incoming Chair, Roger Egolf; Past Chair, George Ruger, Councilor, Jeanne Berk and Alternate Councilor, Celia Williams to form the 2021 Executive Committee of the section. 55 LVACS members (7.5%) voted.

CALL FOR APPOINTMENTS TO LVACS STANDING COMMITTEES

As we head into a new year, the 2021 LVACS Executive Committee asks all members to consider supporting the section's work in member engagement, education and public outreach by joining one of our Standing Committees. The current committees and their areas of activity are:

- ❖ **Awards** Committee administers all awards activities, such as nominations for local, regional, and national ACS awards and special section awards.
- ❖ **Chemistry Olympiad** Committee coordinates the U.S. National Chemistry Olympiad, a national competition for high school students, sponsored by ACS.
- ❖ **Education/SEED** Committee coordinates activities associated with our local high schools especially ACS Project SEED and ACS Scholars Program.
- ❖ **Professional Relations/Career Counseling** Committee provides members with access to career assistance through the ACS Navigator and local contacts.
- ❖ **Long-Range Planning** Committee monitors progress on the section's Strategic Plan and suggests new programs and activities for future development.
- ❖ **Membership** Committee recruits new ACS members, including Student members, and plans activities to increase member retention.
- ❖ **Minority Affairs** Committee develops programs and activities that encourage and support diversity, inclusion and respect in the chemical sciences.
- ❖ **National Chemistry Week/Chemists Celebrate Earth Week** Committee coordinates activities and arranges events to highlight the importance of chemistry to the general public during NCW/CCEW.
- ❖ **Publicity** Committee provides appropriate notices of the meetings and other activities of the Section and oversees editorial and financial policies of the section's newsletter, website, social media and email campaigns.
- ❖ **Nominating** Committee, appointed annually by the Section Chair, consisting of a Chair and two or more members not later than September of each year. Not more than two members of the EC may be members of the Nominating Committee. The Nominating Committee identifies and recruits candidates for section offices and reports an election ballot of nominees to the secretary no later than November 1st of each year. In addition, this committee suggests candidates for national offices and proposes nominees for awards.
- ❖ **Program** Committee determines the venues, arrangements and principal speakers of the regular meetings of the Section. The Chair-Elect of the Section is Chair of this committee. Normally, there are eight meetings per year, held at different locations throughout the geographic area of the Section. The meetings shall be arranged by a local host, appointed by the Program Committee. The host for each meeting shall have responsibility for all of the detailed arrangements for that meeting including: securing the appropriate facilities and food service at the chosen venue, providing information to the secretary for publication and greeting/assisting the speaker.
- ❖ **Public Relations** Committee develops and implements a program using local media contacts to publicize section programs and activities and to enhance the visibility and image of the section, Society, and profession.
- ❖ **Safety** Committee promotes safe laboratory practices through the presentation of safety symposia for teachers and students and provides advice to local officials on safety-related issues.
- ❖ **Senior Chemists** Committee promotes ways in which retired chemists can provide special services to the section such as judging science fairs, hosting tour speakers, volunteering for weekday events during NCW/CCEW and mentoring younger chemists.
- ❖ **Women Chemists** Committee attracts, retains, develops, promotes, and advocates for women to positively impact diversity, equity and inclusion in the Society and the profession.
- ❖ **Younger Chemists** Committee advocates, develops, and supports rising chemists to positively impact their careers, the ACS, and the future of chemistry.

Interested in joining one of the above committees or have an idea for a new committee?
Contact the Secretary, nigel53.sanders@gmail.com

LVACS granted ACS Award for Diversity, Inclusion and Respect project “LVACS After-School Chemistry Partnership”

The Lehigh Valley Section was informed by ACS in mid-December that we have been awarded \$2000 in funding for meaningful programming/activities that advance the ACS core value of diversity, inclusion and respect. The funds were given based on our proposed program for this spring entitled “LVACS After-School Chemistry Partnership” (see the October 2020 Octagon, page 11).

According to program coordinator and ACS Career Consultant Greglynn Gibbs, we will be using this DI&R grant to enable our members to partner with the community to provide an interactive, virtual after-school chemistry extension program via Zoom. The “LVACS After-School Chemistry Partnership” program will be run as a series and take place one day/week over the course of three months (February-April), allowing LVACS members/student members representing different facets of diversity to participate. The Penn State/Berks Student Chapter, LVACS SEED Coordinator Jeremy Heyman and the NCC Science Club are co-sponsoring the program. The participating partners include Reading Science Center (representing Reading-area schools), Yocum Institute for the Arts, Boys and Girls Club of Bethlehem, and The Fe Foundation and will involve 100-150 K-12 students. This DI&R-focused partnership is intended to be a 360° experience: highly interactive with volunteers learning as much from the participants as participants will be learning from presenters.

The Partnership program features the following kinds of experiences:

- Heritage Days Professional Speaker Series (1-2 events) – participants will have the opportunity to learn how chemical professional went from dreaming of being a scientist to achieving their dreams.
- Student Opportunity & Career Consultant Sessions (2 events) – students will learn about HS student opportunities, such as Project SEED and internships, as well as get help writing personal statements, essays, and resumes from an ACS Career Consultant in order to help them with their applications.
- Chem Club Days (2-3 events) – participants will receive chemistry experiment kits to follow along with Student Chapter and LVACS Volunteers as they introduce the experiment, provide direction, and discuss observations. Students will be able to see the presenter live over Zoom, as well as what other students are doing. Experiments and kits will be modeled after the NCW 2020 Slime Kit Activity and made available through pick-up points or by mail.
- College Talk (1-2 events) – student chapter members and chapter alum will talk about their path to college, the challenges they faced, how they persevered and answer questions from participants.
- Social Media 101 – participants will learn about social media and how to use it in a professional way to build a portfolio and increase opportunities
- Book/Movie Club Days – participants will choose from a list of books/movies and discussion days will be scheduled based around the books/movies chosen.

Focus topics during the three months include: Black History Month, National Battery Day, ACS SEED Program, National Peanut Butter Lovers Day (celebrating the ‘Uncommon Life’ of G.W. Carver), National Bubble Week, National Biodiesel Day, National Teenager Day, National Nutrition Month, Earth Week and National Science Day.

Interested in participating? Let us know!

CONTACT: Greglynn Gibbs, gdw104@psu.edu

Additional information on the ACS Diversity, Inclusion and Respect Core Value:
<https://www.acs.org/content/acs/en/membership-and-networks/acs/welcoming/diversity.html>



Ellen H. Swallow Richards: Early Environmental Chemist

In 1887 Richards conducted an unprecedented survey that led to the first state water-quality standards in the nation and the first modern municipal sewage treatment plant.

The most prominent female American chemist of the 19th century, Ellen Henrietta Swallow Richards (1842–1911) was a pioneer in sanitary engineering and a founder of home economics in the United States. She was the first woman to be admitted to the Massachusetts Institute of Technology. Born to an old but relatively poor New England family, Ellen Swallow spent several years teaching school, tutoring, and cleaning houses in order to earn enough money to attend one of the new women's colleges. By the time she reached her mid-20s, and with the \$300 she had saved, she entered Vassar College in Poughkeepsie, New York, in 1868 as a special student and graduated two years later.



Ellen H. Swallow, about 1858.
 MIT Museum

Affinity for Science and Acceptance to MIT

At Vassar she was attracted to astronomy and chemistry. Upon graduation she applied for positions with various industrial chemists but was turned down in all cases. At the suggestion of one of these chemists, however, she applied and was accepted as a special student at MIT, making her the first woman in America to be accepted by a scientific school. Three years later she received a second bachelor's degree—a BS from MIT—as well as a master's degree from Vassar, to which she had submitted a thesis on the chemical analysis of an iron ore (“Notes on Some Sulpharsenites and Sulphantimonites from Colorado.”) She then continued at MIT with hopes of earning a doctorate, but MIT was not to award its first doctorate to a woman until 1886.

Furthering Women's Education

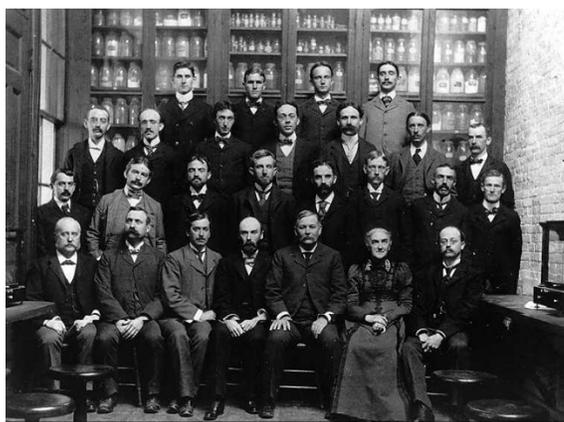
In 1875 she married Robert Hallowell Richards, chairman of MIT's mining engineering department. Supported in her ambitions by her husband, Richards volunteered her services as well as \$1,000 annually to further women's scientific education at MIT. Through her efforts the Women's Laboratory was established in 1876, and in 1879 she was recognized as an assistant instructor, without pay, for teaching the curriculum in chemical analysis, industrial chemistry, mineralogy, and applied biology. The laboratory was closed in 1883 after MIT began awarding undergraduate degrees to women on a regular basis and there was no more need for a special track.



Ellen Swallow Richards [far left, rear] and female MIT students in 1888.
 MIT Museum

Water-Quality Studies

Coincidentally, in the same year MIT opened the nation's first laboratory of sanitary chemistry (1884), she was appointed as an instructor. In 1887, at the request of the Massachusetts State Board of Health, Richards and her assistants performed a survey of the quality of the inland bodies of water of Massachusetts, many of which were already polluted with industrial waste and municipal sewage. The scale of the survey was unprecedented: it led to the first state water-quality standards in the nation and the first modern municipal sewage treatment plant, in Lowell, Massachusetts. From 1887 to 1897 Richards served as official water analyst for the State Board of Health while continuing as an instructor at MIT—the rank she held at her death. She and her colleague A. G. Woodman wrote a classic text in the field of sanitary engineering: *Air, Water, and Food from a Sanitary Standpoint* (1900).

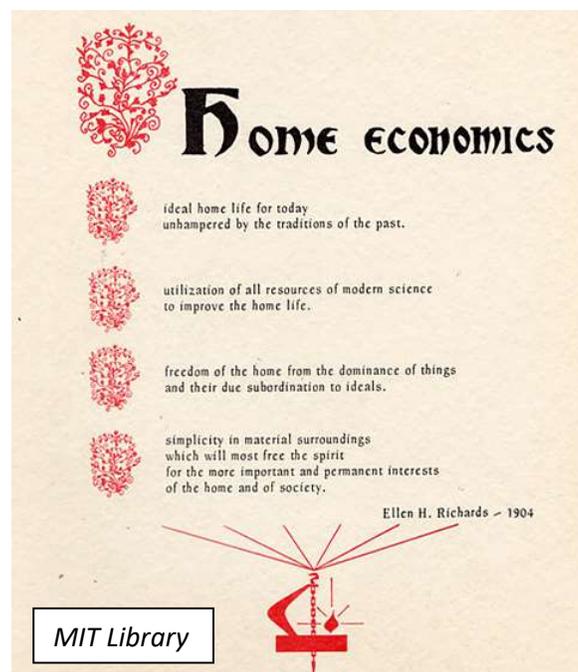


LONE WOMAN: Richards amid MIT's chemistry staff (circa 1890). In his book, *Rachel Carson and Her Sisters: Extraordinary Women Who Have Shaped America's Environment*, Robert K. Musil writes MIT's president John Daniel Runkle countered criticism of Richards as frail with the comment, "Yes, but did you see her eyes? She will not fail."

MIT Museum

Home Economics

From her days at the Women's Laboratory, Richards was very concerned about applying scientific principles to domestic topics—good nutrition, pure foods, proper clothing, physical fitness, sanitation, and efficient practices that would allow women more time for pursuits other than cooking and cleaning. In 1882 she published *The Chemistry of Cooking and Cleaning: A Manual for Housekeepers*. By setting up model kitchens open to the public, establishing programs of study, and organizing conferences, Richards campaigned tirelessly for the new discipline of home economics. Growing out of several summer conferences held at Lake Placid, New York, the American Home Economics Association was formed in 1908 with Richards as its first president.



All her life, she pressed on. "I ask nothing more, only longer days or quicker memory," she said. There is so much to do." In her 1902 book *Euthenics*, Ellen Swallow Richards wrote, "If the State is to have good citizens it must provide for the teaching of the essentials to a generation that will become the wiser mothers and fathers of the next."

Based on: Science History Institute, <https://www.sciencehistory.org/historical-profile/ellen-h-swallow-richards>
 Nautilus, <http://nautil.us/issue/46/balance/the-woman-who-gave-us-the-science-of-normal-life>
 History Net, <https://www.historynet.com/ellen-swallow-a-one-woman-parade-of-firsts.htm>
 MIT History, <https://libraries.mit.edu/mithistory/community/notable-persons/ellen-swallow-richards/>
 ACS, <https://www.acs.org/content/acs/en/education/whatischemistry/women-scientists/ellen-h-swallow-richards.html>

Reading Science Center Opens Amid Pandemic Restrictions

Owing to COVID-19 restrictions, the new Reading Science Center at 645 Penn Street in Reading, PA had to postpone its planned April opening until October and was open to the public on weekends 11-5 until reimposition of restrictions closed it again until January 4th. The center features more than 25 STEM-themed interactive exhibits in a vibrant 7,000 square foot space including: Electricity, Light & Sound, Vision, Engineering, Forces & Motion, Cell Lab and an Early Learners Area.



"We need engineers. We need scientists," says Mary Chown, the center's executive director. "We need to invest in our youth and provide opportunity for them to excel and exceed."

According to founder Jim Cinelli "It's very, very important for our country, in order to maintain its economic competitiveness, to keep a pipeline of students pursuing careers in science, technology, engineering and math."

The goal, officials said, was to make the center as accessible as possible. "That's one of the reasons we wanted to be in downtown Reading," Cinelli explained. "We have a pretty large, underserved population in the city, and we wanted to make it very accessible to the community in Reading." "This is kind of just a start for us," says Chown, "Within the next two to three years, we hope to have a bigger place that's dedicated." The just-opened Reading Science Center is a good start and will attract visitors of all ages, with the primary mission to engage kids in the wonder of science, technology, engineering and math.



Sources: Holly Harrar, Channel 69 News Oct 5, 2020; See broadcast video at link below

https://www.wfmz.com/news/area/berks/reading-science-center-opens-on-penn-street/article_361599fc-0658-11eb-b0b8-a3690f83ff0e.html

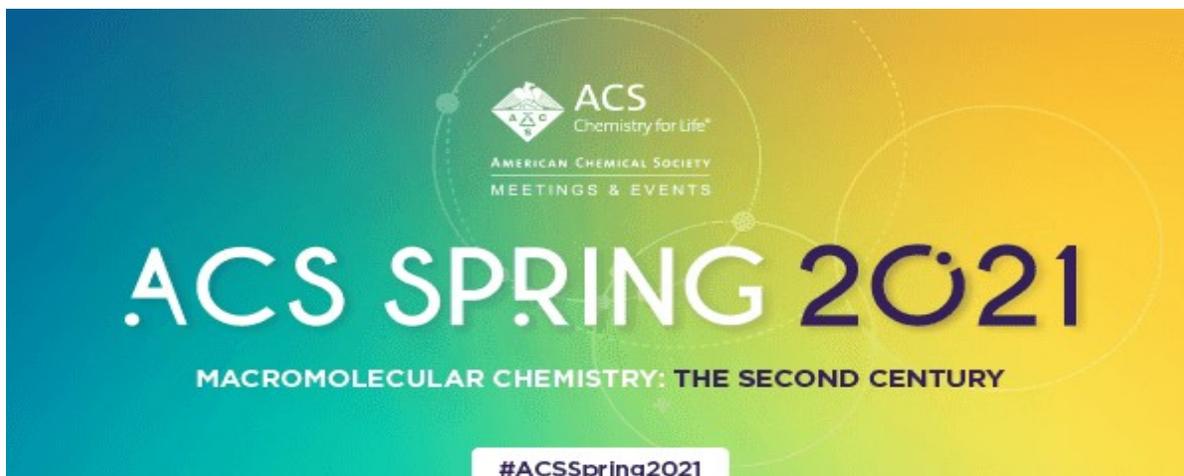
Reading Science Center, <https://www.readingsciencecenter.org>

Chemistry Fun with the Berks Chemical Society!



Hey, everybody, the Berks Chemical Society is going to be on TV!

Berks Community Television (BCTV) will be hosting the Penn State Berks Student Chapter as they introduce students and parents to both chemistry concepts and the value of chemistry in society using experiments that can be performed at home. In each segment, after brief introductions of the hosts and guest scientists, live demonstrations of a cool chemistry topic will begin. The Fun Chemistry includes: The Chemistry Around You - Polymers and Slime; What's in Your Kitchen? - Kitchen Chemistry Experiments; Chemistry for Tots - Storybook Chemistry; Now You See It, Now You Don't - Acids Bases & Disappearing Ink; Chemistry that Glows - Glow It Up!; Chemistry and Art - STEAM Fun! and Chemists Celebrate Earth Week 2021. Dates of the broadcasts are not set as of this writing, but look for posts on our social media and the BCS website: <https://sites.psu.edu/berkschemsoc/>



Submit Your Oral & Poster Presentations for ACS Spring 2021

Showcase your research during ACS Spring 2021 by [submitting an abstract](#) for oral and poster presentations by January 19, 2021.

[ACS Spring 2021](#) will be held virtually April 5-16, with this year's meeting theme focusing on the *Macromolecular Chemistry: The Second Century*. The virtual program will include **10 weekdays of live sessions**, followed by **two weeks of on-demand content** and **networking opportunities**.

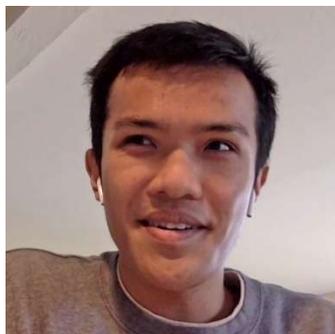
Registration for the virtual meeting will open mid-January and will remain open through the end of the meeting.

ACS Spring 2021 Registration Rates

- \$149 for non-members
- \$99 for ACS members
- \$29 for students and teachers
- No cost for unemployed, retired, and 50-year emeritus members

Visit the website to find a list of all the programming divisions and planned symposia open for submissions. **The deadline to submit abstracts is January 19, 2021.**

https://www.acs.org/content/acs/en/meetings/acs-meetings.html?sc=201228_mtg_em_SPR21_members_od



Benito Buksh

Go ahead... ask a chemistry grad!

Princeton University's Chem-STEM tells students what doing chemistry is really like...

Photos by C. Todd Reichart, Princeton University



Marissa Lavagnino

“How do you come up with ideas?” “Have you discovered any interesting stuff?” “What’s the most dangerous chemical you’ve worked with?” These are just a few of the irreproachable questions asked — and answered — through a new science outreach program run by Princeton’s Department of Chemistry introducing high schoolers to grad school chemistry.

Chem-Stem is a live, online program run by graduate students in the department of chemistry at Princeton University. The goal of Chem-Stem is to inform middle-school and high-school students about graduate school / a career in science and ultimately inspire students at a young age to pursue careers in STEM. Given the current digital learning setting, they thought this would be an excellent time to help motivate students to be excited about science! “I think it’s really enriching to interact with the high school students because they’re so optimistic and curious,” says Benito Buksh, a first-year graduate student and one of Chem-STEM’s initiators. “This childlike optimism and curiosity about the world is exactly why we went into science in the first place.”

The program begins with a 10-minute introductory presentation on the path to graduate school, what graduate students actually do, and what a career in science entails. Additionally, they talk about how chemistry impacts students’ lives (chemistry is all around us and saves lives!). This presentation is followed by a guided 10 to 20 minute Q&A session where the students can ask two to three chemistry graduate students questions and/or the graduate students can ask each other questions (What is your favorite part about graduate school / Are chemicals dangerous?).

As an example of the Q&A, when one Trenton High School student asked how a new material gets conceived, “like, what’s the process?” third-year grad student Marissa Lavagnino gave a pitch-perfect answer to the 20 students online: “When you’re doing organic chemistry in general, you’re really just mixing two things together. Then, you characterize the material once it’s done mixing,” she said. “When you’re trying to develop a material, you have a specific purpose - you’re adding in new things or removing things, heating them up or cooling them down. It’s a lot of trial and error and optimization.”

The pilot program in spring 2020 saw five events with Princeton section-area high schools including Trenton High, Hamilton High, and Council Rock High in Newtown, Pennsylvania. The program continued in fall 2020 with nine additional virtual visits. Program leader Benito Buksh has contacted Lehigh Valley section to make us aware of the program and to identify potentially interested schools in our area.

More info? Contact Benito Buksh, bbuksh@princeton.edu

Source: Wendy Plump, Princeton University, May 13, 2020

Education and Achievement Awards for 2020 Reflect Virtual Year

The most critical part of ACS' mission is to provide guidelines for high quality chemical education at all levels. LVACS strives to keep students and teachers inspired throughout their academic careers and rewards exceptional achievement through our annual awards programs. Our Awards Program for 2020 suffered a severe setback due to COVID-19 and awards were significantly delayed and, in some cases, cancelled. As we begin the process of honoring contributions during the pandemic year of 2020 with our 2021 awards, we look back to the times when we could applaud our colleagues' work in person and then also look forward to recapturing that peer recognition spirit when we are all able to gather again.



LVACS Annual Awards

The Lehigh Valley section offers the following awards and scholarships each academic year:

- Undergraduate senior awards
- Foundation in Chemistry Award
- High School Teacher of the Year
- Small College Teacher of the Year
- Organic Chemistry Award
- Chemagination Competition
- Chemistry Olympiad Competition
- ACS Project SEED and Scholars Program

Detailed descriptions of these awards, eligibility and nomination/application materials may be accessed through our LVACS website, <https://www.lvacs.org/education-and-student-awards> or by contacting the LVACS awards committee chair, John Freeman, jcf2@rcn.com.



LEHIGH VALLEY SECTION OF THE AMERICAN CHEMICAL SOCIETY
2021 EXECUTIVE COMMITTEE

OFFICERS

Chair:
Roger Egolf
rae4@psu.edu



Chair Elect:
Lindsey Welch
lawelch@cedarcrest.edu



Immediate Past Chair:
George Ruger
gruger04@yahoo.com



Secretary:
Nigel Sanders
nigel53.sanders@gmail.com



Treasurer:
Lorena Tribe
lut1@psu.edu



COUNCILORS

Jeanne Berk (term ends 12/31/21)
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Kelley Caflin (term ends 12/31/23)
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ALTERNATE COUNCILORS

Mike Bertucci (term ends 12/31/23)
bertuccim@moravian.edu



Celia Williams (term ends 12/31/21)
lvacscma@gmail.com

