

THE OCTAGON

LVACS 2025 Officers Announced: See Page 3

LVACS January Meeting

Thursday, January 23rd

Collier Hall of Science, Moravian University

"Swimming Pool Chemistry, or How to Green the Rio Diving Pool"



So... your chemistry career has taken off, and you now own a home with a swimming pool. Do you know enough chemistry to take care of your pool? Absolutely! With a basic knowledge of acid-base chemistry and solubility equilibria, plus some chlorine chemistry, you can understand the key principles of pool maintenance. We'll discuss the key ideas in pool chemistry--pH, chlorine sanitation, and calcium concentration--take a look at a new chlorination system involving electrolysis, and reflect on how it all went wrong at the diving pool at the Rio Olympics. Students encouraged to attend, because swimming pool chemistry is a great way to see basic chemical principles at work in real life.

Speakers: Carl Salter, Professor of Chemistry and William Farina, Laboratory Coordinator and Instructor, Moravian University

The meeting will be hybrid: connection details will be posted

Social Hour - Collier Lobby 5-6 pm [Cheese and Crackers, Fruit Plate, iced tea and water]

Dinner - Collier Lobby 6-7 pm [Balsamic-Glazed Chicken Breast Grilled, then Topped with a Colorful, Classic Tomato Basil Bruschetta Salad; Market House Salad with Homemade Croutons and Ranch & Balsamic Vinaigrette; Vegetarian Pasta Primavera]

LVACS Meeting and Pool Talk - Mellon Lecture Hall, Collier 202 7-8 pm

Social Hour/Dinner: \$20 / \$10 students/retirees/unemployed

Reservations: Please contact June Thompson by 1/17, thompsonj03@moravian.edu

Directions: <https://www.moravian.edu/psych-conference/directions-and-maps>

Parking: Main Street or Lots M, N, O

MEETING ORGANIZER CONTACT: Carl Salter, salterc@moravian.edu

LVACS Events Calendar

HAPPY NEW YEAR FROM LVACS!



...and best wishes for a
 (more?) quantized 2025!



1 H 1.00794	2 He 4.002602	3 Li 6.941	4 Be 9.012182	5 B 10.811	6 C 12.011	7 N 14.007	8 O 15.999	9 F 18.998	10 Ne 20.180	11 Na 22.990	12 Mg 24.305	13 Al 26.982	14 Si 28.086	15 P 30.974	16 S 32.06	17 Cl 35.45	18 Ar 39.948	19 K 39.098	20 Ca 40.078	21 Sc 44.956	22 Ti 47.88	23 V 50.942	24 Cr 52.00	25 Mn 54.938	26 Fe 55.845	27 Co 58.933	28 Ni 58.69	29 Cu 63.546	30 Zn 65.38	31 Ga 69.723	32 Ge 72.64	33 As 74.922	34 Se 78.96	35 Br 79.904	36 Kr 83.80	37 Rb 85.468	38 Sr 87.62	39 Y 88.906	40 Zr 91.224	41 Nb 92.906	42 Mo 95.94	43 Tc 98.906	44 Ru 101.07	45 Rh 102.91	46 Pd 106.36	47 Ag 107.87	48 Cd 112.41	49 In 114.82	50 Sn 118.71	51 Sb 121.76	52 Te 127.6	53 I 126.91	54 Xe 131.29	55 Ba 137.33	56 La 138.91	57 Ce 140.12	58 Pr 140.91	59 Nd 144.24	60 Pm 144.91	61 Sm 150.36	62 Eu 151.96	63 Gd 157.25	64 Tb 158.93	65 Dy 162.50	66 Ho 164.93	67 Er 167.26	68 Tm 168.93	69 Yb 173.05	70 Lu 174.97	71 Hf 178.49	72 Ta 180.95	73 W 183.85	74 Re 186.21	75 Os 190.23	76 Ir 192.22	77 Pt 195.08	78 Au 196.97	79 Hg 200.59	80 Tl 204.38	81 Pb 207.2	82 Bi 208.98	83 Po 209	84 At 210	85 Rn 222	86 Fr 223	87 Ra 226	88 Ac 227	89 Th 232.04	90 Pa 231.04	91 U 238.03	92 Np 237.05	93 Pu 239.05	94 Am 243.06	95 Cm 247.07	96 Bk 247.07	97 Cf 251.08	98 Es 252.08	99 Fm 257.09	100 Md 258.10	101 Nh 261.10	102 Fl 269.10	103 Lv 260.10	104 Ts 261.10	105 Og 269.10
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January 2025

Section Meeting at Moravian University

Thursday, January 23rd, 5-8 pm

Collier Hall of Science, Moravian University

“Swimming Pool Chemistry, or How to Green the Rio Diving Pool”

Speakers: Carl Salter and William Farina, Moravian University

Reservations: June Thompson, thompsonj03@moravian.edu

ORGANIZER CONTACT: Carl Salter, salterc@moravian.edu



February 2025

Section Meeting at Albright College

Thursday, February 27th

Speaker: Kyle Smith, Penn Color, Inc.

CONTACT: Matt Sonntag, msonntag@albright.edu



March 2025

Section Meeting at Muhlenberg College

Thursday, March 6th

Speaker: Valerie Shurtleff, Merck/West Point, PA

CONTACT: Sherri Young, sherriyoung@muhlenberg.edu



April 2025

Section Meeting/Undergraduate Research Posters at DeSales University

Tuesday, April 8th

Speaker: TBA

CONTACT: Sara Hayik, sara.hayik@desales.edu



Also In This Issue...

3. LVACS Elections 2024: New Officers Announced.

4-5. November Meeting Report; 2024 Ned D. Heindel Lecture and Presentation of Ned Heindel Organic Chemistry Award.

6-7. WCC Pages: Color Me Mine Holiday Event Report; **IUPAC Global Women's Breakfast 2/11.**

8. LVACS 2025 Awards Competitions Announced.

9-10. YCC Pages: Don't forget Geroige Ruger LVACS travel awards and NEW LVACS Mini ChemLuminary Awards!

11. Career Page: NEW ACS Career Center Launched!

12-13. SCC Pages: Mollusc Fiber Optics seen in Heart Cackle.

14. **ACS PHYS Webinar 1/22:** “From Stardust to Life: The Chemistry of Habitable Worlds.”

15. 2025 Chemistry Olympiad competition kicks off in LV.

16. 2024 Executive Committee.

Stay tuned to www.lvacs.org and our social media pages for all the latest!   
 CONTACT: Nigel Sanders, LVACS secretary, newsletter editor and webmaster, nigel53.sanders@gmail.com

LVACS Announces 2025 Officers

A special welcome to new officers Carl Salter,
Chair-elect and John Freeman, Alternate Councilor



The Lehigh Valley ACS Section held its annual election November 3-16 by an online voting process. 37 qualified voters participated. The election results are listed below (each candidate received 37 votes each) and were confirmed by the ACS Secretary's office in December. Terms began January 1st.

Chair-elect: **Carl Salter** (one-year term; proceeds in second year (2026) to Chair and in third year (2027) to past Chair

Secretary: **Nigel Sanders** (one-year term)

Treasurer: **Sherman Cox** (2-year term)

Councilor: **Jeanne Berk** (3-year term)

Alternate Councilor: **John Freeman** (3-year term)

Carl and John will be joining the Executive Committee (EC) in their new capacities along with the current members Nigel, Sherman, Jeanne and the incoming Chair, Chester Crane and past chair Philip Elias. Carl is presently Professor of Chemistry at Moravian University and the recipient of the LVACS 2024 Award for Excellence in Chemistry Teaching at Small Colleges within the Lehigh Valley. John is a 40-year member of the ACS and has been Chair and Treasurer of LVACS in past years. He is currently Awards Chair and has been serving on the LVACS EC as a Member-at-Large for several years.

REVIEW NEW OFFICER [BIOS](#) and direct all questions to LVACS Secretary Nigel Sanders, nigel53.sanders@gmail.com. Please congratulate the new officers and thank them for volunteering to keep our section strong!

Call for LVACS Committee Members / Chairs

LVACS is always looking for volunteers who share a special interest in the many communities within our section. The Section's [new bylaws](#) passed in September, specify three standing Committees: Nominating (Mike Bertucci, Chair, bertuccm@lafayette.edu), Program (Chaired by the current Chair-elect, Carl Salter, salterc@moravian.edu) and Finance (Chaired by the current treasurer, Sherman Cox, shermdc51@gmail.com). Other Committees must be approved by the EC, providing that a member willing to serve as Chair is identified. For example, at the November Executive Committee meeting, we welcomed Yi Du (duyidoit@gmail.com) as new Chair of the Women Chemists Committee (see page 6 for a good example of a Committee-sponsored event, fully supported by the LVACS local section). Other active committees include our Younger Chemists Committee, chaired by Steve Boyer (sboyer11@esu.edu) and our Awards Committee, chaired by John Freeman (jcf2@rcn.com). There are many opportunities to start/restart committees serving other communities such as Senior Chemists, Membership, Professional Relations, Inclusion, K-12 Education, SEED/Scholars program coordinator and others. Chairing or serving on a Local Section committee can be a rewarding way to meet ACS chemists with similar interests in our local area.

Interested? Please contact Nigel Sanders, LVACS Secretary, at nigel53.sanders@gmail.com

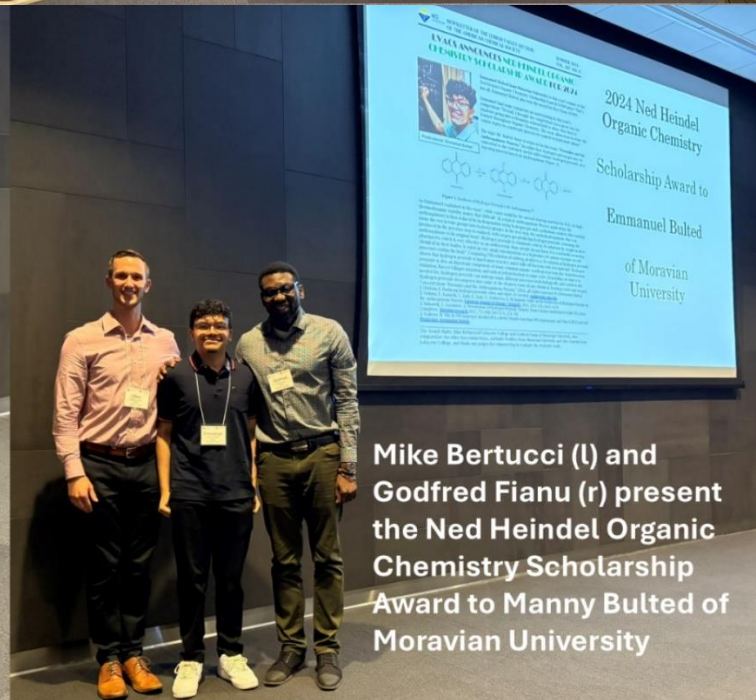
Lehigh Valley ACS November Meeting Report

The LVACS November 20th section meeting continued the new tradition of celebrating the end of the year at Lehigh University with remembrance of one of ACS' greats, our very own Ned Heindel, and hearing a lecture in his honor by an expert in his field of Medicinal Chemistry. This year the **Ned D. Heindel Lectureship Award** was presented to **Allen B. Reitz, Ph.D., CEO of Fox Chase Therapeutic Discoveries, Inc.** After an energizing social hour and dinner in Iacocca Hall's Wood Dining Room, the meeting began with presentation of the **Ned Heindel Organic Chemistry Award to Moravian University student Emmanuel Bulted**. Then we heard from Lorena Tribe of Penn State Berks and Christophe Guillon of Azevan Pharmaceuticals, relating their personal reminiscences of how Ned's gentle mentorship helped them pursue their career paths. Finally, **Sherri Young of Muhlenberg College and Mike Bertucci of Lafayette College** formally introduced Dr. Reitz and presented his Lectureship award which led right into his talk "A research career: Make what you love benefit the world!" A very fine meeting all around enjoyed by 40 members. See the [slideshow](#).

Attendees enjoy the social hour (with ideas exploding from their heads?)



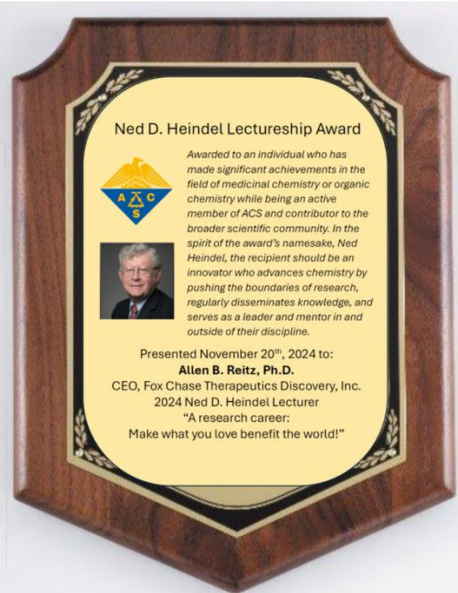
Philip Elias, LVACS 2024 Chair, presides at the meeting for the final time in his tenure



Mike Bertucci (l) and Godfred Fianu (r) present the Ned Heindel Organic Chemistry Scholarship Award to Manny Bulted of Moravian University

Lehigh Valley ACS November Meeting Report

Presentation of Ned D. Heindel Lectureship Award to Allen Reitz of FCTDI



FCTDI

Mazaperine

Cc1ccc(cc1)Nc2ccc(cc2)Nc3ccc(cc3)N

6. mazaperine, RWJ 37796

Table 2. Conditioned Excitatory Synapse (EAB) Activity and Synapse Timing Altered

Group	Dose (mg/kg)	Effect	Significance	Notes
3	10-17 mg/kg	no effect		
4	10-17 mg/kg	no effect		
5	10-17 mg/kg	no effect		
6	10-17 mg/kg	no effect		
7	10-17 mg/kg	no effect		
8	10-17 mg/kg	no effect		
9	10-17 mg/kg	no effect		
10	10-17 mg/kg	no effect		
11	10-17 mg/kg	no effect		
12	10-17 mg/kg	no effect		
13	10-17 mg/kg	no effect		
14	10-17 mg/kg	no effect		
15	10-17 mg/kg	no effect		
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19	10-17 mg/kg	no effect		
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21	10-17 mg/kg	no effect		
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45	10-17 mg/kg	no effect		
46	10-17 mg/kg	no effect		
47	10-17 mg/kg	no effect		
48	10-17 mg/kg	no effect		
49	10-17 mg/kg	no effect		
50	10-17 mg/kg	no effect		

Reitz AB, Baxter EW, Codd EE, Davis CB, Jordan AD, Maryonoff CA, McDonnell ME, Powell ET, Renzi MJ, Scholt MR, Scott MK, Vaughn JL. Orally active benzamide antipsychotic agents with affinity for dopamine D2, serotonin 5-HT1A, and adrenergic alpha1 receptors. *J Med Chem*. 1998 Jun 4;41(12):1997-2009. doi: 10.1021/jm970994z

FOX CHASE THERAPEUTICS DISCOVERY, INC.



Many thanks to Sherri Young, Mike Bertucci and Chester Crane of LVACS and Lisa Arechiga of Lehigh University for arranging this event and kudos to our Heindel Lecturer, Dr. Allen Reitz!

Women Chemists Committee (WCC) Celebrates the Holidays and Engagement for Women Chemists with a Pottery Painting Party

The LVACS Women Chemists Committee event December 18th at Color Me Mine in Bethlehem was an artistic endeavor worthy of Michelangelo (or at least his students!). Hosted by new WCC Chair Yi Du of ExxonMobil R&D, 12 members and friends took paint brushes in hand to decorate their favorite pottery substrate while sharing some career insights and other personal interests. It was a great time and a super way to cap off the year 2024 for LVACS. *We thank Yi for organizing and hosting this [unique event](#).* Stayed tuned for more WCC activities in 2025: Happy New Year (both)!

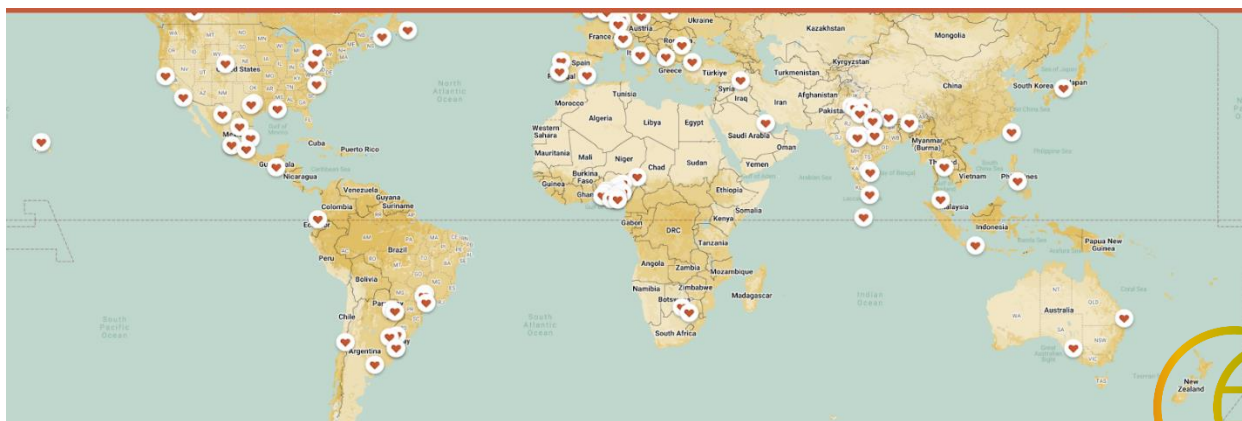


Bye, Dragon! Snake's coming!

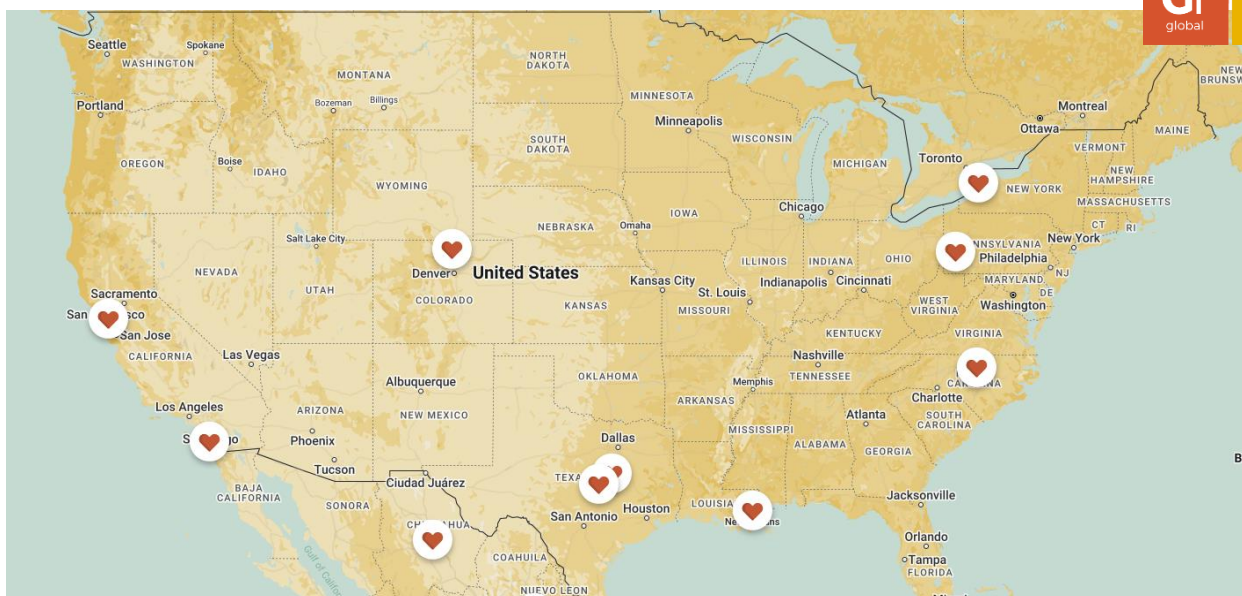
ACS Women Chemists Sponsor IUPAC Global Women's Breakfast 2025

Happy holidays from Fatima Mustafa, Project Coordinator, IUPAC GWB!

As per your continuous efforts in supporting women in Chemistry, we are glad to bring to your attention this amazing opportunity of engaging your institute/ACS local section in the IUPAC Global Women's Breakfast event, that will take place on **Feb 11, 2025** with the theme “*Accelerating Equity in Science*” in support of the [International Year of Quantum Science and Technology\(IYO\)](https://iupac.org/iyo/) in 2025. For more info: <https://iupac.org/gwb/>. Unlike traditional events where you register to attend e.g conferences, this is an annual global occasion where groups, institutes, universities, schools are encouraged to organize their *own event* to celebrate women in science and foster collaboration in the scientific community. As we understand everyone's busy schedule, please note that the event could be as simple as gathering over coffee for a few colleagues or as big as hosting a symposium or seminar. The format is entirely up to you—flexibility is key! *Excited to add your event to the map?* Since 2019, the event has been organized annually with over 300 local events held worldwide each year. The US has organized 186 events in total up to now with 13 in Pennsylvania including 1 for 2025 GWB. Let's work together to increase the US participation, add your event to the map and and proudly celebrate the incredible contributions of women in science!



IUPAC GWB 2025 registered events globally



IUPAC GWB 2025 US registered events

LVACS Annual Competitions and Awards: Call for Nominations

John Freeman, jcf2@rcn.com, LVACS Awards Committee Chair, along with the Section's Executive Committee invite members and the local community to recognize outstanding achievements in chemistry and chemical education by our colleagues. More on these awards, including past winners and forms can be found on our website, <https://www.lvacs.org/education-and-student-awards>.

Chemagination Competiton

Chemagination is a great learning experience for students. In addition to increasing their knowledge of science and chemistry, they can improve their creative, teamwork and public speaking skills. High school students are asked to imagine that they are living 25 years in the future and are writing for ChemMatters, a magazine for high school students that focuses on the role of chemistry in everyday life. The editor chooses them to them to write the cover article for the next issue of the magazine describing a recent breakthrough or innovation in chemistry and its applications that improve the lives of those living in 2050 and design the magazine's cover. The article must be written to fit in one of four categories: Alternative Energy, Environment, Medicine/Health, or New Materials. The winners of the LVACS local section competition will advance to MARM 2025.

Foundation in Chemistry Scholarship Award

The Lehigh Valley Section of the American Chemical Society (LVACS) is delighted to announce the 2025 Foundation in Chemistry Award. The award, designed to promote the chemical sciences at the college level, will be given to a high school senior who will be majoring in chemistry, biochemistry, or chemical engineering and attending a college or university in the Lehigh Valley Section. This scholarship award is based on individual merit and consists of \$2000 and a plaque.

Excellence in High School Teaching Award

The award is designed to promote excellence in Chemistry instruction at the high school level within the membership boundaries of the LVACS (Lehigh, Northampton, Berks, Monroe, Schuylkill, and Carbon Counties in PA, and Warren County in NJ). The award consists of \$2000 and a certificate of recognition. We hope that members will identify an outstanding teacher at their school and support them for the award. Additionally, we hope that members will share this with your neighborhood schools to increase awareness of the award. The winner of this award will be nominated by the Section for the ACS Division of Chemical Education Middle Atlantic Region (MARM) Award for Excellence in High School Teaching.

Outstanding Achievement in Teaching Chemical Sciences at Small Colleges

You are cordially invited to nominate a colleague to be recognized at the annual awards program of the Lehigh Valley Section of the American Chemical Society (LVACS). We are seeking to recognize, encourage, and stimulate high quality teaching and research at small colleges. The award consists of \$2000 and a certificate of recognition. Please send the nominee's short curriculum vitae, list of publications, and evaluation of the nominee's achievements as a teacher in a small college. The winner of this award will be nominated by the Section for the MARM's E. Emmet Reid Award.

Ned Heindel Organic Chemistry Scholarship Award

This annual Scholarship for Organic Chemistry is for students below the junior level, currently enrolled in organic chemistry at an institution in the section, and a chemistry, biochemistry, or chemical engineering major. The competition entails taking the ACS Organic Chemistry Examination (45%), a brief, one-page letter of recommendation from the student's organic chemistry professor (10%), and an essay on a topic in organic chemistry (45%). The value of the scholarship is \$2000. Additionally, the top essay will receive \$200.

Younger Chemists Committee (YCC) Page

Students! Don't forget the George Ruger LVACS Student Travel Awards for Spring 2025 Meetings!

The travel award is for a \$150 to support students from the local section traveling to an ACS Conference. For your application to be complete and considered, submit this completed form AND:

- A copy of the email notifying abstract acceptance for the conference.
- A short explanatory letter (1 page max) describing what you hope to learn from the meeting.

Eligibility:

- Any college or university student attending a school in the Lehigh Valley ACS Local Section area who is presenting at an ACS National or Regional meeting. Only one presenter per presentation is eligible.
- Preference will be given to first-time attendees.
- The award is based on merit as judged by the LVACS Executive Committee.

Post presentation requirements:

- Submit a photo and short paragraph about your experience to be published in the Octagon Newsletter.
- If possible, present at the LVACS Undergraduate Poster Session before the Awards Banquet

All applications must be completed and emailed to Steven Boyer (sboyer11@esu.edu) by the following dates:

2025 Deadlines (all are 11:59pm on given date):

- **Spring National Meeting 2/7/2025**
- **MARM, NERM 5/11/2025**
- **Fall National Meeting 7/1/2025**

Application (below and also available [here](#))

Student Name _____ Institution _____

Mailing address for check _____

Faculty Advisor Name _____

Presentation Title _____

Conference Attending _____

This conference is (circle one)	regional	national
Format of presentation (circle all that apply)	poster	oral
This is your first conference presentation:	Yes	No
Have you won a previous LVACS Travel Award?	Yes	No

Student Signature _____ Date _____

Student Name (printed) _____

Faculty Advisor Signature _____ Date _____

Faculty Advisor (printed) _____

Younger Chemists Committee (YCC) Page

Students! New! Mini ChemLuminary Awards for Chem Clubs

LVACS is accepting nominations for the following Mini ChemLuminary Awards:

Outstanding Performance by a Chemistry Club

This award recognizes a chemistry club for outstanding overall performance and for excellence in individual programs or activities for the current academic year.

Outstanding Individual Event

Recognizes a chemistry club for an innovative event, hands-on activity or demonstration during the current academic year.

**Award winners will be recognized at the LVACS Awards Banquet in April.

Eligibility:

- Any chemistry related student organization in Lehigh Valley ACS Local (does not require being an ACS Student Chapter).
- One nomination per award per school. Any additional applications will not be submitted to the committee for review.
- **The attached application must be submitted to Steve Boyer (sboyer11@esu.edu) by 11:59 pm on 3/7/2025 for consideration. (also available [here](#))**

While not required, we encourage all clubs to present a poster at the LVACS Undergraduate Poster Session on 4/8/25 at DeSales University.

Mini ChemLuminary Nomination Form

Club Name_____

Institution_____

Number of members_____

Summary of events organized

Use the following table to list events that were organized by the club during the 24-25 academic year. You may add more rows as needed. Please indicate the event you are nominating for the best individual event award by bolding the event title in the table. You may only nominate one event per school.

	Event	Approximate Number of Attendees/volunteers
Example	Mole Day Demonstrations in the Quad	50/4
1		
2		
3		
.....		

Brief event description

Provide a short (one paragraph) description for each of the events listed in the above table. Make sure the paragraphs are numbered to match the table. You may attach an appendix with any pictures, flyers, or other supporting information for the nomination. Please indicate the event you are nominating for the best individual event award by starting the description with (Event Nomination)

Example: (Event Nomination) From 2-4pm on 11/23/24, the club did chemistry demonstrations for the campus community on Named Quad. This was a collaboration event between the Chem Club and the STEM Club on campus. Members of the Chem Club organized demonstrations for the event which included Elephant Toothpaste, iodine clock reaction, and slime.

LEHIGH VALLEY ACS CAREER PAGE

Check out the Career page on our website lvacs.org/careers for a wealth of information on the services provided by LVACS and ACS to chemists at all stages of their careers. Online courses, 1-on-1 consulting, professional development grants and the new [ACS Career Center](#) package are some of the benefits offered to ACS members to assist in planning and executing your career.



[My Account](#) | [Job Search](#) | [Manage Resumes](#) | [Create Job Alerts](#)

The American Chemical Society is proud to announce the launch of its new and improved career center, [ACS Chemistry Careers](#) (formerly C&ENjobs and Get Experience). From internships and REUs, to full-time research and lab positions, we have you covered in all stages of your career. [Create an account](#) and start exploring the benefits of our new career center today.

SEARCH OPPORTUNITIES



Search and apply to top **chemistry jobs** at institutions that value your credentials.



Upload your resume so employers can contact you. You remain anonymous until you choose to release your contact information.



Create **Job Alerts** and receive an email each time a job matching your specified criteria becomes available.

POST YOUR JOB



Post your job, or your institution's job, where the industry's most qualified chemistry professionals go to advance their careers.



Email your job directly to American Chemical Society job seekers via our exclusive **Job Flash™** email.



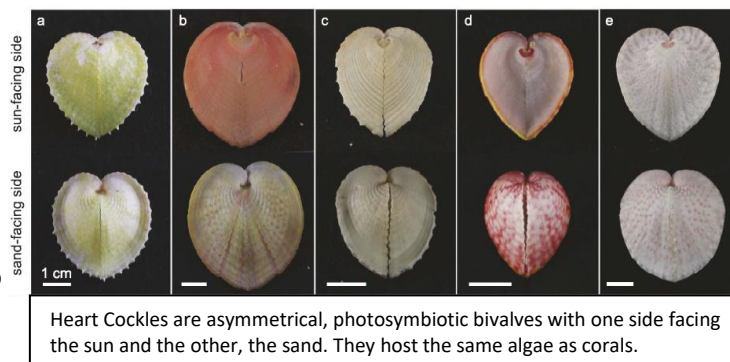
Search our **Resume Bank** using robust filters to narrow your candidate search.

Lehigh Valley ACS Senior Chemists Page

What a mollusc shell and fiber optic cables have in common

Scientists found that the little windows in the heart cockle shells stream more than twice as much useful sunlight into their interiors for their algal tenants than harmful UV radiation.
 Ruiqi Li/Dakota McCoy

as reported by Ari Daniel, National Public Radio



Healthy corals are colorful and full of life. And under normal conditions, corals and algae depend on one another. The corals offer the algae protection and the photosynthesizing algae provide the coral with the components they need to make proteins and sugars. As waters warm, though, corals often bleach, which means they eject their algae. "The corals look white or sometimes black cause they've died," says [Dakota McCoy](#), a biologist at the University of Chicago. "There's no fish around. It's way less biodiverse." However, "if you snorkel over a reef after a heat wave, other animals still look healthy," says McCoy. "They've still got their algae unlike the coral. It seems to take more to get them to bleach. So that's kind of a weird biological mystery." These seemingly healthy creatures include a clam-like mollusc called a heart cockle — the name coming from the shape of its shell. "These strange little clams are a little bit tougher than corals," says McCoy, "even though they host the same type of algae inside their cells that corals do." McCoy wanted to know why that might be. In an **open access paper** published in the November 19th issue of [Nature Communications](#), she and her colleagues conclude that the structure of the heart cockle's shell operates as its own kind of fiber optic cables to channel light to the algae living inside it. It's a finding that may have both engineering and conservation implications.

Stained glass in miniature

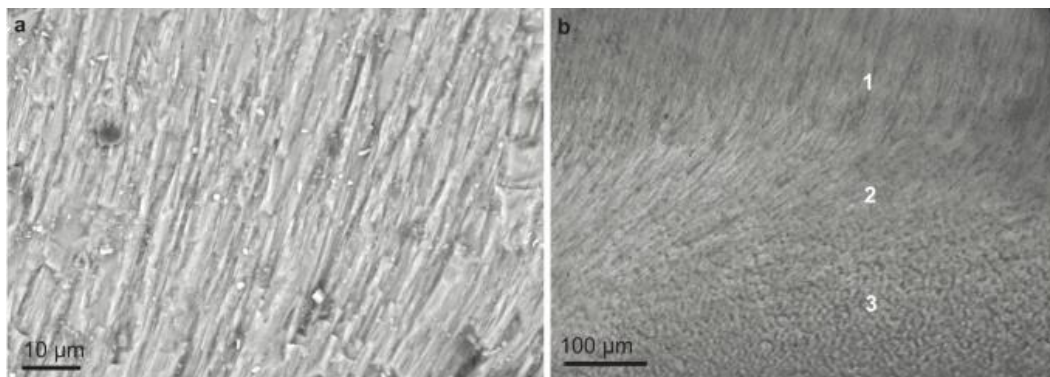
McCoy and her colleagues began their investigation by shining LED lights through the heart cockles. "In a lot of shells, there [are] tiny little triangles where the light passes through. In some of the shells, it looks more like big zebra stripes. Some of the shells look like stained glass windows. So there's material there but light gets through." She wanted to know how the heart cockles render their shells transparent to get the light to their algal residents that depend on it. "Are they doing something more interesting than just letting light pass through?," she wondered. So she gathered some cockles from the Yale Peabody Museum of Natural History and an online collector for a closer look. An instrument called a spectrophotometer, "can measure what color light passes through a little fragment of shell suspended in seawater by scanning over every wavelength of light from ultraviolet to infrared," McCoy explains. She and her colleagues found that the little windows in the heart cockle shells stream more than twice as much useful sunlight into their interiors for their algal tenants than harmful UV radiation. In addition, some individuals have mineral lenses beneath their little windows. "What they seem to do is condense light into a beam so that it's illuminating more deeply into the algae-rich tissue that's doing all the photosynthesis," says McCoy. The lens may also spread the light out "so you're not going to actually burn your [algae] or have too much light intensity," says Stanford University physicist [Jennifer Dionne](#), who collaborated with McCoy.

Lehigh Valley ACS Senior Chemists Page

What a mollusc shell and fiber optic cables have in common (continued)

Natural fiber optics

McCoy and Dionne then looked more closely at the shell's architecture. They knew it was made out of a kind of calcium carbonate, aragonite, a mineral that's usually opaque in coral skeletons or other clam shells. When those structures are examined under a microscope, McCoy says, "you see lots of big plates that are jumbled together and often arranged in a very sturdy brick-like manner." But when she used an electron microscope to study the mineral structure of the heart cockle shell, the calcium carbonate crystals were organized into long, super narrow fibers that were "all oriented the same direction as the direction that sunlight needs to travel to get into the shell," she says. Dionne instantly saw something familiar. "Here's a natural organism that is guiding light essentially via its own fiber optic bundles to basically help its symbionts harness sunlight," she says. "I think it might be one of the first examples in nature." The researchers say that structure could inspire tiny cameras with miniscule lenses or even improve fiber optic cable technology. "I think there's a lot we can learn about how biology handles light," says Dionne. University of Georgia cell biologist [Mark Farmer](#) wasn't involved in the research and was impressed with the paper. "It's difficult to balance the needs of a strong structural shell — which is of course the reason that clams make shells in the first place — with light transmission," he says. "So I think the fact that the cockles have solved effectively both problems with these fiber optics is the most significant finding." Farmer says the results may help explain why corals tend to bleach more readily than heart cockles, a phenomenon triggered by stress. While both organisms may be exposed to the stress of warming ocean temperatures, "by eliminating that additional stress of ultraviolet light, which can damage DNA, the cockles are perhaps less subject to the kind of stress that would lead to a bleaching event," says Farmer. McCoy agrees and believes that this difference could provide insights into how to help corals. "Can we think a little bit more about how heart cockles manage the light environment for their algae and maybe take inspiration from that to engineer new algae or new corals — a little bit more resilient, a little bit more robust?" she asks. McCoy sees in these shells more than a billion years of evolution — what she calls "product design honed by natural selection." "The heart cockle is a very cool story of how a living creature can manipulate light as well as many human engineers can," she says. "It's a beautiful example of a sustainable creature using solar energy in a very efficient way, thanks to an amazing natural evolved technology."



a A cross-sectional SEM of a single shell window shows fibrous prisms of aragonite oriented roughly perpendicularly to the shell surface (the "fibrous prismatic layer"). Together, these prisms act like fiber optic cable bundles. **b** A light microscope image of a polished shell fragment shows the fibrous prisms rotating in orientation between the regions labeled 1–3. In region 1, we see the side view of fibrous prisms; in region 3 we see cross sections of aligned prisms pointing into the page.

Figure 4 excerpt, [Nature Communications](#) volume 15, Article number: 9445 (2024) © 2024 Springer Nature Limited

From Stardust to Life: The Chemistry of Habitable Worlds

Free Webinar Co-produced with the ACS PHYS Astrochemistry Subdivision
Wednesday, Jan. 22nd | 3:00 PM – 4:00 PM EST

What made Earth hospitable to the origins of life? And how often should we expect planets around other stars to be habitable? The answers to both these questions lie in the formation and distribution of molecules in planet-forming disks around young stars. By studying the chemistry of these disks, we can begin to map out under which conditions young planets have access to the elements most associated with life, to water, and even to organic molecules.

Join Karin Öberg of the Department of Astronomy at Harvard University as she reviews our current understanding of this chemistry, as well as how this understanding has been achieved through a combination of astronomical observations, including chemical imaging of disks with the powerful microwave telescope ALMA, theory, and laboratory experiments aimed at recreating some of the exotic chemistry characteristic of planet-forming environments.



Karin Öberg
Speaker
Thomas Dudley Cabot Professor of the Natural Sciences,
Department of Astronomy,
Harvard University



Susanna Widicus Weaver
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What You Will Learn

- The basics of planet formation and its links to chemistry
- How organic molecules can form at cryogenic temperatures
- What observational methods enable us to observe molecules in star and planet forming regions

REGISTER FOR FREE!



Chemistry Olympiad 2025 Kicks Off in Lehigh Valley

A note from Gail Marsella, gbcmars@gmail.com, LVACS Olympiad coordinator.

Dear Teachers and Principals in the Lehigh Valley Area:

The 2025 Chemistry Olympiad for high school students is revving up. Interested students can get registered for the exams at the American Chemical Society (ACS) website from now until **January 17, 2025**. **Please introduce your students to the program and encourage them to participate.**

Our Lehigh Valley local section exam is open to any high school student in Lehigh, Northampton, Warren (NJ), Berks, Carbon, Schuylkill, and Monroe counties. Participants should have completed or are taking at least one HS chemistry class. Advanced placement students are particularly encouraged to participate. **(Registration link below.)**

Note: we have updated our teacher/principal spreadsheet with current website information. If you are new to this program, welcome! If you have colleagues who might be interested in the program for their students, please share this information with them.

The Olympiad has four tiers:

- **Local Section Exam: March 23, 2025 at Muhlenberg College in Allentown, PA.** This is a paper exam. The top 12 participants from this exam will advance to the National Exam (only 2 from any one high school, however).
- **National Exam: April 13, 2025 at Lehigh University in Bethlehem, PA** - US Citizens or green card holders only. This consists of two paper exams, plus a laboratory practical exam, so it's a long day (we provide breaks, water, and lunch).
- **Study Camp:** June 2025. The top twenty participants from around the country will go to a study camp for intensive tutoring.
- **International Olympiad Competition:** July 2025. The top four participants from the study camp will travel to the hosting country for this event.

New this year: parents/guardians must register their students online at the ACS website. Students must be registered to participate.

Here is the registration link (**deadline for student registrations is January 17, 2025**):

https://fs10.formsite.com/ACS_Outreach/2025USNCO/index

Students and parents are strongly encouraged to review the materials available on the ACS website:

- **About:** <https://www.acs.org/education/olympiad/about/international.html>
- **Rules and Eligibility:** <https://www.acs.org/education/olympiad/rules-and-eligibility.html>
- **How to Participate:** <https://www.acs.org/education/olympiad/participate.html>
- **Prepare for Exams:** (back tests, coaching, webinars, forums, etc.)
<https://www.acs.org/education/olympiad/prepare-for-exams.html>

CONTACT: Gail Marsella, Muhlenberg College Chemistry Instructor, retired, gbcmars@gmail.com

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crane@musselpolymers.com



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salterc@moravian.edu



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philipjelijas@gmail.com



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Nigel Sanders
nigel53.sanders@gmail.com



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Sherman Cox
shermdc51@gmail.com

COUNCILORS

Jeanne Berk (term ends 12/31/27)
jrberk@cedarcrest.edu



Matt Sonntag (term ends 12/31/26)
msonntag@albright.edu

ALTERNATE COUNCILOR

John Freeman (term ends 12/31/27)
jcf2@rcn.com



