

THE CAPITAL CHEMIST

A Publication of the Chemical Society of Washington Section of the American Chemical Society

Join Us for the Next CSW Meeting on March 14th

Join us on Thursday, March 14th, for the Chemical Society of Washington (CSW) dinner meeting, including presentation of the Hillebrand Prize, Schubert Award, and Outstanding Volunteer Award.

Dr. Lyle Isaacs is being presented the 2018 Hillebrand Prize for his elucidation of the remarkable molecular recognition properties of cucurbit[n]uril-type molecular containers and demonstration of their biomedical application as solubilizing excipients and reversal agents.

Megan Hart (Montgomery Blair High School, Silver Spring, Maryland) is being presented the 2018 Leo Schubert Memorial Award in recognition of her outstanding teaching of high school chemistry.

Ivana Brekalo is being presented the 2019 Local Section Outreach Volunteer of the Year Award.

Dr. Lyle Isaacs Professor
Department of Chemistry and Biochemistry
University of Maryland, College Park

"Cucurbit[n]uril Molecular Containers: From Basic Science to Biomedical Applications"

Biography

Dr. Lyle Isaacs is currently a Professor in the Department of Chemistry and Biochemistry at the University of Maryland (UMD), College Park and is a world leader in the preparation and use of a class of molecular container compounds known as cucurbiturils (CB[n]). Lyle is a native New Yorker who graduated from the Bronx High School of Science before receiving degrees from the University of Chicago (B.S. 1991), the University of California, Los Angeles (M.S. 1992), and the Swiss Federal Institute of Technology (ETH), Zurich (Ph.D. 1995). For his Ph.D. work on the functionalization of buckminsterfullerene he received the Silver Medallion of the ETH. After an NIH postdoctoral fellowship at Harvard studying molecular recognition, he joined the University of Maryland in 1998. Dr. Isaacs' research is documented in over 155 peer reviewed publications, 11 patents, and 7 book chapters. Dr. Isaacs' work has received over 10,000 citations with a current h-index of 54. Previously, Dr. Isaacs has been recognized as a Cottrell Scholar of Research Corporation, won the Invention of the Year Award from UMD (2011), and was elected Fellow of the American Association for the Advancement of Science in 2013. Dr. Isaacs has been a tireless advocate for the CB[n] field and organized the first international meeting on CB[n] chemistry which has grown into the biannual International Conference on Cucurbiturils (ICCB). Dr. Isaacs is also active in service and is currently the Director of the University of Maryland Chemistry Graduate Assistance in Areas of National Needs (GAANN) program funded by the US Department of Education.

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Inside this issue:

- Attend this month's CSW Meeting on March 14th
- Learn about this year's CCEW theme, "Take Note: The Chemistry of Paper", and host an Illustrated Poem contest, or volunteer for Rockville Science Day
- Volunteer for the Chemathon!
- Attend the NCAC-SOT/CSW Spring Symposium
- Participate in the Wakefield Forest STEAM Day or volunteer for the Fairfax County Science Fair
- Learn more about MARM



Abstract

Containers are ubiquitous in everyday life, where they are used to store foods and beverages to maintain freshness, to ship objects to specific locations worldwide, and to promote organization of our stuff. Molecules need containers too, and for many of the same reasons. Cyclodextrin (CD) molecular containers have a variety of practical applications in everyday life. For example, CDs are used to formulate over \$5 billion per year of hydrophobic pharmaceutical agents for human administration and as the active ingredient in the household product Febreze. Over the past 2 decades, we have been developing the basic science of an alternative class of molecular containers – cucurbiturils – and exploiting their unique molecular recognition properties. This talk will trace the development of CB[n] receptors in my laboratory starting with our early work which elucidated the mechanism of CB[n] formation. Early on, the Isaacs lab made the key discovery that CB[n]•guest complexes can reach unprecedented levels of affinity and selectivity in water – even surpassing that of the biological Avidin•biotin affinity pair – which has served as a guiding principle and tool for us and many others. Our mechanistic knowledge enabled the preparation of a variety of CB[n]-type receptors in which the key glycoluril and formaldehyde building blocks were systematically *exchanged*, *deleted*, and *augmented* in order to understand their molecular recognition roles and enable new functions. For example, we found that nor-seco-CB[n], in which CH₂-bridges were deleted, display interesting structural and recognition properties like chiral recognition, homotropic allostery, and metal ion induced folding and assembly. The deletion and exchange of glycoluril building blocks lead us to acyclic CB[n]-type receptors with high potential for real world biomedical application. For example, highly water soluble acyclic CB[n]-type receptors can be used as solubilizing excipients for insoluble drugs in ways that complement and extend established CD technology. Acyclic CB[n]-type also function as *in vivo* (rats) sequestration agents for neuromuscular blocking agents that are used routinely during surgery (rocuronium, vecuronium, cisatracurium) but which display lingering post-surgical effects. Most recently, we have been exploring the use of acyclic CB[n] as a sequestration agent for methamphetamine and others drugs of abuse with potential application in drug overdose treatment. Augmentation of the glycoluril building blocks of CB[n] with clickable functionality enabled their attachment to solid phases for protein separation, to targeting ligands for targeted drug delivery, and to non-covalently modify proteins with polyethylene glycol to improve stability and modulate properties. Selected examples drawn from each area will be presented.

Meeting Logistics

Date: Thursday, March 14, 2019

Time: 6:00 p.m. Check-in / Social Hour

6:30 p.m. Dinner

7:00 p.m. Awards Presentation

7:30 p.m. Lecture

Location: ACS Headquarters – Marvel Hall 1155 16th St., N.W., Washington, DC

Menu: Meal will be catered by Fresh Connections Catering and will feature Prime Rib served au jus, with twice baked potatoes.

Vegetarian Option: Vegan Stuffed Cabbage Rolls (stuffed with brown rice, mixed mushrooms, dried cranberries, onions and red wine, served with penne marinara).

Sides: Salad and artisan bread

Assorted beverages will be provided.

Cost: \$26 (Members and guests) / \$13 (Students and High School Teachers)

RSVP by noon Tuesday, March 12, to csw@acs.org (preferred) or by phone (messages only: 202.659.2650).

Please provide the names in your party when you RSVP, and if you wish to have the meat or vegetarian option. The public is invited to attend. You may attend the talk only, but reservations are appreciated. If you need any further information or would like to make a reservation, please contact the CSW office by email at csw@acs.org or by voicemail at 202.659.2650.

Parking: Parking is available in nearby commercial parking garages. Please be aware that garage closing times vary. Parking is also available on the street after 6:30 pm, but be aware that most parking meters are in effect until 10:00 pm and may be limited to 2 hours. You should check the individual meters for details and payment methods as some are no longer coin-operated.

Congratulations to the 2018 Hillebrand and Schubert Award Winners

CSW is pleased to announce the winner of the 2018 Hillebrand Prize: Professor Lyle Isaacs

Professor Isaacs is in the Department of Chemistry & Biochemistry at the University of Maryland. He is recognized for his excellent work in elucidating the remarkable molecular recognition properties of cucurbit[n]uril-type molecular containers and demonstrating their biomedical application as solubilizing excipients and reversal agents.

The Hillebrand Prize is awarded annually for original contributions to the science of chemistry by a member or members of the Chemical Society of Washington. The Hillebrand Prize is the most prestigious honor given by CSW and is recognized nationally as a mark of significant accomplishment in chemistry. Many previous Hillebrand Prize winners have won numerous other national and international awards, including three that have received the Nobel Prize. The Hillebrand Prize originated in 1924 and is named for Dr. William F. Hillebrand (1853-1925), an internationally recognized pioneer in analytical chemistry and one of Washington's most distinguished chemists.

CSW is pleased to announce the winner of the 2018 Schubert Award: Ms. Megan Hart

Ms. Hart is being awarded the Schubert Award for advances in the chemistry curriculum at Montgomery Blair High School in Silver Spring, MD. Since joining Montgomery Blair, she has been involved in innovations in the chemistry curriculum including the development of a course in organic chemistry that incorporates hands-on, project-based material. She has also upgraded the Forensics course by the inclusion of "Crime and Punishment Day" at Blair, and incorporation of aspects of anthropology and etymology into the course content. One of her referents noted that she "is able to motivate students to teach themselves."

The Leo Schubert Memorial Award recognizes an outstanding teacher of high school chemistry in the Washington, D.C. area. The award was established in 1979 to honor Dr. Leo Schubert, a chemistry professor at American University who devoted much of his career to developing programs for high school teachers and students.

Congratulations to the College Chemistry Achievement Awardees!

College Chemistry Achievement Awardees

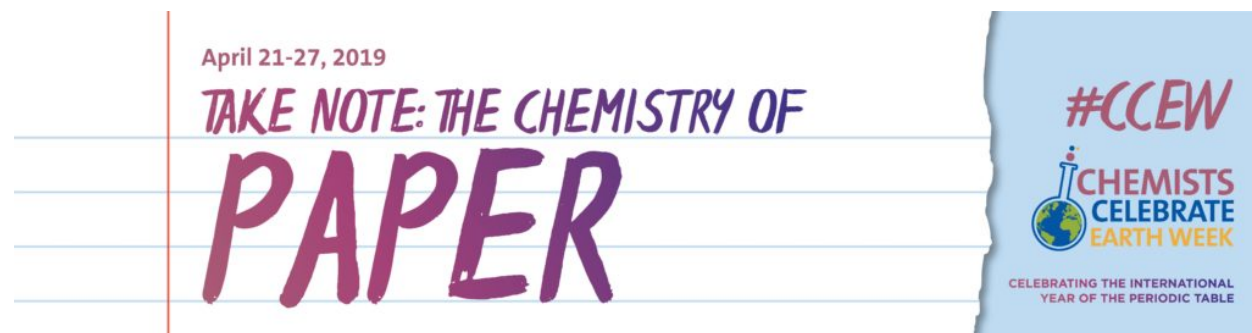
February 14, 2019



Left to Right: Nicole Barnes, Karina Bursch, Casey Culhane, Elizabeth Diessner, Caroline Doherty, Mary Katherine Robey, Sophia Sommerkamp

Congratulations to all the students who received awards! [See the full list of students receiving the award.](#) We were pleased to be able to acknowledge these students at CSW's February 14, 2019, dinner meeting, where we presented each with an award certificate and \$25 Amazon gift card. These awards are presented annually to outstanding seniors majoring in chemistry and biochemistry from each of the area colleges and universities.

Chemists Celebrate Earth Week - April 21-27, 2019

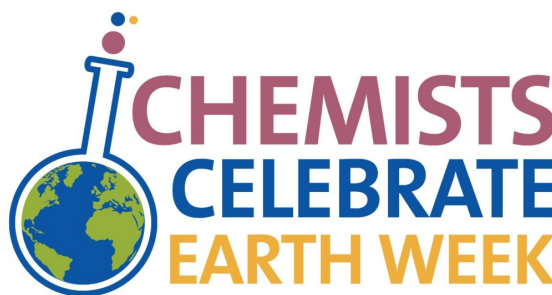


Chemists Celebrate Earth Week (CCEW) is a community-based program of the American Chemical Society (ACS). This annual program unites ACS local sections, student chapters, technical divisions, businesses, schools, and individuals in communicating the positive role that chemistry plays in the world. Earth Day was first officially recognized on April 22, 1970 as a way to demonstrate support for a healthy environment, raise awareness about environmental issues, and remind people that we all need to contribute to a sustainable planet. For years, chemists have been promoting a better world through recyclable plastics, cleaner-burning fuels, phosphate-free detergents, environmental monitoring, and green chemistry initiatives. The ACS joined the Earth Day celebration on April 22, 2003.

The Chemical Society of Washington (CSW) will once again participate in Chemists Celebrate Earth Week (CCEW) activities. Chemistry is all around us and is vital to our planet's sustainability. Whether it's used in recyclable and biodegradable materials or through the reduction of waste, chemistry is involved in ensuring that we can be eco-friendly and kind to our environment. CCEW seeks to bring international focus to environmental causes, such as clean air, water, and energy. ACS offers events, contests, and educational resources for members, chemical educators, and chemistry enthusiasts to illustrate the positive role that chemistry plays in preserving the Earth. The CCEW 2019 theme is "Take Note: The Chemistry of Paper." This year's theme looks at the chemistry associated with paper. Paper is one of the most amazing materials ever invented. It has been around for 2000 years and has been essential to the development of knowledge and technology around the world. The basic process of making paper hasn't changed since its invention. Paper has been made using a variety of plants as the source of fiber. Plants are harvested to obtain fibers. These plant fibers are made from chemical compounds called cellulose and lignin. Cellulose is a long polymer made from glucose molecule subunits (or parts). Lignin is a more complex polymer that helps strengthen the plant stem and aids in the transport of water from the ground up into the plant. This and other topics are presented in this year version of Celebrating Chemistry. The electronic version of the Celebrating Chemistry newsletter for CCEW, as well as additional information about this year's CCEW celebration, is available from the ACS website (www.acs.org/ccew).

CCEW Illustrated Poem Contest - Entries due April 29, 2019

As part of the Chemists Celebrate Earth Day activities, the American Chemical Society is sponsoring an illustrated poem contest for K-12 students. Students are asked to write and illustrate a poem using the Chemists Celebrate Earth Week 2019 theme, "Take Note: The Chemistry of Paper." This year's theme looks at the chemistry associated with paper. Paper is one of the most amazing materials ever invented. It has been around for 2000 years and has been essential to the development of knowledge and technology around the world. The basic process of



making paper hasn't changed since its invention. Paper has been made using a variety of plants as the source of fiber. Plants are harvested to obtain fibers. These plant fibers are made from chemical compounds called cellulose and lignin. Cellulose is a long polymer made from glucose molecule subunits (or parts). Lignin is a more complex polymer that helps strengthen the plant stem and aids in the transport of water from the ground up into the plant. The illustrated poems should relate to the chemistry of paper. Detailed rules and guidelines are available on the Chemists Celebrate Earth Day website; www.acs.org/ccew. All Entries must provide the information that the ACS request via the [entry form](#) which is available via the ACS or CSW websites. [View flyer](#). Teachers at schools in the Chemical Society of Washington area are encouraged to have a contest at their school and then submit the winning entries from the school to:

Chemist Celebrate Earth Week Coordinator
Chemical Society of Washington
1155 16th Street, NW, Stop O-218
Washington, DC 20036

Electronic submissions should be sent to: Kim.Morehouse@FDA.HHS.GOV

All entries must be received by Monday, April 29, 2019 so winners at the local section level can be submitted to the ACS by Friday May 4, 2019.

Rockville Science Day - Sunday, April 28, 2019

Come and join us at Montgomery College for the 30th annual Rockville Science Day on Sunday, April 28, 2019, featuring a variety of science and technology-related exhibits, activities, games and demos. Activities and exhibits include rocket-building (and launching), telescope viewing, a travelling planetarium, all kinds of robots, backyard wildlife, ship models, microscopes, snakes, oyster farming, botball, stream science, a pigeon release, Civil War medical practice, coding challenges, math puzzles, chemistry in action (flames, explosions & other reactions), electric vehicle demos, quadcopters, archaeology mini-digs, 3D printing, and brain games.

Rockville Science Day is intended to provide a friendly environment for students and their parents to participate in some hands-on demonstrations and to learn more about how science and engineering are important to our society. There will be more than 70 exhibitors with hands on activities. Additional information about Rockville Science Day can be found on their website (<http://rockvillesciencecenter.org/rockville-science-day/>).

As part of the celebration of Chemists Celebrate Earth Week, the Chemical Society of Washington, in conjunction with the Chemistry Department at Montgomery College, Rockville Campus will participate in Rockville Science Day once again this year. Rockville Science Day is open to the public and CSW encourages you to attend.

This event will be co-sponsored by the CSW Outreach Committee and the CSW Environmental/Sustainability Committee. Volunteers from CSW will be providing hands on activities for children who attend the event as a part of CSW's participation in Chemists Celebrate Earth Week (CCEW). Volunteers will also hand out copies of the Celebrating Chemistry publication for CCEW, and various CCEW themed products. If you would like to volunteer for this event, please contact the CSW CCEW coordinator, Kim Morehouse (Kim.Morehouse@fda.hhs.gov).

35th Annual Chemathon will take place on Saturday, April 27, 2019 - Volunteers Needed!

The Thirty-fifth Annual Chemathon will take place on Saturday, April 27, 2019. The Chemathon is an annual chemistry competition for high school chemistry students in Maryland, Northern Virginia, and the District of Columbia. The Chemathon competition is organized by a committee of area high school chemistry teachers and chemists, and is hosted by the Department of Chemistry and Biochemistry at the University of Maryland at College Park. The Chemathon is open to all area high schools that would like to participate. There are two competitive tracks; Level I: for students who have not taken and are not currently taking AP Chemistry or IB Chemistry and have not previously participated in Chemathon, and Level II: aimed at students at the AP and/or IB level as well as previous contestants. The theme for the chemistry signs (posters) this year is "Chemistry of the Atmosphere." There is no entry or registration fee. If you are a high school chemistry teacher and would like your students to participate in this event, please see the Chemathon website for information on how to register your school (<http://www2.chem.umd.edu/chemathon/>).



The Chemical Society of Washington will once again be a sponsor of this event. Volunteers are needed to help judge the poster contest as well as to assist with some of the activities that the students will be competing in. If you would like to volunteer for this event, please contact Kim Morehouse via e-mail at kim.morehouse@fda.hhs.gov.

Joint NCAC-SOT/CSW Spring 2019 Symposium

Intersection of Chemistry and Toxicology in the 21st Century

Save the Date!

When: Tuesday, April 30, 2019, 8:30 AM - 4:30 PM

Where: American Chemical Society (ACS) Headquarters,
1155 16th St. NW, Washington DC 20036

Synopsis:

Databases, software, machine learning, and online marketplaces are increasingly used by chemists and toxicologists to identify and/or design safer chemicals and materials. This day-long symposium is intended to provide CSW and NCAC-SOT members with updates on advancements in each of these tools, identify what improvements are needed, and discuss strategies for increasing worldwide adoption of such tools. Recognized experts from industry, NGOs, academia, and government will present their perspectives on this topic.

Registration, speaker line-up, and other details to come.

Contact CSW (csw@acs.org) if you wish to be contacted as additional details become available.

Wakefield Forest Elementary School STEAM Fair March 28, 2019



Science | Technology | Engineering | Art | Mathematics
WAKEFIELD FOREST ELEMENTARY SCHOOL

Wakefield Forest Elementary School is hosting their 3rd annual STEAM Fair on Thursday, March 28, 2019 from 6-8 PM and is seeking passionate local professionals in STEAM-related fields to be exhibitors. The fairs hosted the past two years have been huge successes, with more than 550 attendees at each! This special evening is quickly becoming one the school eagerly anticipates each year. It's a night when the halls are full of excitement, energy and a love of learning all things STEAM.

The Wakefield Forest Elementary School STEAM Fair will be a free, celebratory event for our students and their families. We are looking for exhibitors to showcase their work alongside a hands-on activity that directly relates to STEAM. This event will allow students to see exciting applications of concepts being taught in class, and give them the opportunity to be inspired by community members in STEAM fields.

If you are interested in participating, please contact Melissa Fabrizio, Coordinator, WFES STEAM Fair at 703-405-7340 or wfessteamfair@gmail.com

Fairfax County Regional Science Fair March 15-17, 2019

The Fairfax County Regional Science and Engineering Fair is scheduled for the weekend of March 15-17, 2019.

Chemical Society of Washington members are invited and encouraged to participate this year on Saturday, March 16th. It is wonderful to have local chemists support the science fair and the students who have worked long and hard on their projects.

More information can be found on the FCPS science fair website: <https://www.fcps.edu/sciencefair>.

If you are interested in judging, you may visit this website to register:
https://insys.fcps.edu/sciencefair/form_contributor.cfm

2019 ACS Middle Atlantic Regional Meeting 5/30-6/1

I am excited to highlight some of the amazing opportunities available at the 2019 American Chemical Society Middle Atlantic Regional Meeting. The 47th MARM will be held May 30 through June 1, 2019 in Baltimore, Maryland at the University of Maryland, Baltimore County. This year's theme is "Seeking Solutions through Chemistry" and this meeting is the perfect chance for chemists, both established and aspiring, to connect with the chemistry community, jumpstart your research and teaching, find new career opportunities, and help mentor the next generation.



Have you made progress this year and are ready to let everyone know? Abstract submissions are open now through Monday, March 4th! There is a fantastic lineup of technical sessions on some of the most pressing topics in the world today including Atmospheric and Environmental Chemistry, the Opioid Crisis, Spectroscopy and Homeland Security, and more. Enjoy some great science with colleagues, hear from some of the sharpest minds in the field, and don't forget to take a break and visit the exhibit hall.

Are you an educator trying to bring your lecture into the 21st century? Embrace the future at MARM 2019. Highlights include a symposium on Digital Technologies in the Undergraduate Classroom where you can discover the cutting edge in integrating technology into the chemistry classroom. Join IONiC, an Interactive Online Network of Inorganic Chemists and learn how VIPEr, the Virtual Inorganic Pedagogical Electronic Resource, can help energize your teaching by participating in an IONiC/VIPEr workshop.

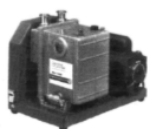
Just starting out or looking for a change? There are some great career programming available at MARM 2019 just waiting for you! Learn about potential career paths, take advantage of resume review sessions, attend panel discussions to get perspectives from employers and recent chemistry grads, and learn about the unique challenges facing international chemistry students and professionals. Undergraduates are especially encouraged to participate in the undergraduate poster session and gain valuable experience communicating science. And, of course, don't miss the 2019 Chemagination Competition where high school students from local ACS sections will compete in a contest designed to strengthen their creative, teamwork and public speaking skills.

No matter what you're looking for, MARM 2019 may have the solution you seek. I hope you'll join us May 30 through June 1 in the beautiful city of Baltimore for the 2019 ACS Middle Atlantic Regional Meeting!

Please visit <https://marmacs.org/> for registration and additional information.

-Alan Anderson, CSW MARM Representative.

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There are many companies and organizations searching for chemical and biochemical personnel to fill important jobs in their organizations.

- Companies for laboratory and management positions
- Universities & Colleges for teaching positions and laboratory personnel
- Hospitals for technical and research personnel

There are several web sites that may help you search for these open positions.

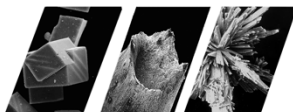
- www.mboservices.net
- <http://membership.acs.org/W/WashDC/career.html>



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The **Chemical Society of Washington(CSW)** is the local ACS Chapter for the Washington, DC area and serves approximately 4,000 members.

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CSW Calendar of Events

March 14: CSW Meeting/Hillebrand Award Ceremony

March 15-17: Fairfax County Science Fair

March 18: CSW Board of Managers Meeting

March 28: Wakefield Forest STEAM Day

April 20: YCC Career Day

April 21-27: CCEW

April 27: Chemathon

April 28: Rockville Science Day

April 29: Illustrated Poem Deadline

April 30: Joint NCAC-SOT/CSW Symposium

May 20: CSW Board of Managers Meeting

May 30-June 1: MARM

September 16: CSW Board of Managers Meeting

November 21: CSW Board of Managers Meeting