



**Maryland is represented in the 55th
International Chemistry Olympiad, IChO!**

Maryland Local Section Newsletter

Editor-in-chief: Beatrice Salazar

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From the Editor's Desk...

The word volunteer traces back to the 12th century when for the first time more than 500 hospitals were operated by volunteers. The dictionary tells us that volunteer is "a person that undertakes a job or a task". Why not add: "...without pay..." or "... engaged in endless hours to complete a task ..."? Whatever

the definition, I would say that a major aspect of volunteering involves work for others. ACS Maryland section functions because of its volunteers. We are enthusiastic ACS members that want to engage with people interested in chemistry. This issue is a tribute to volunteers in the ACS Maryland Section where we say **thank you!** You have been doing a great job and we are grateful.

Also, in this issue we celebrate the accomplishments of Anurag Sodhi, a high school student, who for the first time in the history of the ACS Maryland section is participating in IChO, the International Chemistry Olympiad (page 4).

We are also introducing the new Young Chemists Committee; YCC had been dormant for a while. However, in January 2023, a renewed interest from ACS members brought YCC back. YCC is made up of young chemists up to 40 years old. Dr. Olivia H. Wilkins, one of our exemplary volunteers, has taken the task of chairing this committee. We congratulate her and offer our support. Dr. Wilkins has been a writer for the Chesapeake Chemist as well, we present here another of her articles. This time with an invitation to YCC (page 11).

Our sections on *Books* (page), *14 laugh a little* (page 15), and *Chemistry Literature spotlight* (page 9) are back. Finally, on July 15th we have a tour of the distillation co. Lost Ark Distillery in Columbia, MD. see page 13 for more information. This event was organized by the co-chairs of the entertainment committee Dr. Louise Hellwig and Dr. Michele Foss. 

We hope you enjoy the Newsletter and take advantage of the many events at the ACS Maryland Section.

Welcome to The Chesapeake Chemist
a monthly magazine and newsletter for Chemists!

Contact Editor: beatricesalazar1@gmail.com

Contact ACS Maryland Section at acsmarylandsection10@gmail.com



Follow us...

Be one of us! Write articles for the Chesapeake Chemist. Send announcement of your projects and activities. Share your chemistry life with your colleagues.

Questions about
ACS Maryland Section?



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[Publications](#)

Important information



Scholarships Now Available for High School graduates!

- CSAWWA Water Works Scholarship - \$1,000
- The Aaron Thomas Memorial Scholarship - \$3,500
- Hazen and Sawyer (Mr. Thomas' former employer) has partnered with CSAWWA to award a \$3,500 scholarship to a 2023 Baltimore City High School graduate who exhibits passion, curiosity, leadership, and eagerness to contribute to improving water and wastewater systems, the health of the Chesapeake Bay, and the nation.

[More information about the awards can be found here.](#)

The application deadline for both awards is July 21, 2023.

Maryland is represented in the International Chemistry Olympiad! June 16

Read about IChO at the Baltimore Sun. Also, read about Anurag Sodhi a high school student representing USA and Maryland in the 55th IChO in Switzerland. on pages 4- 8.

The 2nd Maryland Local Section of the ACS Executive Board Meeting took place in June 6, 2023 see the Agenda and minutes in the website acsmaryland.org.

Going on vacation?

Remember chemistry is everywhere, art and chemistry, food and chemistry, and **STEM** is around us, so enjoy great conversations finding chemistry relationships and discovering the chemistry of the world.

Visit Brussels and enjoy the [atomium](#) sculpture, an excellent representation of STEM at its best! It was constructed as the main pavilion of the world's fair Expo 58 in 1958, hosted in [Brussels](#). The Atomium is a giant 165 billion times enlarged model representing an elementary iron crystal. (Click on the [atomium](#) pic). Send us your vacation story related to chemistry! Contact [Beatrice Salazar](#), Editor in chief, The Chesapeake Chemist.



**Maryland
 will be
 represented
 in the
 International
 Chemistry
 Olympiad,
 IChO!**

**Congratulations
 Maryland!**

The success and accomplishments of Anurag Sodhi, an 11th grade high school student from Centennial High School is pride and success for Maryland state. This disciplined and accomplished chemistry student has learned at an early age the value of knowledge and the joy of success.

High school teachers constantly emphasize the value of learning one step at a time. Anurag has taken this concept to the highest level: One step at a year. Every year since he started to participate in the US National Chemistry Olympiad (USNCO) he created a goal to improve his knowledge of chemistry and his ability to take test to reach the maximum goal, that is, participate in the International Chemistry Olympiad (IChO) and he made it!

I heard from him this year before the competition began “Ms. Salazar, this year, I will make the next level...” He has proven these words year after year. I admire his confidence and his dedication to improving his chemistry knowledge every time.

The Chesapeake Chemist has compiled chronological data of Anurag’s chemistry competitions; we can see his progress in the next page. The year

2023 marks the year Anurag Sodhi makes the 55th US international team.

Four Olympians will represent USA in Switzerland on July 16th. This is the first time in the history of the ACS Maryland local section that we sent a student in this category to compete with 90 or more nations; we will know soon how many nations are participating in the competition this year.



55TH INTERNATIONAL
 CHEMISTRY OLYMPIAD
 SWITZERLAND 2023

Photo courtesy of Malgorzata Thatcher, 20 students attending Chemistry Camp and 4 students attending IChO



Contact:

Anurag Sodhi <anusoda976@gmail.com> please join me in congratulating him, his family, his teacher (Robert Astri) and his school (Centennial HS). Beatrice Salazar, USNCO Coordinator in Maryland: Beatricesalazar1@gmail.com .



2023 Team USA and alternates: L to R: Sebastian Kumar (1st alternate), Mingwen Duan, Alice Liu, Anurag Sodhi, Phoenix Wu, and Brian Li (2nd alternate) Courtesy of Sri Balasubramanian

Learn more: [The 2023 IChO winners](#), [2023 Chemistry Study Camp Winners](#), [High Honors and Honors](#)



I MADE IT!

My experience at camp: "The best thing about camp was meeting different people from across the country who are not only enthusiastic about chemistry but also about problem solving and doing challenging things." Anurag Sodhi

Anurag's progress every year he participated in USNCO



2020

Anurag Begins USNCO Virtually

- Honors list

2021

Anurag 2nd time USNCO Virtually/person

- Honors list
- High Honors list

2022

Anurag 3rd time USNCO Virtually/person

- Honors list
- High Honors list
- Chemistry Camp

2023

Anurag 4th time USNCO In person

- Honors list
- High Honors list
- Chemistry Camp
- International, IChO

2023 International Chemistry Olympiad team revealed.

by [Nina Notman](#), special to C&EN

June 21, 2023

The team that will represent the US at the 55th International Chemistry Olympiad, to be held July 16–25 in Zurich, Switzerland, has been announced. The four high school students will compete against teams from around 90 countries.

The 2023 team consists of [Mingwen Duan](#) from East Lyme High School in Connecticut, [Alice Liu](#) from Marquette High School in Missouri, [Anurag Sodhi](#) from Centennial High School in Maryland, and [Phoenix Wu](#) from Seven Lakes High School in Texas. The first alternate is [Sebastian Kumar](#) from Tesla STEM High School in Washington State. The second alternate is [Brian Li](#) from Acton-Boxborough Regional High School in Massachusetts.

The team was chosen from the 20 students who participated in the [Chemistry Olympiad Study Camp](#), which was held at the University of Maryland, College Park, June 4–17. The best thing about the camp for Sodhi was “meeting different people from across the country who are not only enthusiastic about chemistry but also about problem solving and doing challenging things.” Liu concurs, adding that “I also really enjoyed the lectures and laboratory activities. The experience has just been amazing from start to finish.”

In Zurich, the US students will compete in written and practical exams alongside students from other nations.

Wu was also on the US team for the 2022 International Chemistry Olympiad, which was held online. “I am both excited and nervous about the practical portions [in this year’s competition] since that was missing in last year’s International Chemistry Olympiad,” he says.

The students will also have time for sightseeing, to explore Swiss science universities and institutes, to participate in panel discussions about careers and entrepreneurship in chemistry, and to get to know competitors from other nations. “It’ll be similar to camp in that the best part will be getting to meet the other people, except this time it is not from all around the country, it is from around the world,” says Duan. “I think there is a great chance we will get four gold medals this year,” says Esther Hines, head team mentor from Billerica Memorial High School in Massachusetts. Three additional mentors will accompany the team to Zurich: Joseph Houck from Pennsylvania State University, Laura Serbulea from University of Virginia; and Songwen Xie from Massachusetts College of Pharmacy and Health Sciences.

For more information, visit the following website www.acs.org/olympiad and icho2023.ch.

From the Desk of 2023 IChO President



Professor Günther Dissertori

President of IChO 2023 and Rector of ETH Zurich

"We are excited to host the 55th International Chemistry Olympiad 2023 in Zurich at ETH. After more than 30 years of attending the International Chemistry Olympiads, Switzerland will host this exciting event next year for the first time. Finding Solutions will be the main theme of the International Chemistry Olympiad 2023".



Professor Wendelin J. Stark

Head of Scientific Committee IChO 2023

"Switzerland is one of the most important locations for the brightest minds in the world. As a professor of chemistry and applied biosciences, I am therefore particularly pleased to welcome the most brilliant chemistry talents of the future at ETH Zurich. Among other things, here we foster innovation: we want to attract inventors and find novel impactful solutions to improve our everyday lives".

From the Desk of 2023 USNCO USA



Malgorzata Thatcher

Program Specialist U.S. National Chemistry Olympiad

American Chemical Society | Phone:202-872-6328 | www.acs.org/olympiad

The US National Chemistry Olympiad program is proud to announce the team that will represent the U.S. in the 55th International Chemistry Olympiad July 14, 2023 in Zurich, Switzerland. The four members of the U.S. National Chemistry Olympiad (USNCO) team are:

Mingwen Duan, East Lyme High School, CT, Connecticut Valley Local Section. Alice Liu, Marquette High School, MO, St. Louis Local Section. Anurag Sodhi, Centennial High School, MD, Maryland Local Section. Phoenix Wu, Seven Lakes High School, TX, Greater Houston Local Section. Please join us in congratulating the members of Team USA and wish them luck at IChO.

From the Desk of 2023 USNCO Maryland



Beatrice Salazar

Head of the MD Committee on High School Resource Program | Coordinator of the USNCO – MD

"We, members of the Maryland local section are excited with this triumph. Every year we send four of our best USA students to IChO but 2023 is an especial year because one of our local section Olympian is participating for the first time internationally. I am therefore, particularly pleased and proud of the accomplishments of Anurag Sodhi and I wish him and the USA Team an impactful performance in Switzerland".

WHO IS WHO IN USNCO

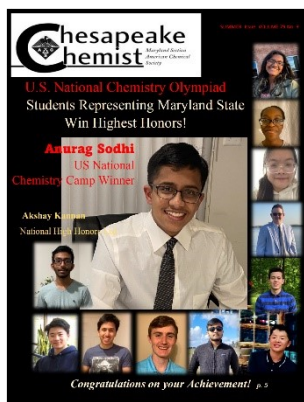
Chesapeake Chemist issues that include articles on USNCO, IChO and Anurag Sodhi.



2020



2021



2022



2023

SUCCESSFUL STORIES

The ACS Maryland Section website: acsmaryland.org has a page where we can read a letter from two students that have experienced chemistry camp: **Joe Wan** (2011) and **Anurag Sodhi** (2022). Check the link: [High School Education](#).

Interview with Anurag...

3 Things you enjoyed the most at Chemistry Camp.

1. The value of time management (especially in the lab).
2. How to keep calm in high-stress situations.

1 Thing you feel it could improve this year.

1. Being with the other campers (both reconnecting with the returning campers and meeting the new ones).
2. Hearing all the guest speakers and guest lectures we had during camp (especially those of Dr. John Warner and Dr. David MacMillan).
3. The multiple late-night movie nights we had.

2 Things you learned new at Chemistry Camp.

1. Better lunches would be nice :) (Aside from that very few complaints, despite having already been through the experience before, I still really enjoyed my time!)

CHEMISTRY LITERATURE SPOTLIGHT

World of Atoms

By [Camilo Rojas, PhD.](#)



While reading the recent, massive, wonderful biography of Sylvia Plath by Heather Clark I learned that as a 20-year-old junior at Smith College, Plath took a science course titled “World of Atoms” to meet a science requirement. Plath, a brilliant trailblazing poet, was not interested in science; she worked very hard to do well in the course but apparently was depressed by “World of Atoms”. Even though she received an A in the course, there was no love lost once the experience was over. I thought this was sad. She was able to pick apart complex poetry to understand how the technical aspects of a poem translated into emotional impact. Why would a brilliant person like Sylvia Plath have such a hard time with an introductory science course? History is full of examples of brilliant contributors in a given field that are not very competent, to say the least, in science or math. Pablo Neruda, another great poet, presumably had difficulty with basic math. How much of this difference in preference for a given field is a natural phenomenon and how much is the result of cultural environment, specifically educational practices?

Coincidentally, at the time I read the passage in Plath’s biography, I had been tutoring a high school student on the periodic table. The periodic table reminds me of Mark Twain’s quip: “a classic is a book everybody praises but nobody reads”. All of us, me included, acknowledge the importance of the periodic table without fully realizing why. The textbook we use during our tutoring sessions incorporates some of the concepts in the periodic table in a round-about way in a chapter on “Electrons in Atoms and the Periodic Table”. After reading the chapter, I did not feel it gave a sense of how amazing an achievement the periodic table is and of its pervasive presence. To ameliorate this pedagogical limitation and to improve weakness that misses an opportunity to motivate science students. To ameliorate this limitation and to improve my own understanding, my student and I read and discussed an article on the periodic table by Oliver Sacks titled “*Everything in Its Place – One man’s love affair with the periodic table.*” It appeared in The New York Times Magazine in 1999 when humanity was celebrating the upcoming millennium and “everybody that was anybody” was trying to take stock on the greatest discoveries of the past millennium. The periodic table was one of them.

Sacks’ article beautifully intermingles three messages throughout: the history of the discovery of the periodic table, its significance, and the author’s personal relationship with the periodic table through the years. The one thing I remember distinctly is the experiment Oliver Sacks did in his youth adding alkali elements to water and watching in wonder how different alkali increased in their reactivity as they were down in the group in the periodic table. An impactful moment children AND adults are bound to remember when exposed to the reactions live.

Oliver Sacks writes about the elements known to the ancients, the elements discovered in the Middle Ages and those discovered around the Age of Enlightenment. The historical context provides a setting for an appreciation of Mendeleev's contribution in 1868: he made a small three-by-three grid juxtaposing nine elements from halogens, alkali and alkali earth metals according to their molecular weights. The grid made a repetitive pattern: a halogen followed by an alkali metal followed by an alkaline earth metal. The grid suggested a fragment of a larger pattern that led to the idea of periodicity.

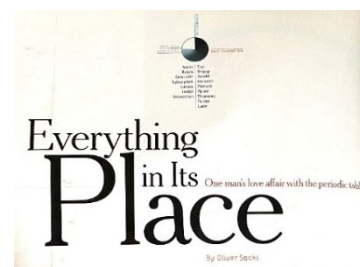
Cl 35.5	K 39	Ca 40
Br 80	Rb 85	Sr 88
I 127	Cs 133	Ba 137

Sometimes in art museums visitors are made privy to preliminary sketches of a work by an artist that eventually culminates in a major masterpiece thus giving visitors a feel for the creative process. Mendeleev's grid is a beautiful "sketch" of the periodic table with the ideas of periodicity and reactivity already built into it. After Mendeleev's expansion of the initial grid to incorporate the 65 elements known at the time, there were gaps that predicted that there were elements that had not been discovered. Amazingly, gallium, scandium and germanium were discovered within two years after their existence had been predicted by Mendeleev's "chunky rectangle". What could be more beautiful and satisfying than this?

Up to the death of Mendeleev in 1907, chemists had discovered that elements belonged to groups with certain properties and that these properties repeated with a periodicity based on atomic weights. But WHY should properties recur periodically based on atomic weights? What was lacking was a theory to explain the empirical findings.

Enter the physicists. Ernest Rutherford based-on his experiments using bombardment of gold foil with alpha particles suggested that the atom was like a miniature solar system. Niels Bohr incorporated the idea that electromagnetic energy emitted or absorbed discrete packets of quanta to propose his model of the atom. Electrons were conceived to occupy a series of orbits of differing energies about the nucleus. In one "Mendeleev-moment", Bohr connected the Rutherford model with the previously inexplicable nature of optical spectra to explain electron excitation followed by return to the ground state within the atom's orbits. In another major accomplishment, Henry Moseley discovered a fundamental relationship between the order of the elements and their x-ray spectra. The spectra could be correlated to the number of positive charges in the nucleus (atomic number) without the gaps, irregularities or fractions when using atomic weights. The result was a spectacular, rigorous, independent confirmation by physicists, of the periodic table devised by the chemists.

Even though it was published almost 25 years ago, Oliver Sacks' article will never be out of date. It vividly conveys the beauty and excitement of the periodic table by emphasizing the process of its discovery along with his personal engagement that brings those discoveries to light. Would Sylvia Plath have reacted more positively to the world of atoms if she could have seen how alkali metals react with water? My student dutifully answered the questions I had prepared for him as a guide to read the article. He even humored me by saying he enjoyed reading the article. I wish we had had the opportunity to replicate the reactions of alkali metals with water. Ref. Article:



Article Page 126

Maryland Younger Chemists Committee, YCC, seeks members

By Olivia Harper Wilkins

The Maryland Section is about to, once again, have an active Local Section Younger Chemists Committee (YCC). The reinstatement of the Maryland YCC comes after a more-than-10-year hiatus, with the aim of providing support and a professional network for younger chemists.

Local Section YCCs mirror the national committee, which was founded as a joint board-council committee of ACS in 1974. Both endeavors to advocate for and provide resources to early-career chemists, specifically those 40 years old and younger. In addition to programming at National ACS Meetings, the national YCC provides opportunities for leadership development, grants travel awards, and encourages younger chemist engagement in the Society (such as through the Catalyze the Vote initiative). Local Section YCCs provide similar opportunities but leverage a closer-knit community. Across the U.S., Local Section YCCs host social networking events (like private tours of breweries or museums) and professional development training (such as diversity, equity, inclusion, and accessibility—or DEIA—workshops). Such events give younger chemists within a local section a space to make connections with others in the

chemical sciences outside of their immediate colleagues in their department or workplace.

The opportunity to network with chemists at similar career and life stages is one reason why Kaylyn Stewart, a third-year chemistry major and Meyerhoff Scholar at the University of Maryland, Baltimore County (UMBC), is excited at the prospect of Maryland having its very own YCC.

The Executive Committee of the Maryland Section also sees the value of having a local YCC, and at its Executive Meeting in April 2021, a motion to revive a Local Section YCC was approved.¹ However, it was Kaylyn’s experience at the ACS Leadership Institute nearly two years later that catalyzed the committee’s revival in Maryland.

I recently chatted with Kaylyn,² who attended the Leadership Institute held in Atlanta, Georgia, in January 2023. “I learned a lot. It was an experience I hadn’t had before,” said Kaylyn, referring to the Leadership Institute’s smaller, more intimate setting than that of national and regional meetings. Not only did Kaylyn meet other younger chemists, she had the chance to speak one-on-one with members of ACS national leadership. “It was a really a valuable experience.”


Last Fall, Kaylyn’s research advisor

at UMBC connected her with Beatrice Salazar—currently the ACS Maryland Chair-elect—who invited Kaylyn to share her research as part of a virtual panel. Kaylyn later learned that Beatrice was going to be at the Leadership Institute and seized the opportunity to connect with Beatrice in person. In turn, Beatrice introduced Kaylyn to other attendees at the Institute. “She helped other people see my accomplishments.”

The Leadership Institute is also where Kaylyn first heard of Local Section YCCs. She asked Beatrice whether Maryland had one, only to learn that the Maryland Section YCC was inactive. This conversation reignited the interest in making the Maryland YCC active again. Over the next year, the Maryland YCC will gear up to support younger chemists from Frederick County to Anne Arundel County and the Eastern Shore. One of the first tasks for the Committee is to define its Mission and Vision statements with input from local early-career chemists. The Maryland YCC also seeks to gather members who will help establish a community of younger chemists across a range of professional stages and sectors in the state. Kaylyn, who is ACS currently the president of UMBC’s student chapter, is eager for the

YCC SEEKS MEMBERS Continue:

YCC to get started because of the opportunity to expand her network beyond her department and peers and “having another layer of community in chemistry.”

Younger chemists who are part of the ACS Maryland Section and are interested in being a Member or the Secretary of the Maryland YCC should email me, the committee’s Chair, at olivia.h.wilkins@nasa.gov . 

References. 1Minutes of Executive Meeting of Maryland Section of the American Chemical Society, 19 April 2021. 2Interview with Kaylyn Stewart, 11 May 2023.

Olivia Harper Wilkins, Ph.D., is a NASA Postdoctoral Program (NPP) Fellow at NASA Goddard Space Flight Center. She is also a Maryland Section Member-at-Large, Chair of the Maryland Younger Chemists Committee (YCC), and a National YCC Affiliate. You can connect with her on Twitter and Instagram at @LivWithoutLimit. She can also be reached by email at olivia.h.wilkins@nasa.gov. Views expressed are the author’s own.



The Younger Chemists Committee Invites all ACS Maryland Members to join this exciting committee

Positions available

Co-chair

Secretary

Activities/Awards coordinator

Requirements

Love Chemistry

40yrs younger or less

ACS member or interested in membership.

CONTACT: YCC Committee Chair, olivia.h.wilkins@nasa.gov

Links:

ACS Maryland Local Section: <https://acsmaryland.org>

Committees: <https://acsmaryland.org/committees-acs-maryland-section/>

YCC-Page: <https://acsmaryland.org/younger-chemists-committee-ycc/>

YCC- information PPT – “get to know us”

[https://acsmaryland.org/wp-](https://acsmaryland.org/wp-content/uploads/2023/06/Maryland_YCC_About_rev20230608.pdf)

[content/uploads/2023/06/Maryland_YCC_About_rev20230608.pdf](https://acsmaryland.org/wp-content/uploads/2023/06/Maryland_YCC_About_rev20230608.pdf)

YCC – Newsletter: [\[content/uploads/2023/05/YCC-page-to-introduce-it-ACS-MD-LS.pdf\]\(https://acsmaryland.org/wp-content/uploads/2023/05/YCC-page-to-introduce-it-ACS-MD-LS.pdf\)](https://acsmaryland.org/wp-</p></div><div data-bbox=)



Please join the Maryland Chapter of the ACS for a Distillery tour of **Lost Ark Distillery in Columbia, MD**

Cost: \$25 per person due at time of the event

Date and time: July 15, 2023 @ 1pm

RSVP to foss.michele@gmail.com by July 1, 2023

non-drinkers and young adults 13-20 are \$10 and children are free.

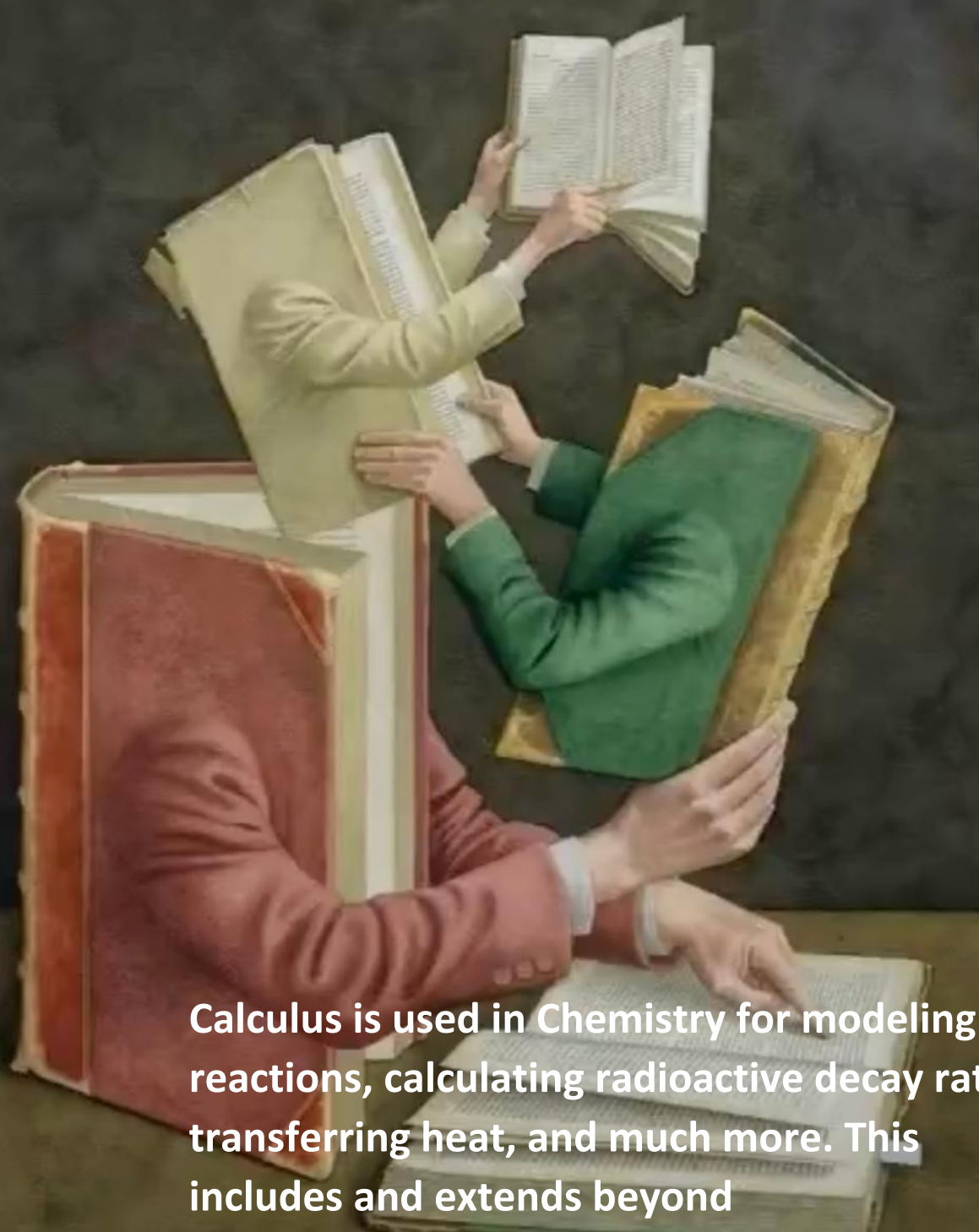
Tour includes: 40 min tour, 20 min educational tasting, souvenir glass and a craft and a cocktail.

Direction:

9570 Berger Road Suite L
Columbia, MD, 21046

<https://www.lostarkdistilling.com/>

HOW IS CALCULUS USED IN CHEMISTRY?



Calculus is used in Chemistry for modeling reactions, calculating radioactive decay rate, transferring heat, and much more. This includes and extends beyond thermodynamics, electrochemistry, analytical chemistry, and quantum chemistry.

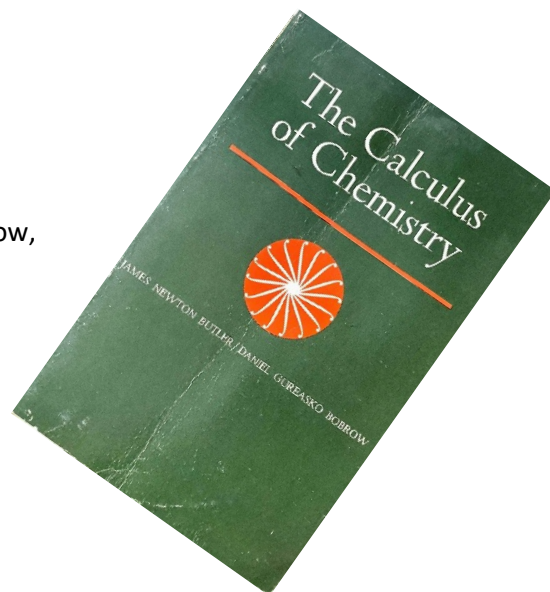
BOOKS...

The Calculus of Chemistry James Newron Butler/Daniel Gureasko Bobrow,
NY, Amsterdam, 1965

By, Beatrice Salazar, ACS Maryland Councilor



Let's look at an example of calculus in chemistry. For example, finding the **radioactive decay rate** of Uranium 238.



We'll start by looking at a formula:

$$-\frac{dN}{dt} = N \lambda$$

$$-\frac{dN}{dt}$$

This formula states that, whether I have a *large* or a *small* sample of radioactive matter, it will decay at a rate proportional to its size. Because of this, the decay rate changes as time goes on and the sample decreases in size. Calculus is useful in determining **the decay rate at any given time.**

$$\frac{dN}{Nt} = -\lambda dt$$

$$\int_{N_0}^N \frac{dN}{N} = -\lambda \int_{t=0}^t dt$$

$$\ln(N) - \ln(N_0) = -\lambda t$$

$$\ln\left(\frac{N}{N_0}\right) = -\lambda t$$

$$\frac{N}{N_0} = e^{-\lambda t}$$

$$N = N_0 e^{-\lambda t}$$

$$-\frac{dN}{dt} = N \lambda$$

This formula = The number of atoms decaying per second in a given sample
 N = Number of atoms (size of the sample) and λ = The decay

constant, specific to each radioactive element for (Uranium - 238 = 4.916×10^{-18})

knowing the decay constant, we can solve for the decay rate at any given time. Let's move the 'N' term to the other side. And multiply by (-1.) Next, we'll integrate over a general interval and evaluate said integral.

Taking the integral to both sides (integral is continuous sum from a beginning and ending limit). Then, combine the left side of the equation using **log** rules. A log is the inverse function of exponentiation eg., $\log_{10}1000=3$ or $1000=10^3$ The Scottish Mathematician John Napier published his discovery in 1614 the purpose was to help in multiplication of large hypotenuses called sines. The original hypotenuse Napier used was 10^7 .

Ln rules: After the integral, we take the ln on both sides. The ln of a division is the ln of the numerator minus the ln of the denominator.

Ln in base e so $\ln(e) = 1$ Therefore, cancels out.

remove the denominator by multiplying both sides by N_0 and take the derivative of N with respect to t (time) which is rate.

We've arrived at the formula for radioactive decay, which we could use to solve the half-life of our sample.

COLLEGE COURSES USING CALCULUS ([link](#))

<p>first year college chemistry</p> <p>second year college chemistry</p> <p>third year college chemistry</p>	<p>the only calculus required, would be reaction rate equations. See formula above)</p> $d[A] = -k[A]dt ; d[A] = -k[A^2]d$ <p>if only taken organic chemistry no much calculus is necessary.</p> <p>thermodynamics has some multivariable calculus (partial derivatives) and quantum mechanics has partial differential equations</p>
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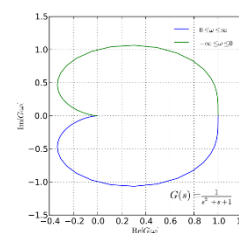
SOME EXAMPLES where calculus is applied

Analytical chemistry

To predict the **pH** ($-\log [H^+]$, for which moieties (any part of a molecule – does not have to be a complete functional group) will complex and infer statistics thereof.

Electrochemistry

The Nernst-Planck equation [is challenging](#). But just to calculate the concentration of some things, taking are of different kinds of reactants, depending on what you do you'll need to be good in calculus. Nyquist plots are not really difficult to use but the theory to obtain them is quite complex (it's not a pun) if you look at [Nyquist stability criterion](#).



Organometallic Chemistry
example, or a TOF (turn over

To calculate the oxidation degree of a metal for frequency), a [TON](#) it refers also to **catalysis**.

Thermodynamics

Chemistry thermodynamics requires good skills in math to do, also in **mass transfer** or **heat transfer**, everything which is close to **process chemistry**, as per the [McCabe Thiele model](#) for distillation (for example) this is not hard but you need.

Quantum Chemistry

Here You need to be very good in linear algebra, able to solve differential equations, have some skills in analysis to calculate integrals, and so on.

Kinetics

Calculus and some skills in algebra can help and be able to solve differential equations.
See an example of calculus used in thermodynamics and kinetics.

U.S. National Chemistry Olympiad, [USNCO](#)

Students' knowledge of thermodynamics is part of the exams. The following mathematics is required for successful testing on this competition. Algebra/ calculus.

Stoichiometry | Solutions | Descriptive chemistry | Laboratory techniques | States Of Matter | Thermodynamics | Kinetics | Equilibrium | Oxidation - Reduction | Atomic Structure | Periodicity | Bonding | Molecular Structure | Organic chemistry | Biochemistry

CONTACT: beatricesalazar1@gmail.com



LAUGH A LITTLE...

Q: Why does a hamburger have less energy than a steak?

A: Because it's in the **ground state!**

Q: What did the thermometer say to the graduated cylinder?

A: "You may have graduated, but I've got **many degrees.**

Q: Why did the attacking army use acid?

A: To neutralize the enemy's **base!**

Q: Why do chemists like **nitrates** so much?

A: They're cheaper than day rates!

Q: What's the dullest element?

A: **Bohrium!**

Q: Why should you go drinking with neutrons?

A: Because wherever they go, there's **no charge!**

Q: What's a chemistry teacher's favorite thing to teach about?

A: Ammonia, because it's pretty **basic** stuff.



SEEKING CHEMISTS FREELANCE VOLUNTEERS!

Share your experiences at regional or national meetings, write short articles from half a page to max 3 pages. Your articles could be personal experiences at work, at a scientific meeting or articles about your research. It does not have to be a scientific article with the rules of regulations of a paper to be published in a scientific journal. But it is a way to let your colleagues know what the nature of your work is. It is a way to practice writing. It is a way to make your ideas known. Send the article to the [editor of the Chesapeake Chemist](#) of the ACS Maryland Section.

ANNOUNCeMeNTS

PROJECT SEED and HIGH SCHOOL SUMMER **RESEARCH** PROGRAMS are up and running.



Louise Hellwig, Ph.D.

High school students are invited to participate in both Project SEED summer program and Research Summer Program at several universities and colleges in the Baltimore Area. These students receive a stipend from both the ACS and ACS Maryland Section to work in a chemistry research project or chemistry related area during the summer. Students may repeat the experience once. If they want to do it for a third time, they need to a letter from their advisor requesting this opportunity. This program has a different name.

For more information contact Project SEED coordinator, Dr. Louise Hellwig at Morgan State University of use the section's website [https://acsmaryland.org \(project SEED\)](https://acsmaryland.org (project SEED))

*The Entertainment Committee is inviting all ACS Members to a **tour of a distillation factory**, learn the chemistry of whiskey! See invitation on page13 and reserve with Michele Foss, Ph. D.*



Our Distillery Experience Includes:

- 40-minute guided tour
 - 20-minute educational tasting
 - Professional nosing/tasting glass to take home
 - Signature craft cocktail
-

*Maryland Chemist of the Year is **seeking nominations** for the 2023 award.*



Think about your colleagues, we need to empower chemists, we want to celebrate chemists' accomplishments.

Nominate people from chemistry or related chemistry careers in the Maryland area. We are eager to get nominees from industry, academia, or any other affiliation. Contact the [Chair of the Committee](#) or check our [website](#) for more information.

2023 Administration Officers Volunteers

2023 Section Officers

Chair 2023	Kelly Elkins, Kmelkins@towson.edu
Vice-Chair (Chair 2024)	Jiangnan Peng, jiangnanpeng@morgan.edu
Chair Elect (Chair 2025)	Beatrice Salazar, beatricesalazar1@gmail.com
Immediate Past Chair-2022	Sarah Zimmermann, scatzim@gmail.com
Secretary 2023-2024	Louise Hellwig, louise.hellwig@morgan.edu
Treasurer 2023-2024	Lee Lefkowitz, lee_lefkowitz@hotmail.com

2023 Committee on Nominations and Elections

Chair	Eric C. Cotton Chair 2021, ccotton2@ccbcmd.edu
Committee member	Jiangnan Peng, jiangnanpeng@morgan.edu
Committee member	Beatrice Salazar, beatricesalazar1@gmail.com
Committee member	Sara Narayan, snarayan5@yahoo.com
Committee member	Pumtiwitt McCarthy, pumtiwitt.mccarthy@morgan.edu

Council/Committees

2023-2025	Kelly Elkins, Nominations Committee, Kmelkins@towson.edu
2021-2023	Beatrice Salazar, HIS/DPR Division, CHED Committee, beatricesalazar1@gmail.com
2021-2023	Jan Kolakowski, Tech. Committee, jek6042@gmail.com
2021-2023	Stephanie Watson, stephanie.watson@nist.gov

Alternate Councilor

2023-2025	Jillian Malbrough, jillian.malbrough2@gmail.com
2021-2023	Alexander Samokhvalov, alexandr.samokhvalov@morgan.edu
2021-2023	Michele Foss, foss.michele@gmail.com
2021-2023	Robert Clapper, rob.clapper@scioninstruments.com

Member-At-Large

2023	Eric C. Cotton, ccotton2@ccbcmd.edu
2023	Nirupam J. Trivedi, nirupam.j.trivedi.civ@army.mil
2023	Olivia Harper Wilkins, olivia.h.wilkins@nasa.gov
2023	Rose A. Pesce-Rodriguez, rose.a.pesce-rodriguez.civ@army.mil
2023	Saraswathi Narayan, snarayan5@yahoo.com

Maryland Section Website/Social Media

2023 Webmaster	Nicole Carbonaro, ncarbonaro@towson.edu
Chesapeake Chemist Editor-in-Chief	Beatrice Salazar, Chair 2018, beatricesalazar1@gmail.com
Social Media Liaison	Pumtiwitt McCarthy, Chair 2020, pumtiwitt.mccarthy@morgan.edu
Local Section contact:	acsmarylandsection10@gmail.com

AWARDS

Braude Award, L. Hellwig
Remsen Award, D. Ferraris
Maryland Chemist of the Year Award,
B. Salazar
Senior Chemist Award, M. Eiss
Student Award, S. Narayan

PROGRAMS

Women Chemists Committee, K. Elkins
Student Travel, L. Hellwig
High School Outreach: National Chemistry Olympiad & Chemists Celebrate Earth Day, B. Salazar
Middle and Elementary School Outreach (National Chemistry Week, Earth Week), R. A. Pesce-Rodriguez
Publicity, P. McCarthy / B. Salazar / N. Carbonaro
Entertainment/Tours, M. Foss / L. Hellwig
YCC, O.H. Wilkins

EVENTS CONTACT

The U.S. National Chemistry Olympiad
USNCO MARYLAND

URL: <http://www.beatricesalazarusnccocoordinator.webs.com>

WCC February Lecture [Kelly Elkins](#)

Jan - April

Student Travel Awards

<https://acsmaryland.org/travel-awards/>

Email: Louise Hellwig <Louise.Hellwig@morgan.edu>

Jan – March

Student Awards <https://acsmaryland.org/student-awards/>

Email: Sara Narayan, snarayan5@yahoo.com, SNARAYAN@stevenson.edu

April

Chemists Celebrate Earth Day – beatricesalazar1@gmail.com

National Chemistry Week / Earth Week Events

[Rose Pesce-Rodriguez](#)

Chemists Celebrate Earth Day – [Beatrice Salazar](#)

<http://acsmarylandevents2016.webs.com>

Beer & Social Tours: Louise Hellwig <Louise.Hellwig@morgan.edu>
and Michele Foss <foss.michele@gmail.com>

April - Oct.

Senior Awards

Email: Merle Eiss, meiss32@aol.com

May

Braude Award

<https://acsmaryland.org/braude-award/>

Email: Louise Hellwig <Louise.Hellwig@morgan.edu>

Oct.

The Remsen Award

<https://acsmaryland.org/remsen-award/>

Email: Dana Ferraris (dferraris@mcdaniel.edu)
<dferraris@mcdaniel.edu>

Nov.

The Maryland Chemist of the Year Award

<https://acsmaryland.org/maryland-chemist-of-the-year/>

[Beatrice Salazar](#), Award Committee Chair

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Receiving the Chesapeake Chemist

Hopefully, if you are reading the Chesapeake Chemist this month. You are receiving it via e-mail from us. We went to electronic-only mailings to our Maryland ACS membership in October 2006.

Changing your e-mail address? Moving out of the MD ACS area?

Let us update your email if you have any changes.

E-mail us at

acsmarylandsection10@gmail.com

Provide your ACS member number, full name, and email changes and we can ensure that your records are updated with National ACS.

Contact the National ACS

membership division:

800-333-9511 (US only) or at

service@acs.org to

ensure that you receive the Chesapeake Chemist, and please add your ACS email.



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