Volume 110, No. 7 September 2023

THE CHEMICAL BULLETIN

Chicago Section of the American Chemical Society Newsletter

September Hybrid Monthly Meeting: Education Night

Thursday, September 14, 2023 5:30 – 8:30 PM CDT

Breaking Barriers: High School Perspectives on STEM Research

Dr. Ami LeFevre

Curriculum Director of Science
Niles West High School

ABSTRACT

The presentation "Breaking Barriers: High School Perspectives on STEM Research" unveils innovative science projects and achievements cultivated by high school students in STEM field. Educators, mentors, and institutions play a pivotal role in fostering the research environment that encourages scientific exploration, risk-taking, and the pursuit of solutions to real-world problems from the high school student perspective. Through our Niles West High School research program, we witness how research students develop communication and collaboration skills, mentorship relationships, ignite a passion for inquiry, and inspire future STEM leaders. The presentation casts a spotlight on the essentials and challenges of a high school research program that fosters curiosity and critical thinking.

IN-PERSON DINNER

$25 for ACS members
$27 for nonmembers
$15 for students and postdocs
Virtual or lecture-only attendance is free

North Park University
Johnson Center room 325
3225 West Foster Ave
Chicago, IL 60625
Directions

REGISTRATION

By phone (847-391-9091), email (chicagoacs@ameritech.net) or online:

REGISTER HERE

DEADLINES TO REGISTER

Wednesday, Sept. 6, 12 PM (Dinner)
Tuesday, Sept. 12, 8 PM (Virtual or Lecture Only)

IN THIS ISSUE

AGENDA

5:30–6:00	Registration; Project SEED and Student Poster Session
6:00–6:45	Dinner
6:45–6:50	Announcements - Peggy Schott, Chair
6:50–7:10	Presentations of the 2023 Award for Excellence in High School Teaching of Chemistry and 2023 High School Student Scholarships
7:10–8:15	Presentation by Dr. Ami LeFevre
8:15–8:30	Q&A and Closing

DINNER

- Caesar Salad
- Garlic Breadsticks
- Eggplant Parmesan
- Pasta Marinara or Alfredo
- Italian Sausage and Peppers
- Cheesecake

MEET THE SPEAKER

Dr. Ami LeFevre is a Curriculum & Instruction specialist with a wealth of expertise in education, particularly in the field of science. Holding a Doctorate in Education (Ed.D.), Dr. LeFevre has dedicated her career to advancing pedagogical practices and fostering excellence in science education. With her Doctorate in Education, Dr. LeFevre brings a deep understanding of curriculum development and instructional strategies. Her mastery lies in curriculum models within science education, scientific argumentation, and the implementation of action research studies.

Dr. LeFevre has showcased her passion for education through 33 years of dedicated service at Niles West High School in Skokie, Illinois. Notably, she has held the role of Director of Science at a secondary school that promotes scientific research. She has demonstrated her passion to support and grow the research program. Her experience extends to teaching higher education college courses, where she has mentored and guided future educators. Currently, Dr. LeFevre is working with North Park University to develop and implement a successful Supplemental Instructional (SI) Leadership program supported by a NSF grant.

Dr. LeFevre's credentials extend far beyond her doctorate. Her professional licensure includes National Board Certification, a testament to her commitment to excellence. Additionally, she is certified with a licensure in Learning Disabilities (L.D.) and Learning Behavioral Specialist (L.B.S.) Special Education. Her qualifications also encompass a Type 75 Administrator status and an Illinois Teacher Evaluator credential. Dr. LeFevre possesses endorsements in Chemistry, Biology, and Physics, underscoring her proficiency across multiple scientific disciplines.

Beyond professional pursuits, Dr. LeFevre is an advocate for fostering curiosity and exploration among learners. She believes in the power of education to transform lives and contribute to society's progress. Her dedication to lifelong learning is reflected in her professional participation and leadership roles in ACS education programs such as Chair of the ACS Chem Matters Committee and ACS ChemClub Advisory Board.

Details: https://mwrm2023.org/

FROM THE EDITOR'S DESK

A New Season

As an educator, September has always marked a time of transition, of summer drawing to a close and a new academic year beginning. September brings changes to my classroom; new faces, new names to learn, and new challenges to meet. Each semester unfolds with its own unique cadence, but despite those changes, I find that teaching chemistry–working with students, collaborating with colleagues, mentoring research projects–remains just as satisfying from year to year.

This September also marks a time of transition for *The Chemical Bulletin*, as Irene Cesa and Amber Arzadon move on from their distinguished service as co-editors. I want to thank both Irene and Amber for the incredible contributions they have made to the bulletin over the past two years. I am inspired by creativity and attention to detail that they brought to each issue, and deeply appreciative of how graciously they shared their time and expertise with me as I prepared to step into this role. While I will work to maintain the high standard that they have established for the bulletin, as with any transition, readers will undoubtedly notice changes. It is my hope that despite those changes, *The Chemical Bulletin* will remain as interesting, informative, and satisfying to read as it has been these past two years.

I am thankful for the community of volunteers that make *The Chemical Bulletin* possible. The quality of the bulletin is a direct reflection of the people who offer their time and talents to it, be that in the form of proofreading, layouts, program information, regular columns, digital editing, feature articles, historical pieces, or other contributions. If you have a story, event, or other information that would be of value to the Chicago Section, I hope that you will reach out to me!

Finally, my sincere thanks to everyone who contributed to the September 2023 issue of *The Chemical Bulletin:* Fadwa Al-Taher, Paul Brandt, Gowri Kuda-Singappulige, Josh Kurutz, Bethel Shekour, Margaret Schott, and Adam Sussman. Thank you for your help!

MATT VAN DUZOR

LETTER FROM THE CHAIR

Celebrating Our Members

As we head into late summer, just three and a half years since the start of the coronavirus pandemic, our lives and daily patterns have been altered in many ways. Some co-workers are performing their jobs from home (or the local coffee shop), Zoom meetings have become commonplace as ways to "gather" virtually, and many of us are still practicing social distancing in our day-to-day interactions with friends, students, and colleagues. Nevertheless, the life of the Chicago Section continues as it has every year since 1895. I am delighted to mention three Section members who have received special recognition in recent months.

Greg Engel, Professor of Chemistry and Molecular Engineering at the University of Chicago, is one of 42 ACS members to be named an ACS Fellow for 2023. The Engel research group uses both theory and experimentation to investigate the role of femtosecond dynamics in steering and controlling excited state reactivity, including in photosynthesis. Greg has served as Chair of the Physical Chemistry Division of ACS and Co-Chair of the Biophysics Subdivision. The ACS Fellows program began in 2009 as a way to recognize and honor ACS members for outstanding achievements in and contributions to science, the profession and ACS. Congratulations, Greg!

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LETTER FROM THE CHAIR

Continued from page 3

Graduate student **Zoha Syed** is one of 35 early-career scientists who were selected to participate in the 2023 Chemical Abstract Services (CAS) Future Leaders Program held in Columbus, Ohio in August. CAS is a division of the American Chemical Society. Participants in this program gain leadership skills and learn about the chemical information industry. Back in the research lab, working under the mentorship of Chicago Section members Omar Farha at Northwestern and Massimiliano Delferro at Argonne National Laboratory, she is using nanoscale species as well-defined catalysts for facilitating a wide array of socially relevant chemical transformations. Congratulations, Zoha!

Tim Marin, who is on the chemistry faculty at Benedictine University, has been selected as winner of the Chicago Section's 2023 Distinguished Service Award (DSA). The DSA recognizes members who have provided exceptional services to the Section. Over the past several years Tim has served as Chair (2019), Annual Report Chair, National Affairs Chair and Councilor, Budget Director, and Office Affairs Co-Chair. He is currently heading up a team called the Office Space Task Force whose aim is to get the Section's records in better order. The words congenial, competent, and committed come to mind. Congratulations, Tim!

MARGARET SCHOTT

SECTION NEWS

Chicago Section Recognized at 2023 ChemLuminary Awards

The Chicago Section took home a pair of honors at the 2023 ChemLuminary Awards on Tuesday, August 15, at the ACS Fall Meeting in San Francisco. This year marked the 25th anniversary of the ChemLuminary Awards. The theme of the event, hosted at the San Francisco Marriot Marquis, was "Harnessing the Power of Our Volunteers."

The Chicago Section received awards in the categories of "Outstanding Virtual Event for Chemists Celebrate Earth Week (CCEW) or National Chemistry Week (NCW)," and "Most Innovative New Activity or Program." The former was awarded for the Chicago Section's sustainability postings on social media observing Chemists Celebrate Earth Week in April 2022. The latter was given in recognition of the Gibbs Medal Reception that took place at the Fall 2022 National Meeting in Chicago.

Image: https://www.acs.org/funding/awards/chemluminary.html

This year, the Chicago Section was nominated in eight ChemLuminary Award categories. Of those nominations, the Chicago Section was named a finalist in seven categories. Past Chicago Section Chair Mark Cesa was in attendance and served as the representative for the section at this year's award celebration.

Since 1999, the ChemLuminary Awards have rewarded "the best examples of programming, outreach, and operations from ACS local sections, technical divisions, regional meetings, and international chemical sciences chapters." The Chicago Section has captured two ChemLuminary awards in four of the last five years.

A Glimpse into the Chicago Section's Past

The following article was first published 99 years ago, in the September 1924 issue of The Chemical Bulletin. It provides a glimpse into the Chicago Section's early growth, its activities and initiatives, and limitations and successes. The author, Gerald Wendt, was Chair of the Chicago Section in 1924. He later became a writer and lecturer on science topics for the general public and served as Science Director for the New York World's Fair of 1939–1940. Notes have been added to clarify some of the terminology for 21st century readers, but the text of the original article has not been altered. – Margaret E. Schott

The Chicago Section This Year

By Gerald L. Wendt, Chairman

The growth of the Chicago Section in activity and effectiveness has more than kept pace with its growth in numbers. Those who visit many Sections agree that nowhere is the comradeship among chemists more varied or more vital. Past administrations have extended our service piece by piece until we now stand second to none in significant and healthy local life nor in leadership in the work of the National Society. Our growth will continue. It is not difficult to enumerate details.

Just as the meetings of the American Chemical Society have become too diversified to be held in one room so our many interests have demanded a system of group meetings[1] which in the past three years have developed to a position of importance fully equal to the general meeting. They will, of course, be maintained. One group will be physical this year and perhaps a new group in chemical education will be added, prompted by the success of the Division of Chemical Education of the national society and by the large number of chemical teachers in Chicago. Technical subjects will be increasingly relegated to the Groups and visiting speakers from outside the Section will be on their programs. Meanwhile the general meeting becomes more general so as to appeal to the largest possible number of members. There are many matters of public interest that the general meeting should consider. We have not been as active as Milwaukee or Indianapolis, for instance, in co-operating with authority and with other organizations in public matters of vital concern to us. Publicity that is mere propaganda cannot compete with public service in the matter of securing our place in the sun. The Program Committee realizes that we are primarily citizens—citizens with a scientific outlook on life and who know this material world. Its plans for this year will stimulate our thought and service in this direction.

The Public Representation Committee should express all this in action. Its task is not merely publicity, no matter how well that be done. There are numberless subjects that demand action, such as the prize essay contest, a campaign before the Illinois legislature to eliminate fraudulent universities, co-operation with the Chemical Warfare Service, relations with the John Crerar Library[2], the vital question of sewage disposal

Continued on page 6

1 – Following dinner and the main lecture, members attended topical group meetings in smaller rooms, each with its own speaker. For example, one of the six group meetings listed for October 22, 1926, at 8:45 p.m. was Group 1. Inorganic and Analytical: "What Does a Prohibition Chemist Do?"

2 – The John Crerar Library opened in 1921 on the northwest corner of Michigan and Randolph as a free public reference library of scientific literature. At one time, the Chicago Section rented space on the fourth floor. Today, the library is operated by the University of Chicago and resides on that campus. The Chicago Section supports the library through the Section's endowed Ipatieff Book Fund, a trust established to support the purchase of books in chemistry.

Continued from page 5

and water supply in the Sanitary District, relations with the press and the supplying of lecturers to many organizations. All of them demand unselfish devotion by the committee members. All of them spring from an ideal of disinterested citizenship.

The Chemical Bulletin is just celebrating its tenth anniversary. It is not only the oldest local section publication and the first intersectional[3] journal, but is easily the outstanding local paper in the American Chemical Society. It gives the opportunity for discussion that our crowded monthly meetings cannot afford and keeps alive the personal point of view that a large group is always in danger of losing. It has much to its credit in making the Chicago Section what it is and in national affairs, too. The now popular intersectional, or regional, meetings, the intersectional journals, the regional election of directors are among its fruits. Its local service, especially when the directory is included, cannot be overestimated. And, withal, it pays its own way. It could expand to many pages if contributions alone, and not income, were the controlling factor. Since the editors never lose enthusiasm and the business manager keeps finding new advertisers and more Local Sections are constantly applying for admission to the family the rest of us need only welcome it once a month—and mention it to advertisers.

There are hard working committees whose accomplishments pass almost un-noticed precisely because they are so well done. The Finance, then House, Membership and Employment Committees burn the midnight mazda[4] doing a volume of work which no one who has not served can appreciate. Partly for this reason the list of committee appointments for this year contains many names which are new to the public eye. Look them up in the directory[5], for it pays to know these men to whom you are indebted. The Employment Committee has a particularly onerous task. Its chief endeavor this year is to build up the knowledge of its work among employers. There is every reason why we should serve the entire West as the New York Chemists Club does the East.

The most pressing need of the Section is a centralized office for these many activities. A full-time secretary would be needed to take the place of many private stenographers and to take a load of labor from busy men. Perhaps the time will come when we can afford it.

That is the great wall. Lack of funds limits all our activities and compels private charity to support even the indispensable ones of today. this should and must be ended. The drive for an endowment fund to which we can each and all contribute and thus do our share in return for the loyal work of committees and officers is the primary task of the present administration. If all this full life of the Section is worth while then each of us should be a shareholder in the endowment and should not wait for solicitation by the Committee.

The sum of this discourse is the word *Committee*. No less than fifty-two members are in the list of committees, officers and editorial board. It is they who are making the Section what it is. They are responsible to the Executive Committee which through them, is ever at the service of the Section and transacts a volume of business which the chairman can but hope at best to keep his eye on.

3 – Beginning in 1915, the bulletin devoted space to other local sections "with whom we are placed closely geographically and in whose boundaries most of us have one or more very good friends" (April 1915 issue). Starting with the Milwaukee Section, the list of cooperating sections expanded over time to include Kansas, Minnesota, Purdue, and Montana, among several others.
4 – The phrase "midnight Mazda" is akin to "midnight oil" as a source of light. It was in use for a time following the invention of the Mazda lamp at General Electric. Thanks in part to the work of Gibbs Medalist Irving Langmuir, the lamp made use of a long-lasting tungsten filament and a bulb filled with an inert gas. The term Mazda comes from Ahura Mazda, the Persian God of light.
5 – For a period of time, the Chicago Section published in alternate years a July-August issue called the Directory (or Directory Number), which listed members of both the Chicago Section and the cooperating Sections and included advertisements.

The John Crerar Library, 1922.

SAFETY FIRST

Artificial Sweeteners: Are They Safe?

Most everyone has a "sweet tooth," which can be a problem if you frequently consume foods and drinks with a lot of added sugars. Added sugar can cause weight gain and a risk of serious health problems, such as diabetes and heart disease. To avoid these problems, many people are turning to sugar substitutes or artificial sweeteners.

Artificial sweeteners are used as substitutes for sugars as they have zero or few calories. Examples include aspartame, sucralose, and stevia, among others. Diabetics and weight conscious consumers may prefer these lower calorie alternatives.

Sweeteners are commonly used in foods and beverages marketed on product labels as "sugar-free" or "diet" and are displayed on the ingredient lists of baked goods, beverages, candy, dairy products, and as many other products. Some artificial sweeteners are also sold in packets or other containers, which can be added to foods or drinks in restaurants or at home.

Photo credit: https://web.musc.edu/about/news-center/2023/05/22/confused-about-sweeteners-after-new-recommendation-musc-dietitian-has-answers

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Sweetener	Approval Date	Brand Name	Sweetness intensity compared to sugar	Foods and/or Beverages
Aspartame	1974	Equal, NutraSweet, Sugar Twin	200	Tabletop sweetener, chewing gum, cold breakfast cereals and dry bases for beverages, instant coffee and tea, gelatins, puddings and fillings, dairy products and topping, and general-purpose sweetener
Saccharin	1977	Sweet Twin, Sweet 'N Low, Necta Sweet	200 - 700	Beverages, fruit juice drinks, and bases or mixes, sugar substitute for cooking or table use, and in processed foods.
Acesulfame potassium (Acs-K)	1988	Sweet One and Sunnett	200	General-purpose sweetener and flavor enhancer in food, except in meat and poultry, and in baked goods
Sucralose	1998	Splenda	600	General-purpose sweetener found in various foods, including baked goods, beverages, chewing gum, gelatins, and frozen dairy desserts
Neotame	2002	Newtame	7000 - 13000	General-purpose sweetener and flavor enhancer in food, except in meat and poultry, and in baked goods
Steviol Glycosides	2008	Truvia	200 - 400	General-purpose sweetener
Advantame	2014	Advantame	20000	General-purpose sweetener and flavor enhancer in food, except in meat and poultry, and in baked goods

SAFETY FIRST

Continued from page 7

The six sweeteners that have been approved by the Food and Drug Administration (FDA) as food additives and allowed to be sold as sugar substitutes are the following:

1. Aspartame
2. Acesulfame potassium (Acs-K)
3. Sucralose
4. Neotame
5. Advantame
6. Saccharin

Some of these sugar substitutes are much sweeter than regular sugar and smaller amounts should be used to produce the same sweetening effect. For example, aspartame is commonly used in "diet" drinks since it has fewer calories than regular sugar. It is also about 200 times sweeter, so far less is needed for products. A package of Equal in your coffee amounts to about the same sweetness as 2 teaspoons of regular sugar. A packet of Equal has 4 calories, but two teaspoons of sugar have 32 calories.

Steviol glycosides obtained from the leaves of the stevia plant (*Stevia rebaudiana* (Bertoni)) are generally recognized as safe (GRAS). These high-purity sweeteners derived from stevia include Rebaudioside A, Stevioside, Rebaudioside D, or steviol glycoside mixtures with Rebaudioside A and/or Stevioside as the main components. However, stevia leaf and crude stevia extracts are not considered GRAS and are not allowed to be used as sweeteners in the U.S.

Individuals with the rare genetic disease phenylketonuria should avoid or restrict aspartame in their foods and drinks as this may cause serious health problems. Also, if individuals have a bowel disease, use of sugar substitutes may cause their symptoms to flare up.

On July 13, 2023, a joint assessment led by the World Health Organization (WHO) evaluated the health impacts of aspartame, a widely studied food additive used in diet drinks and low-sugar foods. In the report, the International Agency for Research on Cancer (IARC) cited "limited evidence" of carcinogenicity in humans, classifying aspartame as "possibly carcinogenic."

There are benefits to replacing added sugars with sugar substitutes. Artificial sweeteners lower the risk of tooth decay and cavities, and they don't raise the levels of sugar in the blood. Sugar substitutes may also help manage weight in the short term since they have few or no calories, but there is uncertainty about longer term benefits. No studies have definitively linked artificial sweeteners to a higher risk of cancer in humans.

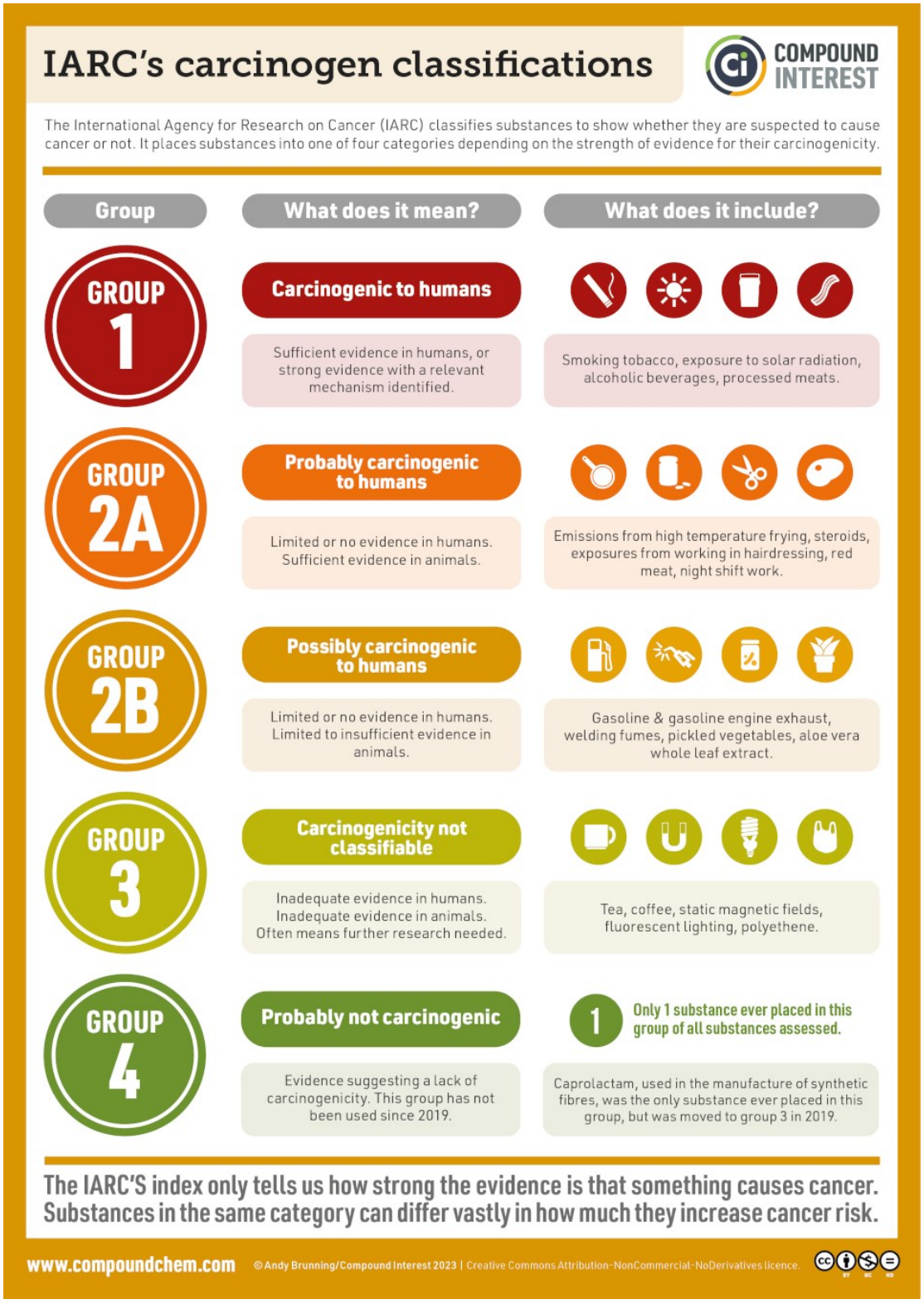
References

"Aspartame and Other Sweeteners," FDA, July 14, 2023. https://www.fda.gov/food/food-additives-petitions/aspartame-and-other-sweeteners-food

"Artificial sweeteners and other sugar substitutes," Mayo Clinic, Jan. 10, 2023. https://www.mayoclinic.org/healthy-lifestyle/nutrition-and-healthy-eating/in-depth/artificial-sweeteners/art-20046936

"Aspartame hazard and risk assessment results released," WHO, July 13, 2023. https://www.who.int/news/item/14-07-2023-aspartame-hazard-and-risk-assessment-results-released

FADWA AL-TAHER



The IARC recently assigned aspartame a group 2B carcinogen classification. Andy Brunning/Compound Interest offers some context with the infographic "IARC Carcinogen Classifications."

https://www.compoundchem.com/2023/07/14/carcinogens/

CHEMSHORTS FOR KIDS

The Element Girls

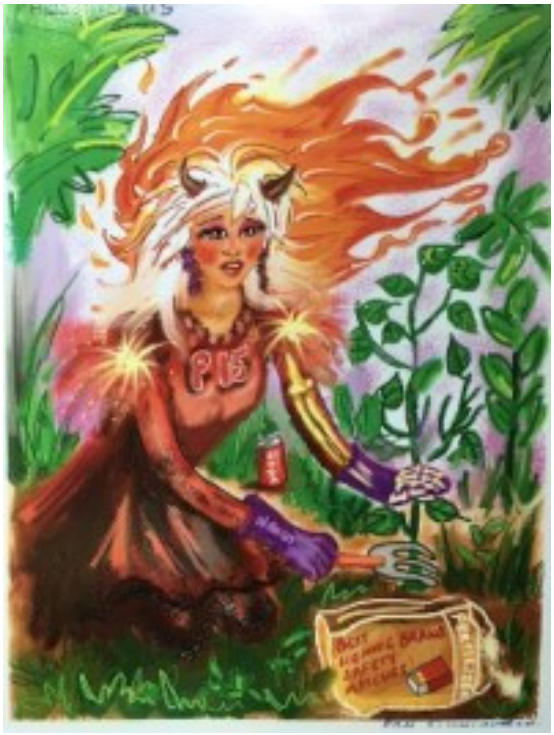
This month's ChemShorts for Kids is unique in that there is no experiment to do, but rather an opportunity for kids to engage differently with the periodic table. I recently attended a ChemEd conference and found myself thoroughly engaged by Rajasree Swaminathan, an author of numerous books about the elements of the periodic table. Ms. Swaminathan is a 20-year veteran, 7th grade teacher in California. She has developed a number of characters, all based on different elements of the periodic table. Many of these characters have found their way into chemistry-themed story books. Her first book, "*Hydrogen and the Alkali Metals: Exciting and Explosive! Element Girls Series Book 1*" introduces us to Atom, a young girl who is gifted a magical periodic table. By touching one of the elements on the periodic table, Atom (and her dog Electron) are transported to that element where they have a conversation and learn about the unique aspects of the element. In this book, Atom visits Hydrogen and her sisters, Lithium, Sodium, Potassium, Rubidium, Cesium, and Francium. In later books, Atom introduces us to her other friends (Ion, Exo, Endo, Valence, and Mole) and together they journey to meet other families of the periodic table.

These books are available on Amazon or Kindle and some of them are available for free. You can find the books on her website: Connecting Science and Art. You can also find videos of some of these stories on YouTube https://www.youtube.com/channel/UCRqH6q2IAY81bxnEckU7tGg) and on Medium:

Lead
https://medium.com/chemistry-element-stories/story-of-the-element-girl-lead-275bb24107ee?source=friends_link&sk=352c8b5408d3aa75cf4a1ca81c013388

Antimony
https://medium.com/chemistry-element-stories/the-story-of-the-element-girl-antimony-5e57adf471af?source=friends_link&sk=424129fed9ce31a57d203201c8c144d2

Aluminum
https://medium.com/chemistry-element-stories/story-of-the-element-girl-aluminum-22ac73771af3?source=friends_link&sk=44bbb95edc5a1fef994f76c4e234f119.



The element Phosphorous from the book *The Magical Periodic Table and The Element Girls - Book 5: The Pnictogens - Nitrogen, Phosphorous, Arsenic, Antimony, Bismuth - Oh! My!* by Rajasree Swaminathan
Reprinted with permission from Raji.Swaminathan@harker.org

There are currently seven books in this series (no noble gases yet) from the representative elements. The pictures are stunning and helpful in remembering the qualities that make up the element. The books are probably most appropriate for young readers 7th – 12th grade, but kids interested in science will find these engaging as well. The stories are somewhat reminiscent of the Magic Treehouse books from a chemistry, rather than a history, perspective. Enjoy this as a STEAM (Science, Technology, Engineering, Art, Math) experience.

References:
https://sites.google.com/staff.harker.org/rajis/home
To view all past "ChemShorts for Kids", go to:
https://chicagoacs.org/ChemShorts

PAUL BRANDT

UPCOMING EVENTS

Sept. 7	Chicago Board of Directors Meeting
Sept. 10	Articles due for the October 2023 *Bulletin* issue
Sept. 14	Chicago ACS September Meeting; Education Night
Oct. 10	Articles due for the November 2023 *Bulletin* issue
Oct. 12	Chicago Board of Directors Meeting
Oct. 18-21	Midwest/Great Lakes Regional Meeting (MWGLRM 2023)
Oct. 27	Chicago ACS October Meeting; Basolo Medal Symposium

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