The Accelerator

INDIANA SECTION OF THE AMERICAN CHEMICAL SOCIETY

JANUARY 2019

Chair's Corner *by Lisa Buchholz*

As 2018 draws to a close, I would like to take this time to acknowledge the wonderful work that members of our local section have done throughout the year. The impact on the community has been tremendous. I encourage all who have been involved in these activities to take a step back and appreciate your accomplishments. Below is just a sample of 2018 achievements:

- Leading, coordinating, volunteering, and/or participating in events such as SEFI 2018, Women & Hi Tech, Think Like a Molecule Poster Session, Project Seed, National Chemistry Week, Annual Biomedical Research Conference for Minority Students, Celebrate Science Indiana, Music and Chemistry with Peter Banks, Chemistry of Cheese, and Chemistry of Distillation plus many more. These events helped to promote chemistry and connect with people throughout our community.

- 3 Chemluminary Awards presented at the ACS National Meeting in Boston-Outstanding Leadership Development Program; Local Section Partnership Award; Outstanding Performance by a Local Section-Medium Large Size

- Selected to host an advocacy and leadership workshop presented by Dr. Allison Campbell, 2017 ACS National President in October.

As we look forward to 2019, I would like to congratulate our newly elected Local Section Executive Committee including our new Chair, Tamiko Porter. I look forward to partnering with Tamiko throughout 2019. I also want to recognize our outgoing officers: Past Chair-Tom Xiao, Secretary-Cathy Peacock, and Treasurer-Paul Morgan. On behalf of the Executive Committee and local section members, I would like to thank you for your service in support of our section.

Lastly, thank you all for allowing me to serve as your Chair in 2018; it has been an honor. I look forward to the sections continued success and impact in 2019! Have a safe and enjoyable holiday season!

Note from the Editor: My apologies for not getting Accelerator out in December. We still plan to publish in March, June, September and December 2019. We hope you had a great holiday season and we look forward to all of the activities and events this coming year!

Thank You to Our 2018 Sponsors!

On behalf of the Executive Committee and local section members, I want to extend a thank you to **Monument Chemical** and **Corteva Agriscience** for their generous monetary contributions. Through this generosity, the local section will be able to fund several events and activities designed to promote chemistry and positively impact our community.

The Executive Committee meets the second **Monday** of each month at 6:00 pm at The Center (6320 Intech Way, Indianapolis, IN 46278). All Local Section members are encouraged to come and join us to learn about the programs and events our section sponsors. Meetings usually last for 2 hours. Dinner is provided before the meeting. Please let us know if you plan to attend so we have a headcount. You can contact our 2019 Chair, Tamiko Porter at **tnp@IUPUI.edu**.

Executive Committee	2018	2019
Chair	Lisa Buccholtz	Tamiko Porter
Past Chair	Tom Xiao	Lisa Buccholtz
Chair-Elect	Tamiko Porter	Debra Feakes
Treasurer	Paul Morgan	Arvind Jaganathan
Secretary	Cathy Peacock	Christine Skaggs
Councilor	Rob Sammelson, Robert Pribush, Beth Lorsbach, Brian Mathes	Rob Sammelson, Robert Pribush, Beth Lorsbach, Brian Mathes
Alternate Councilor	Sibel Selcuk, Erin Dotlich, Tony Trullinger, Linda Osborn	Tom Xiao, Erin Dotlich, Tony Trullinger, Linda Osborn
At Large Member	Mark Pobanz, Ann Wislon Maria Alvin-Gaston	Greg Smith, Ann Wislon Maria Alvin-Gaston

2018 Committee Chairs		
2023 NMLT Strategic Planning	Frederique Deiss	Frederique Deiss
Assistant Newsletter	Andrea Moberly	Andrea Moberly
Awards	Katherine Stickney	Katherine Stickney
Celebrate Science Indiana	Julie Austin	Julie Austin
Chemistry + Humanities	Anne Wilson	Anne Wilson
Chemistry Olympiad	Jianping Huang	Jianping Huang
Chemist's Celebrate Earth Day	Julie Austin	**Open**

Education and Olympiad	Robert Pribush	**Open**
Election Chair	Matt Gardlik	Matt Gardlik
Grants	Ann Cutler	Ann Cutler
IUPUI Poster Session	Tamiko Porter	Tamiko Porter
K-12 Outreach	Erica Posthuma-Adams	Erica Posthuma-Adams
Kids & Chemistry	Brian Mathes	Brian Mathes
Membership Affairs	Rebekah Dickerson	Jordan Knotts
National Chemistry Week	Belgin Canturk	Melissa Lee, Dan Klosowski
Newsletter – Editor and Design	Julie Austin	Julie Austin
Project SEED	Elmer Sanders, Josh Taylor	Elmer Sanders, Josh Taylor
Public Relations Assistant	Norman Sesi	Norman Sesi
Public Relations Chair	Quanbo Xiong	Quanbo Xiong
Science Day at Ball State	Ryan Jeske	Ryan Jeske
Social Media	Erica Posthuma-Adams	Erica Posthuma-Adams
Honorary Trustees		Anne Hunt, Dawn Brooks, Sibel Selcuk
Webmaster	Abraham Hentz	Abraham Hentz
Women Chemists	Carmin Burrell	Carmin Burrell
Younger Chemists Committee	Tejas Shaw	Tejas Shaw

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Want to Study Chemistry Abroad? Now is Your Chance!

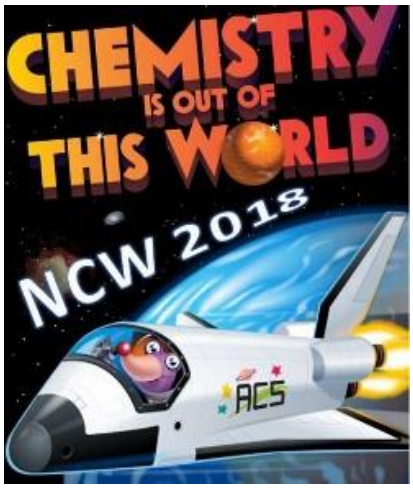
In response to interest in our faculty-led short term study abroad courses in the sciences at Butler University, Mike Samide (msamide@butler.edu) and Anne Wilson (amwilson@butler.edu) of the Department of Chemistry and Biochemistry have developed a science themed Study Tour for Chemistry Alummi, Friends, and Family. These faculty members are beyond excited to lead this 10-day adventure through **France** and **Germany**, where we will be learning about the science, history, and culture surrounding beer, wine, cheese, and chocolate. We have also built in substantial amounts of free time to go and explore Paris, Heidelberg, and Munich at your own pace. We hope that members of the Indiana Section of the ACS will also choose to join us!

If you are interested in learning more information about this Study Tour, it can be found at: https://blue.butler.edu/~msamide/AlumniTour2020/. Enrollment information as well as payment plans can be found at: www.efcollegestudytours.com/2111558aj**.** If you have further questions or would like more information, feel free to contact Mike or Anne.

NCW Community Outreach Event was Out of This World!

By Belgin Canturk

National Chemistry Week (NCW) "Chemistry Day" is an annual event celebrated in the United States. NCW is a community-based outreach program. The mission of the program is to reach the public, particularly elementary and secondary school children, to promote the positive impact of chemistry in everyday life.



The local ACS Indiana Section partnered with the Children's Museum of Indianapolis to celebrate the NCW event on Saturday, November 3rd from 10:00 AM-3:00 PM. This event was led by co-chairs Belgin Canturk (Corteva Agriscience) and Tom Xiao (Eli Lilly). This year's NCW theme was "Chemistry is Out of This World!" which covered chemistry of outer space. The event featured 11 interactive hands-on chemistry booth demonstrations, and 100 volunteers helped out at the event. All the volunteers received a free t-shirt designed by a local middle school student, Avi Maun, who was also the 2018 NCW Illustrated Poem contest winner for the 6-8th grade category.

This year we had two ACS booths. At the first booth, we gave out raffle prizes and ACS brochures. There was also a plasma ball on display that the children could touch. The children were fascinated to see the strand of light drawn to their fingers when they touched it. Next to the ACS booth, we displayed all of the local Illustrated Poem contest winners.

At the second ACS booth, we had NSF-funded "Let's Do Chemistry" kit hands-on activities, the Rocket Reactions and Sublimation Bubbles. Both children and their parents were curious, excited and engaged with both demonstrations. We discussed the importance of safety, especially with regard to the rocket demonstration. The children couldn't get enough of the bubbles, they really enjoyed the visual effect of the bubbles filling with carbon dioxide gas. Facilitators were also able to connect the themes of gas evolution in both the rocket and bubble demonstrations. Parents were surprised to find that the demonstrations utilized common household items and one of biggest takeaways for participants was how chemistry exists in our everyday lives. This sparked new ideas about experiments they could try at home!

The NCW event would not have been possible without the support of our local organizations, industries, and universities including the Children's Museum of Indianapolis, Corteva Agriscience (Dow AgroSciences), AIChE, Heritage Research Group, Eli Lilly, Ball State University, Sycamore School, Indiana University, IUPUI, Butler University, University of Indianapolis, and Taylor University. We truly appreciate their continued support and participation in this outreach event.

On behalf of the local ACS Indiana Section, we are grateful to all of our volunteers for helping us celebrate NCW event at The Children's Museum of Indianapolis. We are looking forward to participating in next year's event!

The Chemistry of Distillation

By Brian Mathes

The Indiana Section continued its long excellence in delving into the chemistry of alcoholic beverages. This iteration had Indiana Chemists descending on the 8th Day Distillery on the near east side of Indianapolis for a terrific talk on distillation given by the Section's own Tom Wysocki. While enjoying some great drinks concocted by the fabulous staff at 8th Day, Tom expounded on all the different chemical aspects of distillation, from water sources to reducing side products in the batches. There was a great discussion on all the chemistry: organic chemistry structures, theoretical plates and separations, analytical chemistry techniques…many disciplines of chemistry were well represented.

We had just under 50 participants learning about their favorite libations. It was a 50:50 mix of chemists and non-chemists - so lots of public education. 8th Day generously gave tours of their production floor allowing the public to see firsthand the process and the equipment. Those tours made Tom's discussions more real and allowed the folks to get a deeper understanding. The section is looking forward to doing this type of educational / social exercise in 2019.


Kids and Chemistry at the Children's Museum of Indianapolis

By Brian Mathes

The Indiana Section ACS continues to volunteer at the Children's Museum to further STEM education. The Section held 6 sessions of "Jiggle Jelly" during the fall break time at the Museum. The foot traffic at the Museum is extremely high during those 2 weeks so this is a key opportunity to get chemistry out in the public's eye. Each session was attended by 25 to 40 members of the public. This means we had the opportunity to help educate over 180 folks on the value and relevancy of chemistry in their lives!

The section intends to be involved in 2019 and as always, we are seeking volunteers who would like to help with this type of public outreach. The time commitment is very small…an hour here and there…so no reason not to volunteer. Contact Brian Mathes at **mathes@lilly.com** for more info. Looking forward to a successful partnership with the Museum in 2019.

Corteva Agriscience: Winner of the Designing Green Chemicals Award

Congratulations to Corteva Agriscience for winning the ACS Designing Greener Chemicals Award for their new weed killer, Rinskor, which is derived from rice. For more information, **https://cen.acs.org/environment/green-chemistry/2018-Green-Chemistry-Challenge-Awards/96/web/2018/10**

Celebrate Science Indiana Attracts ACS Celebrities to Knock Your Socks Off

By Christina Bodurow

The crowd was asked to hold their ears as Allison Campbell, immediate Past President of the ACS, and Andrew Wu, 2018 Chemistry Olympiad Gold Medal Winner, lit the acetylene gas created inside the bottles from calcium carbide and water to send the socks into the crowd. Those that caught a sock received a science t-shirt. This experiment happened shortly after an introductory ceremony where Dr. Christine Bodurow, ACS District II Director, introduced Dr. Campbell, who then introduced Andrew Wu. The Indiana Section, in lieu of an award, gave Andrew a microscope. With a gold medal around his neck, Andrew Wu then introduced his Chemistry teacher from Park Tudor, Dr. Jessica Hollenbeck. Andrew was honored to be able to spend time with Dr. Campbell and Dr. Bodurow and they visited almost all the booths.

Allison Campbell, Immediate Past President of the ACS and Andrew Wu, 2018 Chemistry Olympiad Gold Medal Winner, unite to perform a calcium carbide experiment for the crowd at CSI.

Science filled the Elements Blue Ribbon Pavilion at the Indiana State Fairgrounds on Oct 6th as the crowd of ~4,000 enjoyed over 68 booths of hands-on science fun. Julie Austin, chair of the ACS booth and editor of The Accelerator Newsletter, created the Black Hole Challenge (with Alka Seltzer rockets) and other hands on activities to fit with the NCW theme "Chemistry is Out of this World".

If you haven't been able to attend CSI, Steven Chase has put together this promo video on the event: **https://drive. google.com/file/d/1o29mBJh31NgbIgtU4nLIGza0wy-aN1GV/view?ts=5bd4efca**

The 2018 ACS booth at CSI included a poster board about how chemists study space and how we are involved in space explorations, marshmallows in a vacuum, the Tyndall effect, Alka Seltzer rockets and tornado tubes!

From Left to Right: Jessica Hollenbeck, HS Chemistry Teacher, Christina Bodurow, ACS District II Director, Julie Holland, Chair of ACS booth at Celebrate Science Indiana, Allison Campbell, Immediate Past President of the ACS, and Andrew Wu, 2018 Chemistry Olympiad Gold Medal Winner.

Dr. Campell's Advocacy in a Box Seminar

By Christina Bodurow

Piloted at several National Meetings and one regional meeting, Dr. Campbell came to Indiana to test her "Advocacy in a Box" program at a local section level. Held the day after Celebrate Science Indiana, Allison shared her valuable talents with over 20 Indiana Local Section members, to help build skills to interact with public officials to advocate for chemistry and STEM policies. "Advocating for Science: How to Talk with Your Elected Officials" was the title of her workshop where she discussed an overview of advocacy, building your pitch, path forward input, and then practicing lessons learned in fun ways.

It is amazing how much of a difference one person can make in such a short visit. Just like the demonstration at Celebrate Science Indiana, knocking their socks off with your pitch for STEM advocacy might be a valuable place to start.

Indiana's State Science and Engineering Fair 2019 Coming Soon to The Center

Support strong science: be a judge for the next generation of Indiana's science leaders! On March 30, 2019, more than 200 students representing the best from each of 10 regions around Indiana will be in Indianapolis at The Center (The Heritage Group) to compete at the 31st Annual Hoosier Science and Engineering Fair (HSEF) for awards, scholarships, prizes and, for some students the opportunity to represent Indiana at the 2019 Intel International Science and Engineering Fair in Phoenix, AZ May 12-17, 2019. These high school students will compete against the top winners of regional, state and national science fairs from around the United States and the world.

Below is a photo of last year's Indiana State Science Fair winners. If you look closely, you can see snow in the background. Despite almost 8" of snow; it was amazing how many students & judges were able to show up! Many attendees were blown away by the students and the hard work they put into these projects.

Judges Needed

Please save the March 30th date to invest with your time and talent. The Science Education Foundation of Indiana is the non-profit agency that conducts this event, and sets the following criteria for becoming a judge:

High School Division: (grades 9-12)

"Judges must have a B.A., B.S. or a master's degree with a minimum of three years related professional experience OR a Ph.D., M.D., or equivalent. Judges may include university faculty, corporate scientists and engineers, representatives of private, state and federal research centers and agencies, and medical researchers. Affiliated science fair directors, Affiliate Regional Fair official party members, individuals traveling to the HSEF with an official party, parents or relatives of a student competitor, chaperones, mentors or elementary or secondary teachers may not be eligible to judge."

Junior/Elementary Division: (grades 4-8)

"Judges must at a minimum be enrolled in an accredited university or college or have a B.A., B.S. or a master's degree, OR a Ph.D., M.D., or equivalent. Judges may include high school science teachers, university faculty, corporate scientists and engineers, representatives of private, state and federal

research centers and agencies, and medical researchers. Affiliated science fair directors, Affiliate Regional Fair official party members, individuals traveling to the HSEF with an official party, parents or relatives of a student competitor, chaperones, mentors or elementary teachers may not be eligible to judge."

Special Awards Judge

Choose this if you will be representing a special awards organization or if you are volunteering to work with the special awards selection committee.

Please note: Judges are expected to be available from 8:30 am through 4:00 pm to complete their judging assignments.

To sign up to serve as a judge, please visit: **https://sefi.org/register/hsefjudge.php**

Special Awards

Only a small percentage of participants end up moving on to the Intel Science Fair. Therefore, SEFI offers an opportunity for companies and organizations to sponsor student awards/scholarships. For example, American Statistical Association Central Indiana Chapter, National Organization for Black Chemists and Chemical Engineers (NOBCChE) and Society for Tribologists and Lubrication Engineers (STLE) and others provide awards to recognize science and engineering success. Please visit **https://sefi.org/hsef/SAO** for more information about signing up for special awards. If you know of other companies or organizations that might be interested, we would appreciate if you would forward this information. This is a great way to offer encouragement to a greater number of these very bright students. Thanks for considering.

Indiana Section ACS Member Spotlight - Jianping Huang

By Bob Pribush

Having won the 2018 ChemLuminary Award for Outstanding Performance by a Local Section in the Medium Large Size Category, the Indiana Section is arguably one of the best sections of the American Chemical Society. The award citation stated "Throughout 2017, the Indiana Local Section put chemistry in the spotlight by promoting chemistry through a wide range of community outreach events. The section maximized their impact through active partnerships and participation in several statewide science based events." One component of the Indiana Section outreach endeavor is the United States National Chemistry Olympiad (USNCO) program, which for the past decade the Indiana Section has been successful locally, nationally, and internationally, mainly due to the efforts of program co-chair and Eli Lilly drug discovery synthetic chemist Jianping Huang.

U.S. National Chemistry Olympiad

When long-time Chemistry Olympiad chair Bob Baker left the program, Bob Pribush assumed the role on a pro tem basis, requesting help from any or all who might have an interest. Jianping Huang answered the call, modestly indicating that "he knows how to do this." Indeed, he does know how to prepare students for the USNCO exam! As a result of his teacher-mentoring of students at the high school and middle school levels, in the past ten years three Indiana Section and one Purdue Section students have made the U.S. team, each winning a medal in international competition. Indiana Section students all won gold - Andrew Wu in 2018, Brendan Yap in 2017, and David Liang in 2013 in competitions held in the Czech Republic/Slovakia, Thailand, and Russia, respectively.

To make the U.S. Chemistry Olympiad team requires a student to successfully navigate testing at the local, national, and training camp levels. Nationally 10,000 students take the local section exam (250 in the Indiana Section). Of those, 1000 (a dozen in the Indiana Section) qualify to take the national exam that consists of multiple choice, open-ended, and laboratory components, each lasting about an hour and a half. Of those 1000, 20 are selected to attend an intensive training camp at the United States Air Force Academy. Of those 20, four make the U.S. team.

In each of the past ten years, Jianping has had between one and five of his students finish in the top 20. Overall, he has had 22 students in the U.S. top 20, another 39 students in the top 50, and 51 students in the national top 150.

Jianping's success in the Chemistry Olympiad began in China, where he received his undergraduate and one of his graduate degrees. There he designed curriculum and lesson plans and actively tutored students to prepare them for the Chemistry Olympiad. In six years, eight of his students made the Chinese study camp with three making the Chinese team and winning gold medals at the International Chemistry Olympiad.

At the International level, the Chemistry Olympiad competition includes material and skills typically taught at the junior university level in the United States. In order to make his students internationally competitive, throughout the year Jianping Huang teaches in-person and on-line courses as well as an intensive summer camp. These are available to any middle school or high school student that is willing to put in the consistent extra effort needed to be internationally competitive, sort of like the Amateur Athletic Union (AAU) does with young athletes, except Jianping exercises mind instead of bodies.

The Indiana Section is blessed to have so many dedicated members. Jianping Huang ranks highly among them!

Don't forget to check out our website for back issues of the Accelerator, minutes from the Executive Committee meetings, and a new calendar of events!

http://www.acsindiana.org/acs/

ACS presence in Indianapolis at the 2018 ABRCMS meeting

As always, the National ACS Booth was a great success. Drs. Ben Fiore-Walker and Raquel Jemison had a table chock full of information, and also held a continuous contest to win a IYPT Periodic Table calendar. They signed up many students to receive additional info about Project SEED and Scholars program, and met many ACS Scholar Alums at the conference.

The Indiana Section took on the suggestion of ACS National Minority Affairs Committee Chair, Dr. Ann Kimble-Hill, and wrote an IPG Grant to fund an ACS event at the Conference. Professor Ann Cutler (UIndy) wrote the grant, Professor Tamiko Porter and Linda Osborn organized all the logistics, and Dr. Lisa Bucholz (Indiana Section Chair) presided over the event on Friday, Nov. 16. There were ~50 attendees, who had the chance to learn more about the ACS (a local student, Jordan Knotts, managed the sign-up booth), play chemistry bingo and win prizes, including an ACS Blanket and Chocolate Indy 500 Race Cars.

The Indiana Section truly enjoyed the opportunity to partner on this important diversity-based conference, and we strongly recommend that ACS continue to build on their already strong relationship with ABRCMS in the future.

Upcoming Regional Meetings:

Great Lakes (GLRM) May 1-4, 2019 in Lisle, IL
Central (CERM) June 4-7, 2019 in Midland, MI
195th Technical Meeting, Rubber Division April 30-May 2, 2019, Independence, OH

AMERICAN CHEMICAL SOCIETY
2019 INDIANA SECTION

UNITED STATES NATIONAL CHEMISTRY OLYMPIAD EXAMINATION

March 30, 2019

U.S. National Chemistry Olympiad

Dear Chemistry Colleagues:

Honor your best chemistry students by providing them with an opportunity to participate in the United States National Chemistry Olympiad (USNCO) competition sponsored by the Indiana Section of the American Chemical Society (ACS). The Local Section USNCO examination will be held at 8:30 on Saturday, March 30, 2019 at Brebeuf Jesuit Preparatory School. The exam serves two purposes: 1) to recognize the best high school chemistry students and high schools in the Indiana Section and 2) to select twelve students to take the national USNCO exam in April.

Indiana Section ACS recognition awards will be based on student performance on the 110-minute multiple-choice Local Section Chemistry Olympiad Examination written by a national USNCO committee. Copies of Local Section Chemistry Olympiad Exams from previous years can be downloaded from the website:

https://www.acs.org/content/acs/en/education/students/highschool/olympiad.html

Click on the Exams link to access local section and national exams.

Indiana Section ACS Awards

Indiana Section ACS awards are given in two categories: 1) First-Year Exam (students who have taken one year or less of a high school chemistry course and 2) Advanced Exam (students who are enrolled in a second or higher high school chemistry course). The top three students in each category will receive a recognition plaque and a $100 cash award. Students who finish in the top 10% in each category will also

receive recognition plaques. Additionally, the top scoring student from every school represented by a minimum of three students will have their name inscribed on a perpetual plaque displayed in that school.

The five top scoring schools in each category will receive a team plaque and a one-year membership for one teacher in the American Association of Chemistry Teachers (AACT). Teachers receiving the membership may opt to apply the award as partial payment for membership in the American Chemical Society.

National USNCO Participant Selection

Those students who wish to compete for an opportunity to take the USNCO national screening exam at Butler University in April 2019 will also take an additional 45-minute open-ended exam written by the Indiana Section USNCO committee. Twelve Indiana Section students with no more than two students from a single high school may take the USNCO national screening exam to attempt to qualify to participate in the Air Force Academy workshop at which the USNCO team is selected. The twelve students will be selected based on their composite performance on the USNCO Local Section Exam plus the additional open-ended questions written by the USNCO chairs.

Of over 10,000 students who take the USNCO exams annually, each of the past ten years the Indiana Section ACS has had between one and five students finish in the top 20 and thus participate in the Air Force Academy camp with several other Indiana Section students finishing in the top 150. Last year the Indiana Section ACS had three students in the top 20, one of whom made the U.S. team, winning a gold medal in the international competition. In the last ten years, we have had three students make the U.S. team and win gold medals in the international competition.

Please share with your students the excitement of competing for individual awards, school awards and the possibility of becoming a member of the United States National Chemistry Olympic team. Challenge your best students to participate in this year's Indiana Section High School Examination. Registration forms will be sent to all teachers who wish to honor their top-performing chemistry students. Note that there is no limit to the number of students from a given school allowed to take the exams. Rules and registration forms are attached.

Sincerely,

Robert A. Pribush
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RULES AND FORM SHEETS can be found at the end of this Newsletter. For more information, go to **www.acs.org/olympiad**

Ball State's Science Day will be April 20th, 2019, 10am-3pm in the Ball Gym on Ball State's campus.

Families and science enthusiasts are invited to participate in this annual day of fun and interesting science activities and demonstrations.

We expect to have representatives from many different organizations on and off campus, including chemistry, biology, entomology, physics and local high schools.

https://www.bsu.edu/academics/collegesanddepartments/chemistry/activities/community-outreach

In the Beginning Was Milk - Chemistry of Cheese

By Maria Alvim Gaston

This year we hosted the Chemistry of cheese on a lovely September night at the Big Red Liquors Head Quarter, located at 5445 S. East Street, Indianapolis. Our chemistry community and Cheese aficionado came together in this sold out event, once again to learn about the Chemistry of Cheese. Our guests were greeted with complimentary sparkling wine while mingling with other guests until the talk starts. During the night, a variety of cheeses and wines for degustation were served. I had previously presented the Chemistry of Cheese talk in 2016 in a sold-out event and brought it back this year with a different "flavor". It all started with MILK, and then I explained the chemistry of how milk changes into cheese. Although a computational chemist, I am not a cheese monger, or a food expert, but rather a lover of cheese! Here I present the essence of my presentation. I would suggest you have a seat by the fireplace with a glass of wine, some cheese off course and enjoy the reading!

Milk is an emulsion of fat globules in an aqueous environment. The aqueous portion of milk contains a variety of substances including lactose (milk sugar), protein (casein and whey), minerals, and vitamins. Cheese making is the process by which we remove water from milk, concentrating the fat and protein. The major solid components are lactose, fat, and protein. Lactose is the sugar found in milk. Lactose is a disaccharide, which means it is made up of two monosaccharides: glucose and galactose. Our bodies

cannot directly metabolize lactose. Many of us produce an enzyme, lactase, which splits the lactose molecule. The fat portion of milk exists in globular structures. These milk fat globules are complex structures with multiple layers and membranes. The homogenization process breaks up the larger fat globules into smaller ones. Fat-soluble vitamins (A, D, E, and K) and their precursors (e.g. beta-carotene) are also found in this portion of the milk. Milk contains two main types of proteins: whey and casein. Casein proteins exist in structures called micelles and are the most interesting in the cheese making process. These micelles are made up of different types of casein proteins. The main types are alpha s-1 (αs1), alpha s-2 (αs2), beta (β), and kappa (κ).
Kappa casein forms a “hairy” surface around the casein micelle and prevent the casein micelles from sticking together. In order to make cheese, those casein micelles must stick together and aggregate to form curd from milk.

Cheese making depends on a series of reactions, to create to a range of diverse aromas and tastes in cheeses. Most cheese are made from cow’s milk, which is usually pasteurized (heating to 161º F for 15 seconds or 145º F for 30 minutes). Rennet and "starter" bacteria are added and processed for about two hours at 85-105 ºF. The bacteria ferments lactose to form lactic acid, reducing the pH to 4.6 where enzymes such as chymosin coagulate the casein forming curds. The warm curds are allowed to cool before the liquid whey is separated from the curds by cutting the curds into small pieces. Salt is added to enhance flavor, and control microbial and enzymes activity. Next, pressing, and coating (or packing) to reduce moisture loss and prevent contamination. Finally aging (ripening and curing).

Age does indeed matter with cheese, as enzymes continue to degrade the compounds in cheese during storage. It is important to note that RIPENING is the chemical and physical changes occurring in cheese during storage. Moreover, CURING refers to the humidity and temperature during the aging process. Aging cheese is usually held in a temperature and humidity controlled room where ventilation is necessary so that the gases eliminated during ripening are carried away. The longer a cheese is aged, the more flavor components are formed and the more the texture changes. Sharper cheeses are more flavorful and require longer aging process compared to milder cheese. Chemically the major flavor components in cheese maybe grouped into eleven CHEMICAL categories: acids, amino acids, fatty acids, alcohols, sulfur containing compounds, aldehydes, ketones, esters, lactones, furans and terpenes.
Cheeses often are classified according to firmness, which varies with the degree of moisture. The moisture content of firm cheeses may be as low as 25%, while that of soft or fresh cheeses may be as high as 80%.

There are few variations of cheese classification, including fresh (or unripened) cheeses, soft ripened cheeses, firm or semi-firm cheeses, blue-veined, and processed cheeses.

Unripened cheeses are made by coagulating milk proteins (casein) with acid. Examples include soft cheeses like cream cheese, cottage cheese and Neufchatel. Ripened cheeses are made by coagulating milk proteins with enzymes (rennet) and culture acids. These cheeses are then ripened (aged) by bacteria or mold. Blue-veined (or blue) cheeses are neither cooked nor pressed; the curd is inoculated with a species of blue-green mold, which is injected into the cheese by means of long needles. Fermentation occurs from the inside toward the outside. Those cheeses - including Roquefort, Gorgonzola, Stilton, Bleu de Bresse and Danish Blue - have a strong and sharp, peppery flavor and are often crumbled in texture.

Process cheeses are cheeses made from one or several cooked or uncooked pressed cheeses and re-melted, and to which milk, cream or butter is added; they keep for a long time. Depending on the product, stabilizers, emulsifiers, salt, colors, sweeteners and seasonings may be added. A more or less soft and elastic texture and a mild flavor are obtained. In North America, these cheeses are mostly made using Cheddar cheese, whereas in Europe, Emmental and Gruyère predominate. Process cheeses have different names depending on the quantity of cheese they contain (process cheese, process cheese food, cheese spread).

FRESH cheeses in most cases are of the acid–coagulated variety and have little flavor since they are NOT AGED. The sources of flavor compounds are lactic acid and citric acid, and their breakdown products are formic and acetic acid, that impart a pungent acid flavor.
The lactic acid that is not metabolized by bacteria gives cottage cheese its acid taste. Lactic acid is not volatile, but formic and acetic acids are, and are partly responsible for the aroma.
Mesophilic bacteria metabolize citric acid into diacetyl, which is the primary flavor component in soft cheeses,

WHEY cheeses are fresh cheeses made from whey, a by-product from the process of producing other cheeses, which would otherwise be discarded like ricotta cheese.

STRETCH cheeses, like mozzarella, depend on the interactions between casein micelles. The more the casein network is interconnected, the more the cheese stretches. The pH level and temperature play vital roles in influencing the casein interactions. Once you make curd from the milk by adding citric acid, spaces between the casein molecules are reduced. Continuous stirring, heating and increasing acidity helps to shrink the curd particles.

Cheddar cheese is the world's most popular variety and studied cheese. Cheddar is the best-known semi-hard cheese, though there are many other familiar names throughout Europe, including Cantal, Parmesan and Edam. In these cheeses, the ripening process is carried out evenly throughout the cheese by the starter bacteria, in a process occurring over many months. Various studies have identified over 100 different odorants in cheddar cheese, with ethanoic acid (sharp), butyric acid (sweaty, sweet), d – dodecalactone (coconut), methional (boiled potato), furaneol (caramel), homofuraneol (caramel) and butane-2,3-dione (buttery) believed to be important.

Cheddar cheese was first made in England but is now made everywhere. Cheddar has a flavor that is different from other types of semi-hard cheeses due to the heating of the curds, the process of cheddaring, and the aging process. Cheddar uses raw milk and lactic acid bacteria must be added before adding in the rennet, to turn lactose into lactic acid, which lowers the pH of the solution, aiding in the coagulation of the milk. After curds form, they are cut up into smaller pieces to expel liquid (whey). The smaller the curds are cut, the more liquid will drain from them. This step of cutting the curds is used for almost all types of cheese, but it is taken one-step further for cheddar cheese. To make cheddar, the curds are cut up and then pressed together into slabs. The slabs are stacked on top of each other. The weight of stacking the slabs of curds on top of one another presses out more moisture. Then the slabs of curds are again cut up, pressed into slabs and stacked again.

An interesting fact about cheese naming is that, for example, a cheese to be called as Manchego cheese, the cheese must have been produced in the designated provinces that lie within the La Mancha region in Spain. It can be made only with the whole milk of sheep of the manchega breed that are raised on registered farms. The cheese must have been aged for a minimum of 60 days (30 days for cheeses weighing up to 1.5 kg or 3.3 lbs.) and a maximum of two years. The cheese must be produced by pressing in a cylindrical mound that has a maximum height of 4.7 in. and a maximum diameter of 8.7 in. Manchego cheese can be made from pasteurized or raw milk; The only permitted additives are natural rennet and sodium chloride.

The assembled group was lively and all participants enjoyed greeting old friends and meeting new colleagues with similar backgrounds and interests. Hope you enjoyed the reading and see you on the next talk.

News at IUPUI: The Louis Stokes Midwest Regional Center of Excellence awarded $2.5M by National Science Foundation

IUPUI
INDIANA UNIVERSITY–PURDUE UNIVERSITY INDIANAPOLIS

LSMRCE
Louis Stokes Midwest Regional
CENTER OF EXCELLENCE
lsmrce.org

Congratulations to **Dr. Kim Sa T. Nguyen** and the LSMRC for being granted a 5-year award to help increase STEM for underrepresented groups. To learn more about this amazing opportunity, please read:

https://news.iu.edu/stories/2018/11/iupui/releases/08-stem-louis-stokes-midwest-regional-center.html

Summary of Council Discussion on Preventing Sexual Harassment in the Sciences

Sent on behalf of ACS President Peter K. Dorhout

Dear Councilors, Alternate Councilors, and Committee Chairs,

During the fall national meeting in Boston in August, I posed a question for special discussion, "What role should ACS play in preventing sexual harassment in the sciences?" The question was a follow up to the presidential symposium "Science of Sexual Harassment," organized by *C&EN* and the Committee on Women Chemists at the spring national meeting in New Orleans. At the conclusion of the discussion I said that a summary would be provided of the comments, ideas, and suggestions offered by Councilors who spoke, and some follow up actions. That summary can be found on the Council webpage under 'Boston Council Meeting.' Two follow up actions have occurred thus far:

- A statement will now be included on the national meeting registration form requiring registrants to indicate acceptance of the *ACS Volunteer/National Meeting Attendee Conduct Policy*.

- ACS will participate in the Societies Consortium on Professional Conduct to Prevent Sexual Harassment in STEM, organized by AAAS. The consortium was created to help societies, research supporting organizations, and academic research institutions address the key recommendations of the National Academies' June 2018 *Consensus Study Report on Sexual Harassment of Women: Climate, Culture, and Consequences in Academic Sciences, Engineering and Medicine*.

I also hope that you found time to read my recent ACS Comment, *A discussion about sexual harassment and a call for inclusiveness (C&EN,* October 22, 2018*).*

We have an obligation to our charter and to our members to promote high standards of professional ethics, particularly ensuring that the working, meeting, and learning environments for everyone are safe, welcoming, and inclusive. I encourage you to continue the discussion in your local sections, divisions, and committee meetings.

I welcome your ideas and suggestions at p.dorhout@acs.org.

2019 Calendar of Events:

USNCO Exam Registration Form Due Date	Friday, March 1
SEFI (Regional)	Saturday, March 2
USNCO First Year Exam	Saturday, March 30
SEFI (Hoosier)	Saturday, March 30
ACS National Meeting	March 31-Apirl 4th
Science Day at Ball State	Saturday, April 20
Earth Day	Monday, April 22
Celebrate Science Indiana	Saturday, October 5
IUPUI Poster Session	TBD
Awards Night	TBD
Baseball Night	TBD
National Chemistry Week	TBD
Illustrated Poetry Contest	TBD
Volunteer Appreciation	TBD
2023 National Meeting Brainstorming	TBD
Check our website for the latest and greatest on upcoming events for 2019!	

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The Indiana Section of the ACS publishes the Accelerator at least three times a year. The Section is not responsible for statements or opinions printed in this publication. The Editor is responsible for all unsigned and staff articles.

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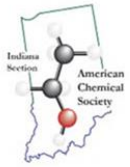
VISION

Our vision is to engage our members and community to advance the broader chemistry enterprise for the benefit of Indiana and beyond.



MISSION

It is the Mission of the Indiana Local Section of the American Chemical Society to improve people's lives through the transforming power of chemistry.

UNITED STATES NATIONAL CHEMISTRY OLYMPIAD
LOCAL SECTION EXAM
INDIANA SECTION OF THE AMERICAN CHEMICAL SOCIETY

2019 FIRST YEAR EXAMINATION RULES

1. The Education Committee of the Indiana Section of the American Chemical Society will conduct the examination and judge the results. Their decisions will be final.

Eligibility and Selection

2. Any student that has taken one year or less of a formal high school chemistry course is eligible. Students who have completed one year of high school chemistry and are enrolled in a second high school course must take the Advanced Examination. Students in the 9th, 10th, 11th, and 12th grades are eligible, although students in lower grades may participate with permission of the examination directors. All registered students have agreed to the rules and conditions of this competition.

Conduct of Examination

3. Any participating student must take the examination at the announced time and place.

4. **Only nonprogrammable scientific calculators will be allowed**. No graphing calculators, smart phones, or calculators with stored programs, constants, or inter-calculator communication features will be permitted. All cell phones and pagers must be powered "off" during the examination period.

5. No periodic tables or supplementary material may be used during the examination other than those provided.

6. Any student who cheats, uses inappropriate materials, or plagiarizes work will be disqualified from the competition. In addition, no school with disqualified students will be eligible for team awards.

Award Structure

7. Placement awards of $100 and a plaque will be awarded to students with the top three examination scores. Ties will not be broken. If two students tie for first place, no second-place award will be given; if two students tie for second place, no third-place award will be given, etc.

8. A plaque will be awarded to those students scoring in the top 10% of those students who sat for the exam.

9. A Certificate of Participation will be given to all students completing the examination.

10. School Awards will go to the top five schools based on the total of the 3 best scores. Each of the top five schools will receive one membership in the American Association of Chemistry Teachers or the equivalent toward membership in the American Chemical Society and a plaque.

11. The top scoring student in each school that has at least three students sit for the exam will be given a recognition nameplate that will be mounted on a school plaque that will be given to the school the first year in which that school competes in the exam.

12. Any student participants and/or award recipients and participating teachers agree that their name and institutional affiliation may be used in press releases or other relevant publications on media or available through the Internet.

United States National Chemistry Olympiad
Local Section Exam
Indiana Section of the American Chemical Society

First Year Examination Registration Form
March 30, 2019 Competition

High school:
Address:
City, Zip:

Teacher Names (Information will be sent only to the first teacher listed.)

1.	E-mail:
2.	Phone #:
3.	Fax:
4.	
5.	

Student Names and Contact Information

	Last Name	First Name	Telephone Number	Graduation Year	Birth Date	U.S. Citizen?
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The registration form must be received by March 1, 2019. Email this form as a Word document to Dr. Robert A. Pribush at rpribush@butler.edu. Phone: 317-989-6799.

Registration limits: There is no limit to the number of students that can take the USNCO Local Section Exam. All students are eligible for placement and honorable mention awards and an invitation to compete for the USNCO team. The top three scores of these students comprise the school team score. If more than 25 students wish to take the exam, attach additional copies of this form with the names of those students.