The Accelerator
INDIANA SECTION OF THE AMERICAN CHEMICAL SOCIETY
DECEMBER 2016

2016 Final Chair's Corner

BY LINDA OSBORN

Bill Nye said "Your job as a leader is not to know everything, but how things are connected. If wisdom is about knowing what you do *not* know, the wisest leaders are unafraid to enlist the help of someone with more expertise." This has been an outstanding year for the Indiana Section because of *your* expertise, for which I am very grateful! I've enjoyed witnessing leadership growth among many of you this year and have appreciated the opportunity to work with such an awesome group of professionals.

A special salute to The Heritage Group, specifically Amy Schumacher for a $10,000 sponsorship from Monument Chemical and to Tony Kriech for a $7,000 sponsorship from Heritage Research Group. Thanks also to Bret Huff for a $2,000 sponsorship from Eli Lilly to supplement four of our events.

Ann Hunt, I'm so glad that you were recognized and honored for outstanding achievements in and contributions to science, the profession, and ACS! Also, I also congratulate Chris Bodurow, our new District II Director!

I'd like to thank all of the Indiana LS members that I had the pleasure of meeting at our events this year. I really enjoyed meeting all of you and am grateful for the talents that you bring to our Indiana Local Section. Now I pass on the baton to our talented 2017 chair, Tom Xiao, and his newly elected executive committee and salute each of our very active executive committee members with my heartfelt gratitude for their talents and contributions to our section in 2016.

Maria Alvim-Gaston

Maria Alvim-Gaston, a Member-at-Large for our section for two years, has chaired two activities this year: Passport to Hi Tech, and the "Chemistry of Cheese". Maria was the speaker for the "Chemistry of Cheese" parts I and part II! Maria conducted an introduction to ACS for Eli Lilly interns and volunteered at the NCW event at the Children's Museum of Indianapolis. Maria was also a judge for the Illustrated Poem contest and she is currently helping with the Project Meet program with YBTC.

Christina Bodurow

Christina Bodurow, former Councilor, has been recently elected to the ACS Board of Directors! Congratulations Chris, our new District II Director! Chris chaired and ran the 2023 NM Brainstorming/Kickoff event at UIndy, was a vital part of the succession planning, volunteered at Celebrate Science Indiana, and NCW's Chemistry Day at the Children's Museum, wrote Accelerator articles, and attended regional and national meetings.

Belgin Canturk

Belgin Canturk, co-Chair of the NCW event at the Children's Museum of Indianapolis, has also volunteered for the ACS AACT booth at Celebrate Science Indiana, recruiting other volunteers to get involved along the way.

Ann Cutler

Ann Cutler, our Grants Chair, has diligently worked to obtain funding for some of our events. In addition to many creative ideas, she also chaired the Chemistry of Cheese Part II event, volunteered at the IMA event, at the Chemistry of Cheese event, Impress for Success and has written for the Accelerator newsletter.

Amy DeBaillie

Amy DeBaillie, Alternate Councilor and WCC Chair, organized the Leadership by Influence workshop. The workshop is based on a book called "Influencer: the New Science of Leading Change" which includes practical strategies you can use to influence others. Amy was also helpful with the "Think like a Molecule" poster session and Accelerator articles. She also participated in the 2023 NM Brainstorming/Kickoff event.

Erin Dotlich

Erin Dotlich, a newly elected Alternate Councilor, nominated Ann Hunt as ACS Fellow and was involved in "Impress for Success" held on November 12 at IUPUI.

Matt Gardlik

Matt, immediate Past Chair, not only personally financially sponsored one of the most successful Local Section events this year, he is constantly working "behind the scenes" to send out Section communications, Accelerators, and he runs our annual elections. He also participated in the 2023 NM Brainstorming/Kickoff event.

Julie Holland

Julie Holland is the Editor of the Accelerator, our Indiana LS newsletter. Julie has been insightful in selection of materials for inclusion and has made the reading interesting to our members. Julie was also the Chair of the ACS Celebrate Science Indiana booth coming up with creative ways to engage children of all ages in chemistry fun.

Ryan Jeske

Ryan Jeske, Chair of Science Day at Ball State, applied for a grant and was recently awarded $900 to spend on his students projects. He and several of his students participated in the "Think like a Molecule" poster session.

Beth Lorsbach

Beth Lorsbach, Councilor of our section, chaired two committees this year: Succession Planning, and Engaging and Motivating Volunteers (co-chair). Beth has also written articles for the Accelerator newsletter and has recruited a new YCC chair, our chair elect, and other members to increase participation in our local section. She also participated in the 2023 NM Brainstorming/Kickoff event and set up our poster at the National Meeting in Philadelphia.

Robert Pribush

Robert Pribush, Councilor, is passionate about chemistry education, and his service as organizer of the Indiana Section's regional competition in the National Chemistry Olympiad for the past 12 years has been outstanding. Bob's national and LS meeting attendance record is astounding; he was there to provide wisdom in many circumstances and has encourage our youth to get involved. Bob was also a judge for the Illustrated Poem contest.

Tamiko Porter

Tamiko Porter, Secretary of the local section, has spearheaded using programs like Eventbrite and Qualtrix to register participants for our many events, served as committee chair of the poster session, committee chair of "Impress for Success" event, and assisted with photography and in other ways for the awards banquet, "Solving Art Mysteries through Chemistry at the IMA" event, "Chemistry of Cheese", "Chemistry of Beer", Celebrate Science Indiana, and NCW at the Children's Museum of Indianapolis. Tamiko was also a judge for the Illustrated Poem contest, has helped advertise the ACS through the Cornerstone program at IUPUI and is an ACS science coach.

Erica Posthuma-Adams

Erica Posthuma-Adams is our K12 Outreach Chair and Social Media Chair and also chaired the AACT booth at Celebrate Science Indiana and helped organize our ACS Member Appreciation and Networking Party. Erica is also the newly appointed Indiana Representative of AACT. She and a student appeared on Channel 8's Indy Style performing an experiment with dry ice to advertise for Celebrate Science Indiana.

Paul Ridenour

Paul Ridenour, Treasurer, has gone out of his way on many occasions to provide the funds! Paul has assisted with Project Seed, and takes care of the books and filling out the treasurer's reports and IRS forms at the end of the year. Paul has served as treasurer of our LS for 5 years and now serves as our new Chemists Celebrate Earth Day (CCED) Chair.

Robert Sammelson

Robert Sammelson is a newly appointed Councilor for our section, replacing Christina Bodurow (recently elected as ACS District II Director). Rob was involved in the "Think like a Molecule" Poster Session, and Science Day at Ball State, was involved in the awards banquet, and served as a judge for the Illustrated Poem contest.

Kathy Stickney

Kathy Stickney has been involved in our local section for over 15 years. She has served in many voluntary roles including our awards committee chair, award night organizer and Master of Ceremonies, assistant with "Think like a Molecule" poster session, IMA event, Chemistry of Beer event, and our ACS Member Appreciation and Networking Party.

Brian Mathes

Brian Mathes, Councilor, chaired three events this year, Kids in Chemistry at the Children's Museum of Indianapolis, Baseball Night at Victory Field, and "Chemistry of Beer", where he was the speaker at Triton Brewhouse. Brian also volunteered at "Think like a Molecule" Poster Session, Project Seed, the NCW event and attended National meetings and serves on the Membership Affairs Committee (MAC).

Paul Morgan

Paul Morgan, Member-at-Large, has co-chaired the Engaging and Motivating Volunteers, helped many organizers with Eventbrite, and participated in both Celebrate Science Indiana and NCW Chemistry Day at the Children's Museum of Indianapolis. Paul served as Member-at-Large and is now Treasurer of our section.

Elmer Sanders

Elmer Sanders, Program Coordinator of Project SEED, had another great year pairing up mentors with students as they celebrate 43 years of public service providing Indianapolis area high school students the opportunity to explore scientific research.

Sibel Selcuk

Sibel Selcuk, Alternate Councilor, helped recruit donations for the K-12 Teacher Appreciation event at Celebrate Science Indiana, recruited Frederique Deiss as keynote speaker for the "Think like a Molecule" Poster Session, and was a judge for the Illustrated Poem contest.

Tejas Shah

Tejas Shah is newly appointed Chair of our Younger Chemists Committee (YCC). In October, he demonstrated his leadership skills by organizing a Program-in-a Box session for YCC members: "The Chemists Code for success: 3 Essential Skill Sets for your Career".

Gregory Dale Smith

Greg Smith, Member-at-Large, chaired the "Solving Mysteries through Chemistry at the Indianapolis Museum of Art". He gave a phenomenal lecture and an engaging tour of the state of the art laboratory at the IMA. As a result of the success and popularity of this event, he lectured at Butler on the same theme, Taylor University in October, Knoxville in mid-November, then toured across TN. He also contributed to the National NCW publication, hosted a booth at Celebrate Science Indiana and a poster at the "Think like a Molecule" Poster Session.

Tom Xiao

Tom Xiao, our 2017 Chair, has participated in many of the events this year, and served as co-chair of the NCW event at the Children's Museum of Indianapolis. Tom also volunteered at Celebrate Science Indiana, and at the Impress for Success event, providing his photography skills at several events and is currently helping with Project Meet partnering with YBTC.

Other members that deserve a special mention include Maria Blanco, Lisa Brouwer, Rebekah Dickerson, Denise Durham, Alyssa Heffren, Ayanna Jackson, Joe Kurek, Joe Mick, Andrea Moberly, William Scott, Randall Short, Kimberly Steward, Josh Taylor, and Ben Woodworth. I can't mention everyone, but I am most grateful to all of you that contributed to a fantastic year.

Finally, I wish Tom and his team the best in 2017. It's great to have current participants continue, new participants join, and past participants rekindle their involvement in the local section.

Happy Holidays to all!

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2017 Election Results *BY LINDA OSBORN*

Please welcome your 2017 Indiana Local Section ACS Executive Committee. The text highlighted in red indicates a change in member position or creation of a new position.

Executive Committee	2016	2017
Chair	*Linda Osborn*	*Tom Xiao*
Chair-Elect	*Tom Xiao*	*Lisa Bucholtz*
Secretary	*Tamiko Porter*	*Tamiko Porter*
Councilors	*Robert Pribush*	*Robert Pribush*
	Brian Mathes	*Brian Mathes*
	Christina Bodurow	*Robert Sammelson*
	Beth Lorsbach	*Beth Lorsbach*
Alternate Councilors	*Amy DeBaillie*	*Amy DeBaillie*
	Sibel Selcuk	*Sibel Selcuk*
	Robert Sammelson	*Tony Trullinger*
		Erin Dotlich
Past Chair	*Matt Gardlik*	*Linda Osborn*
Treasurer	*Paul Ridenour*	*Paul Morgan*
Member-at-Large	*Maria Alvin-Gaston*	*Maria Alvin-Gaston*
	Paul Morgan	*Mark Pobanz*
	Greg Smith	*Anne Wilson*

In addition, please welcome your 2017 Committee Chairs

Committee Chairs	2016	2017
Art and Chemistry		Gregory Dale Smith
Awards	Katherine Stickney	Katherine Stickney
Celebrate Science	Julie Holland	Julie Holland
Chemists Celebrate Earth Day		Paul Ridenour
Education and Olympiad	Bob Pribush	Bob Pribush
Election		*Mathew Gardlik*
Events	Rob Sammelson, Amy DeBaillie, Sibel Selcuk	
Grants	Ann Cutler	Ann Cutler
Kids in Chemistry	Brian Mathes	Brian Mathes
K12 Outreach	Erica Posthuma Adams	Erica Posthuma Adams
Membership Affairs Committee		*Rebekah Dickenson*
		Jordan Knotts
National Chemistry Week	Tom Xiao	*Belgin Canturk*
	Belgin Canturk	*Gregory Smith*

Committee Chairs	2016	2017
Newsletter Editor	Julie Holland	Julie Holland
Newsletter Design	Julie Holland Andrea Moberly	Julie Holland, Andrea Moberly
2023 NMLT Strategic Planning		Frederique Deiss
Project Seed	Elmer Sanders	Elmer Sanders
Project Seed Co-Chair	Josh Taylor	Josh Taylor
Science Day	Ryan Jeske	Ryan Jeske
Social Media	Erica Posthuma Adams	Erica Posthuma Adams
Webmaster	Matt Gardlik	Matt Gardlik
Women Chemists	Amy DeBaillie	Amy DeBaillie
Trustees	David Mitchell Dawn Brooks Ann Hunt	David Mitchell Dawn Brooks Ann Hunt

In addition, we still have several open chair positions including:

Public Relations
Webmaster Co-Chair
College Education Committee
Hospitality Committee
Long Range Planning Committee

If you are interested in chairing one of these open committee positions, or would like to get more involved in our local section, please contact Linda Osborn at **linda.osborn@hrglab.com**.

Thank you for volunteering!

Project Meet Partners with You Be the Chemist

By Larry Sernyk, Maria Alvim-Gaston, Tom Xiao, and Linda Osborn

Have you ever been in a spelling bee? Imagine a similar competition with chemistry! The **You Be The Chemist Challenge®** (YBTC) is an interactive academic contest that encourages students in grades 5-8 to explore chemistry concepts and their real-world applications.

The Indiana section of the ACS is teaming up with YBTC to assist in spreading passion for chemistry to youngsters in our community. We really need your help and have several ways that you can do so. Training will be provided for all of the options described.

1. Do you know of any schools near you that have 5-8th grade students that aren't on the list below that you would be willing to **recruit for the YBTC program** if you were provided all of the materials and information that you need?

School/Homeschool Organization	City	# Students Participating
Indianapolis South Local Challenge, February 25, 2017 at University of Indianapolis (Lindsey Horty/Brad Neal)		
St. Jude Catholic School	Indianapolis	130
Robert Lee Frost #106	Indianapolis	55
Our Lady of Lourdes	Indianapolis	70
West Lafayette Local Challenge, ? ?, 2017 at Purdue University (Katie Effinger/Beatriz Cisneros Organizers)		
Frontier Elementary School	Brookston	15
Frontier Junior/Senior High School	Chalmers	10
Indianapolis North Local Challenge, March 11, 2017 at Dow		
Brownsburg West Middle School	Brownsburg	300
Chapel Hill 7th and 8th Grade Center	Indianapolis	500
Creekside Middle School	Carmel	20
Park Tudor School	Indianapolis	20
Zionsville Middle School	Zionsville	4
Lebanon Middle School	Lebanon	5
Sycamore School	Indianapolis	80
Westlane Middle School	Indianapolis	10
Mt. Vernon Middle School 8th Grade Academy	Fortville	320
Fishback Creek Public Academy	Indianapolis	20
Riverside Intermediate School	Fishers	20
Bloomington Local Challenge, ? ?, 2017 at IU Bloomington (James Stanton Clark/Larry Sernyk Organizers)		
St. Vincent de Paul	Bedford	7

2. Would you be willing to visit one of these listed schools (or one that you recruit) to talk with the teacher and students and to **provide preliminary visit slides and perform a little demonstration** (materials provided) to get the students interested in signing up for the program? This would also involve describing a little bit about your career as a chemist.

3. Would you be willing to **pair up with one of the teachers** listed above or one recruited to help coach the students? This would be an agreement that you and the teacher could

design together to match your time constraints. The YBTC program has sample questions and training materials available.

If we still have your interest, the timeline for this program is from now until March. **Are you up to the challenge**? If so, please contact linda.osborn@hrglab.com with your name and phone number and we will personally contact you to answer any questions that you have and/or to connect you with a school to begin your partnership. A rewarding experience awaits! **Please reply by January 12th.**

https://www.youtube.com/watch?v=cDK-BgTJJAc

Want to Give a Holiday Gift to a Teacher of Chemistry?

By Linda Osborn

Do you know a K-12 teacher of chemistry that you want to help? Consider sponsoring them for a $50 membership to the American Association of Chemistry Teachers (AACT).

In 2009, the American Chemical Society (ACS) set out to answer the question "What can the world's largest scientific society uniquely do to transform science education in the United States?"

After research, review, and feedback from the chemical education community, the answer was clear: create a national organization dedicated solely to supporting K–12 teachers of chemistry. That very idea came alive in September 2013 at the ACS National Meeting in Indianapolis, IN.

The American Association of Chemistry Teachers (AACT) is a professional community by and for K–12 teachers of chemistry. AACT's benefits include easy connections with peers, discovery of quality classroom resources, and helping teachers achieve professional goals. Membership is open to educators and anyone with an interest in K–12 chemistry education. Below is a link to the AACT site. Erica Posthuma-Adams is the official Indiana Representative for AACT and would be happy to answer any questions that you might have (erica.a.posthuma@gmail.com).

https://www.teachchemistry.org

We also have a list of teachers that are interested in becoming members if you don't have a teacher in mind, but would like to help in this way.

What should you do?

1. Have your teacher sign up directly using the link above
    a. Coordinate your payment directly with them
    b. E-mail linda.osborn@hrglab.com to let us know of your contribution!
2. Contact linda.osborn@hrglab.com if you need a connection with an interested teacher
    a. We will be in touch with details

Thanks for considering this generous way to pay it forward!

Doble is Hiring!

Lab Manager, Indianapolis

Doble Engineering is seeking an experienced manager to oversee our Laboratory in Indianapolis. This person will be responsible for supervising and managing all personnel, interfacing directly with customers, and aiding with the testing and other services within the lab.

Must haves: Minimum of 5 years of managerial experience (personnel management-performance appraisals, hiring, terminations, etc.) and minimum 5 years of experience in a lab. Must have a good grasp of analytical chemistry and GC experience.

Visit Doble's Career Page: http://www.doble.com/about/careers/north-america/ and fill out the Lab Manager online application today.

OUR EMPLOYEES ARE OUR MOST IMPORTANT ASSETS. JOIN THE DOBLE TEAM.

2016 Baseball Night at Victory Field

by Brian Mathes

On July 21st, the Indiana Section of the ACS invaded Victory Field for the 15th Annual Baseball night. Can you believe we have been doing this for 15 years? Neither can I! Anyway, the crew got to see a pitcher's duel as the game ended with an Indians squeaking by the Charlotte Knights with a score of 1-0. It was another great evening with terrific attendance as we again emphasized the Young Chemist and Student Chemists in our Central Indiana Community. We had 32 folks representing the section on that warm summer night. Look for the section to repeat this event in 2017!

Celebrate Science Indiana!

By Julie Holland and Linda Osborn

Before a big event, one must advertise. That's exactly what Erica Posthuma-Adams and one of her students did along with Rick Crosslin, on Indy Style TV the Monday before the big Oct. 1st event! Held at the Indiana State Fairgrounds, over 4000 people attended the many hands-on booths including two ACS sponsored booths: one organized by Julie Holland for the ACS and one organized by Erica Posthuma Adams for the American Association of Chemistry Teachers (AACT).

At the ACS booth, hands on fun included making bouncy balls, the chemistry of luminescence using a light box, a pumpkin filled with dry ice and dry ice smoke bubbles, and glow stick giveaways. At the AACT booth, in addition to density towers and UV bead bracelets, we also recognized K-12 teachers by giving all teachers who visited the booth some nice giveaways including colorful safety goggles, I Love Chemistry stickers, jump drives, and providing them with a raffle ticket to win one of 37 prizes valued at over $4,000. AACT memberships were also given away at this event to 3 lucky teachers.

In addition to the booth leaders, ACS member volunteers at the various booths included Chris Bodurow, Denise Durham, Paul Ridenour, Tom Xiao, Josh Taylor, Belgin Canturk, Joe Mick, Alyssa Heffren, Ben

Woodworth, Randall Short, Greg Smith, Tamiko Porter, Paul Morgan, Ayanna Jackson, Kimberly Steward, and a host of student members from local area Colleges and Universities.

Mark your calendar for October 7, 2017 for the next opportunity for more hands on STEM related fun!

Erica Posthuma-Adams and Rick Crosslin go live on Channel 8 while performing experiments to excite the audience about Celebrate Science Indiana.

Top Left: Julie Holland and Denise Durham teach chemistry to anxious children with hands on fun. Top Right: the smiles tell the story! Bottom: Chris Bodurow explains to a family how to make a bouncy ball.

Top Left: Maria Blanco, Erica Posthuma-Adams and her student, pose after set up of the booth. Top Right: Belgin Canturk and a friend pose with potential future scientists! Bottom Right: Density towers and bracelets being made by Celebrate Science Indiana participants.

Top Row: Teachers that won some of the top prizes were Natalie DuBois, Susan Porter, Tobby McLain, Glen Cook and Liz McCarthy. Bottom Row: Sherri Barnes and April Bladen who won AACT memberships.

2016 Illustrated Poem and T-Shirt Design Contest for the NCW

By Alyssa Heffren and Linda Osborn

Twenty two contestants from seven different schools participated in this year's Illustrated Poem contest for 2016 National Chemistry Week with the theme "Solving Mysteries through Chemistry". All of the Illustrated Poems were displayed at Celebrate Science Indiana on October 1st then again on November 5th at the Children's Museum of Indianapolis. The names of this years' winners, their grade, school, and their teachers are shown in the Table below. If you look closely, you will see 3 Clines in the 6th grade. Yes, they are talented triplets!

Illustrated Poem Contest

Category	Award	First	Last	Grade	School	Teacher
3rd-5th	1st	Matthew	Osborn	5	Maple Grove Elementary	Shaun Farmer
	2nd	Jaxen	Rhoton	4	Pleasant Grove Elementary	Natalie Hough
	3rd	Uriel	Cabrera	4	Garden City Elementary	Stephanie Donovan
	HM	Caitlynn	Faulkner	4	Garden City Elementary	Stephanie Donovan
6th-8th	1st	Vanessa	Xiao	7	Park Tudor School	Mrs. Zajac
	2nd	David	Cline	6	Homeschool	Michele Cline
	3rd	Brad	Cline	6	Homeschool	Michele Cline
	HM	Macy	Cline	6	Homeschool	Michele Cline
	HM	Brooklynn	Thorpe	8	St. Joan of Arc	Cayley Coss
	HM	Bea	Smith	7	St. Joan of Arc	Cayley Coss
9th-12th	1st	Victor	Xiao	11	Park Tudor School	Mr. Dewart

T-Shirt Design Contest

K-12	1st	Larken	Adams	12	Triton Central HS	Lynn Baker

Left to Right: Larken Adams, Vanessa Xiao, Caitlynn Faulkner, Victor Xiao, Matthew Osborn, David, Macy, and Brad Cline (triplets!), and Uriel Cabrera, displaying their artwork on stage at the Lilly theatre

During the National Chemistry Week event at the Children's Museum of Indianapolis, an awards ceremony was held at 10:00 am in the Lilly Theater for all first, second, third place and honorable mention winners of the Illustrated Poem and T-shirt contests. Each winner received cash prizes, a certificate and an enlarged poster of their poem. On stage, they each did a great job reading their poems to the audience in the Lilly Theater. One of the most memorable moments occurred after the program when a father hugged his award-winning son. It was touching to see the pride in the father's eyes.

The t-shirt design winner, Larken Adams, received a t-shirt featuring her own design, in addition to her cash prize and certificate. She and her family were thrilled when they walked into the museum and saw all of the volunteers wearing her design on their t-shirts, which was also on the front cover of the program!

Chemistry will be remembered in a positive light for these winners. Hopefully at least a few of them will take their passion to the next level and continue to learn about the composition, structure, properties and change of matter. Chemistry does indeed help solve many mysteries!

Left to Right: Uriel Cabrera reading his poem, Victor Xiao reading his poem, Vanessa Xiao displaying her poem after reading to the audience, Larken Adams displaying her winning T-shirt design, and Caitlynn Faulkner displaying her illustrated poem.

Over 5,000 People Attend Children's Museum of Indianapolis for NCW

By Linda Osborn

The Indiana section held its annual National Chemistry Week (NCW) "Chemistry Day" at the Children's Museum of Indianapolis, a nationally acclaimed interactive children's museum featuring five floors of fun and interactive learning much of which is science related. A perfect setting for the "Solving Mysteries through Chemistry" theme this year, the NCW took place on November 5 from 10:00 am until 3:00 pm. Co-chaired by Tom Xiao and Belgin Canturk, 14 booths were organized.

Volunteers began arriving at 8:00 am wheeling in loads of chemistry-related booth supplies. At the registration tables, they received a free t-shirt for volunteering. The t-shirt design was created by 18-year old Larken Adams, who won the $100 prized - Indiana section t-shirt design contest. Museum members were allowed a sneak preview from 9 - 10 am, then the museum was deluged with children and their families to enjoy Chemistry Day at the museum.

At our ACS booth, we had two hands-on activities related to the NCW theme for the kids to enjoy, gave away raffle tickets for a chance to win 6 chemistry-related prizes and each child received a Frisbee flyer that said "Chemistry is Radica!l" We also allowed an opportunity for the kids to dress up as a chemist bringing in various sizes of lab coats, safety glasses and gloves.

Next to the booth, we displayed all of the Illustrated Poems. An awards ceremony was held at 10:00 am in the Lilly Theater for all first, second, third and honorable mention winners of the Illustrated Poem and T-shirt contests. Each winner received cash prizes, a certificate and an enlarged poster of their poem. The t-shirt design winner received a t-shirt in addition to her cash prize and certificate. She and her family were thrilled when they walked in the museum and saw all of these volunteers wearing her design on their t-shirts, which was also on the front cover of the program!

Partners for this event included the Children's Museum of Indianapolis, Ball State University, Purdue University, Indiana University, IUPUI, Butler University, University of Indianapolis, Pike High School, Chemical Educational Foundation, Dow AgroSciences, Knauf Insulation, AIChE, Indiana Department of Environmental Management, Indy Science Fun, Heritage Research Group, and Eli Lilly.

It means so much to the kids to experience the benefits from these great ACS programs. Tom Xiao took many great photos with different groups who were proud of their students/children.

This year's theme was beautifully intertwined into many of the booths activities. Every booth brought something different for the kids to experiment with and discover. Some of the volunteers really seem to get lost in engaging with the kids and are passionate about chemistry which is always fun to see.

Having 165 volunteers participate made for an engaging atmosphere for all to enjoy.

Kids really love it. The parents want to see them more. They see scientists teaching such cool stuff, so many mysteries that can be solved through chemistry! Thanks to all of you who helped make this a special outreach for our community.

The Chemistry of Success: Dealing with Failure and the Professional Presence (Program in a Box)

By Taylor Kenyon

We've all been there — the gut wrenching feeling as you check the data and realize that all the time, reagents, and money you've used have gone right down the drain because of some unexpected or absent-minded error. This is a tough subject to swallow for any new chemist stumbling into industry or academia; not to mention, it is no easier for the already established chemist. Ultimately, the best chemists excel by dealing with failure, managing their time, and connecting with others. This last fall the Indiana chapter led a seminar on these very skills.

On October 11th, the Indiana chapter's Younger Chemists Committee (YCC) screened the *Project in a Box* (PIB) webinar, "The Chemists Code for Success: 3 Essential Skill Sets for Your Career." The *Program in a Box* is produced and hosted by ACS Webinars. Each program is led by authorities within the topic field. According to the National organization's website, "Subject matter experts provide stimulating science discussions matched with activities that demonstrate how chemistry is applied in everyday life." Previous topics include The Role of Chemistry in Global Security, Spring 2016; Tales of Lab Safety: How to Avoid Rookie Accidents, Fall 2015; Chemistry on the Silver Screen, Spring 2015; Speaking Simply: Communicating Your Science, Fall 2014; and The Chemistry of Scent & Fragrance, Spring 2014.

YCC AND LOCAL MEMBERS ATTENDED OCTOBER'S PROJECT IN A BOX. FROM LEFT TO RIGHT: TEJAS SHAH, TAYLOR KENYON, SEBASTIAN LAULHE, REBEKAH DICKERSON, FREDERIQUE DEISS, JORDAN KNOTS, FARAH OUSMAN, PATRICK KNERR, BEN WOODWORTH

October's program centered upon the skills required to advance your career as a chemist. "It was an engaging night where student chapters at colleges and ACS local sections got together from across the country to learn and discuss soft skills often not taught in the lab like handling failure, professional etiquette and time management," wrote ACS Webinars. The

format of the program utilized interactive videos for the three skillsets including anecdotes of Steve Jobs' brushes with failure and professional etiquette exercises. The unique seminar connected chapters all over the world via social media outlets such as Twitter and Instagram. Chapters submitted questions to be discussed by the digital community and the seminar's hosts in real time.


Tejas Shaw preparing the seminar

October's PIB was hosted by Patricia Simpson, the Director of the School of Chemical Sciences Career Services at the University of Illinois, and Amanda Yarnell, the editorial director of *Chemical and Engineering News*. Each took a turn to address the community driven questions including, "What's the best way to overcome being shy?" and "How can I deal with not getting into my first choice in grad school?"

Current, local Younger Chemist Committee Chair and Discovery Scientist at Dow AgroSciences Tejas Shah led the Indiana chapter's screening. When asked about the YCC and professional development he responded, "I became involved in the YYC because I'd like to network and connect chemists with each other." He further commented about what he viewed as the most significant professional skills in his career. "Time management and professional etiquette are the two big ones for me," wrote Shah.

Local member and Assistant Professor at IUPUI's Chemistry and Chemical Biology Department Frédérique Deiss had a similar message. "Work your network," wrote Deiss. "This means develop your network of professional contacts, be active locally to meet new people, follow up appropriately, cultivate your network, update your professional online profile... At one point in time, one of your contact[s] might be the key person to know to get your dream job, to help you solve an important issue or even have access to some equipment."

Part of navigating science is dealing with failure, and even unexpected "roadblocks" such as equipment failure and resource availability. Staying positive and reaching to others for help is key. Dr. Deiss continued…

> ***"As a new assistant professor, I had to set-up my research laboratory last year,"*** wrote **Dr. Deiss.** ***"At times, the ordering process seemed never ending, but the situation got even rougher when some major equipment and instruments that were supposed to be on stock and delivered shortly took months to actually arrive! Or some key reagents were suddenly not available. This was more frustrating than any failed experiments as we did not have any control on it or the possibility to 'just' try again the experiment. At that time, my group and I learned to be inventive, shifting the schedule of the projects to work with what my group actually have or have access to in shared facilities. Ask around! Most people are happily willing to lend you what you need if***

they can and help you in general, as they know you will be giving back in their time of need."

The YCC can be one avenue to connect to others for guidance and networking. The Younger Chemists Committee (YYC) of the ACS represents early-career chemists to ensure the organization maintains topics relevant to developing chemists. Besides the national section, the Local Section Younger Chemists Committee (LSYCC) promotes networking events and raises awareness about potential roles within the society for younger members. Contact the local chapter for more info.

Previous PIBs can be found on the ACS webinar's homepage. Look for upcoming *Program in a Box* screenings via the Indiana Chapter's homepage and ACS webinar's page, posted below.

Additional Information:

https://www.acs.org/content/acs/en/acs-webinars/program-in-a-box.html
https://storify.com/acswebinars/chemistscodeforsuccess
http://indiana.sites.acs.org/acceleratornewsletter.htm
http://ycc.sites.acs.org/

IUPUI and Cuban University Unite to Study Neglected Diseases

by Linda Osborn

Dr. William Scott (IUPUI) led a Cuban collaboration that received the attention of C&EN, the Indy Star, and IUPUI! It also has the personal attention of the ACS Immediate Past President **Diane Grob Schmidt.**

http://news.iupui.edu/releases/2016/11/cuba-distributed-drug-discovery-program.shtml.

Unique and innovative, this collaboration links students/professors from the US and Cuba, while studying/teaching chemistry, around a common scientific challenge: discovery of drugs to treat neglected diseases. Ultimately, they intend to develop and expand this Cuban collaboration to Mexico and sites in South America.

FIGURE 1. WORKSHOP PARTICIPANTS AT THE UNIVERSITY OF HAVANA

Proposed by Drs. Scott and Daniel Garcia Rivera (University of Havana), their goal is to establish an ongoing collaboration between students and professors at the University of Havana, IUPUI, and other schools in the US. An outgrowth of discussions at the session "Opportunities for

US/Cuba Collaboration in Chemistry…" during the National ACS Meeting in August 2015, the project builds on IUPUI's Distributed Drug Discovery (D3) program which was established in 2003 by Drs. Scott and Martin O'Donnell. At IUPUI, D3 has involved over 1500 Organic II students and 25 independent undergraduate researchers, as well as other schools in the US and Russia, Spain, Poland, and the Czech Republic (*J. Comb. Chem.* **2009,** *11*, 3-13, DOI: 10.1021/cc800183m; *J. Comb. Chem.* **2009**, *11*, 14-33, DOI: 10.1021/cc800184v; *J. Chem. Educ.* **2015**, *92*, 819-826, DOI: 10.1021/ed500135n).

What a great opportunity to expose students to a compelling application of their learning as they make and test new compounds with drug potential against neglected disease!

Drs. Scott and Rivera are sharing their expertise in combinatorial chemistry and solid-phase bioactive-molecule synthesis to facilitate neglected disease drug discovery while at the same time engaging students in research. A rare opportunity to build connections between schools, professors, and students in the US and Cuba, seeds are sown for future scientific collaborations and deeper cross-cultural understanding.

Figure 2. IUPUI Undergrads Priya Dave and Juan Sanchez setting up lab at University of Havana

October 17-21, IUPUI undergraduate students and researchers traveled to Cuba to conduct a workshop and begin a partnership with the University of Havana implementing **IUPUI's Distributed Drug Discovery, or D3, program**. Dr. Scott was awarded a $3,000 2016 IAC Global Innovation Grant. This funding combined with the School of Science at IUPUI made it all possible. The workshop was a follow-up to Dr. Schmidt's 2015 presidential visit to Cuba, discussions with the Cuban Chemical Society, and a symposium on US-Cuba collaboration at the 2015 ACS National Meeting in Boston. Neglected diseases often have no financial incentive for discovery because they affect small or poverty-stricken populations. They break down drug-discovery steps into small components that can be distributed to multiple low-cost sites, making researching treatments affordable. For example, in the classroom, undergraduates at IUPUI and in other parts of the world synthesize molecules in organic chemistry lab courses that might have drug potential.

This partnership has already resulted in seven global collaborations and has ignited passion to continue to help students and researchers across the world have meaningful learning experiences for a humanitarian cause. We congratulate IUPUI researchers and students for this superb partnership and hope that it results in breakthroughs for neglected diseases.

ACS and the Children's Museum

by Brian Mathes

The relationship between the Indiana Section of the ACS and the Children's Museum continues to grow. This year, the Section ran 8 sessions of "Jiggle Jelly" along with 5 sessions of "Reaction in a Bag" for the Children's Museum Field Trip program. The program wound up the 2016 season with 6 sessions of Jiggle Jelly at the NCW event on Nov 6th. We expanded the number of ACS members involved with the presentations as well so that the kids don't have to listen to the same folks! The Science Director at the Children's Museum, John McCollum, was amazing with the event coordination. It was exciting to use the newly renovated Science Lab at the Museum as well. It is a great site for showing kids the wonders of polymer chemistry. Special thanks to Guy Hansen from the Lilly STEM outreach program for all his support.

We are always looking for more volunteers to help on these events at the Museum. It is only a couple of hours in the morning at the Children's Museum once every other month or so. If you are interested in getting involved, contact Brian Mathes at mathes@lilly.com for more information.

Impress for Success 2017

By Tamiko Porter

Twelve undergraduate students attended an energetic day of presentations and conversations with forty area professionals at the November 12th Impress for Success event. The event centered on professional development for students in science, technology, engineering and math (STEM) fields, especially those who self-identified as underrepresented minorities. The group gathered in the IUPUI Library in Indianapolis at 10:30 am and adjourned at approximately 5:30 pm.

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Feedback from the students was very positive and they were very appreciative of the opportunities/information that was provided to them. To our individual speakers, our luncheon

panelists, our mock interview professionals, to those that participated in the professional networking session with speed networking and informative booths and to our planning committee, we are most grateful for your involvement.

The Chemistry of Be Er

By Brian Mathes

Triton Brewhouse near Fort Benjamin Harrison was the location of our revival of the "Chemistry of Beer" presentation on Oct 18th. Brian Mathes presented on everything beer and brewing related to a packed house of 69 folks. The attendees enjoyed a beer flight and a pint while Brian talked about hop selection and the magic of fermentation. The Indiana Section of the ACS rented out the whole Brewhouse for the evening so that we could have as many folks show as possible. Demand for the event was so great that we had to stop reserving seats 8 days prior to the event!

In addition to the presentation that covered the chemistry aspects of beer brewing from water selection to Maillard browning reactions, the attendees were treated to a tour of the brewing operations by the Triton Brewing staff. Thanks to all the ACS members who came out to make this a great success.

"The **Maillard reaction** is a chemical reaction between amino acids and reducing sugars that gives browned food its desirable flavor. Seared steaks, pan-fried dumplings, cookies and other kinds of biscuits, breads, toasted marshmallows, and many other foods undergo this reaction. It is named after French chemist Louis-Camille Maillard, who first described it in 1912 while attempting to reproduce biological protein synthesis." -- Wikipedia

SEFI 2017 SCIENCE FAIR NEEDS JUDGES!

Saturday, April 1st, 2017
IUPUI Campus Center
Lunch and parking provided
125 Junior and 125 Senior judges needed
Judge registration will begin at 8am with orientation at 8:30am
Anticipated finish is 2pm for junior judges and 4pm for senior judges
Middle and high school teachers are welcomed as judges for the middle school projects

HTTPS://WWW.EVENTBRITE.COM/E/SEFI-SCIENCE-FAIR-JUDGING-TICKETS-30111064003

90	124	7	19	16
Th	A	N	K	S
Thorium	Adamantium	Nitrogen	Potassium	Sulpher

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If your company would like to be a sponsor for the Indiana Local Section of the ACS, please contact Tom Xiao, xiao_tom@lilly.com or Ann Cutler acutler@uindy.edu

Thanks also to our in-kind donors in 2016!

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CHILDREN'S MUSEUM INDIANAPOLIS

Brainstorming Session: 2023 ACS National Meeting

By Christina Bodurow

The Indiana Section established itself as an attractive ACS National Meeting destination in the fall of 2013. This was the culmination of literally thirteen years of building capabilities and chemistry community support in central Indiana. As the ACS has already awarded Indianapolis its second National meeting (2023), and recognizing the long runway needed to build strategies, community support, and long-term operational plans, a "Brainstorming for the 2023 ACS National Meeting in Indianapolis" was convened on Thursday, Sept. 22. A large cross-functional group of chemistry leaders across all areas of central Indiana joined the discussion. There were representatives from local Universities (IUPUI, University of Indianapolis, Butler, Ball State, Marian), local companies (Heritage, Dow AgroSciences, Lilly), and many other organizations that committed to future involvement (Visit Indy, IMA, IMS).

The discussion began with a brief overview of the extensive plans that helped to deliver such a highly successful hosting of the National Meeting. With over 200 volunteers, $170K, and dozens of well-planned events and experiences for our ACS guests, there was an extensive set of programs that when it was first conceived, many would not have thought possible. Between the major opening event held at the Indianapolis Motor Speedway (Celebrate Science Indiana, Track Labs, Mini-Cooper Concourse Laps, and more), multiple opportunities to showcase Indiana Science and Technology (multiple technical presentations by local scientists), as well as a major campaign to recruit attendees, the power of having a comprehensive strategy for the next meeting would be critical to success. Here were the key take-aways from the 2013 meeting:

1. Advanced Planning was crucial to success: official start = Nov 2011 for Sept 2013 meeting.

2. Distribution of Leadership roles enabled significant productivity in planning and execution: at least 20 talented, determined, committed leaders over a period of two years delivered the plan.

3. All volunteers and Convention Center personnel demonstrated a positive, can-do attitude, which made the meeting a success.

To develop strategic ideas for the 2023 meeting, the group broke into three discussions, each with a different focus:

Group #1: What should the Indiana Section do to achieve the best attendance (members and exhibitors)?
Group #2: What should Indiana Section do to achieve the best program (technical, plenary)?
Group #3: What should Indiana Section do to achieve the best destination experience?

There were numerous interesting and potentially beneficial ideas shared, as well a lot of energy in the room about steps we could be taking even in the next 12-24 months in order to lay the groundwork for another successful meeting in Indy.

There will be continued "small team" discussions in 2017, led by Chris Bodurow and Frederique Deiss, to prioritize and identify the opportunities requiring the longest advanced planning, and to begin cultivating and expanding the base of the chemistry community that could be involved.

Any member of the Indiana Section who would like to join the discussion should contact the Section Chair, Chris or Frederique to share their ideas and suggestions.

2016 Volunteer Appreciation Celebration at Broken Beaker

By Linda Osborn

Members stepped through the door on "Mass Avenue" and were greeted at a registration table before they were transported into Broken Beaker's world of molecules, isotopes, infusions, and a most wonderful atmosphere for networking. ACS members and special guests, 48 in total, enjoyed science and spirits fused together to celebrate our wonderful ACS Indiana section volunteers. Amidst enjoying the Broken Beaker's best drink and snack concoctions, we recognized the following volunteers:

Christina Bodurow - elected the District II Director!
Chris was awarded a periodic table blanket to as a thank you for all that she has done and continues to do for our Indiana Local Section.

Local Section Outreach Volunteer of the Year, sponsored by the Committee on Community Activities (CCA), is a recognition program that highlights local section volunteers and their outstanding contributions to community outreach.

Brian Mathes
For his continued, long-term leadership and creativity to energize the Indiana Section of the ACS and for his service to the National ACS on the Membership Affairs Committee. Brian has organized the Baseball Night at Victory Field for years, was the organizer and speaker for the Chemistry of Beer, Chairs the Kids and Chemistry events and participated in NCW.

Salutes to Excellence is an award recognition program that affords ACS members and student affiliates an opportunity to recognize outstanding accomplishments, achievements or service for those who have made a positive impact on everyday life.

Kathy Stickney

Kathy Stickney has been involved in our local section for over 15 years. She has served in many voluntary roles, primarily as our awards committee chair, assistance with the "Think like a molecule" poster session, award night organizer and the MC at the IMA event, Chemistry of Beer and the end of year volunteer appreciation event.

Tamiko Porter

Tamiko Porter, chemistry lecturer at IUPUI, is currently the Secretary of the Local Section. Tamiko has spearheaded utilizing programs like Eventbrite and Qualtrix to register participants for our many events, served as committee chair of the poster session, committee chair of "Impress for Success" event, and assisted with photography and in other ways for the awards banquet, "Solving Art Mysteries through Chemistry at the IMA" event, "Chemistry of Cheese", "Chemistry of Beer", Celebrate Science Indiana, NCW at the Children's Museum of Indianapolis, and is an ACS Science Coach.

L-R: Kathy, Tamiko, and Julie

Julie Holland

Julie Holland is the Editor of the Accelerator, our Indiana Local Section newsletter. Julie has been insightful in selection of materials for inclusion and has made the reading interesting to our members. Julie was also the chair of the ACS Celebrate Science Indiana booth coming up with creative ways to engage children of all ages in chemistry fun.

The 2016 Gladysmae Good - **Teacher of Chemistry** is **Stacie Stoffregen** with Greencastle Middle School. This is a local award named after a dedicated local teacher that was active in ACS, Gladysmae Good. We present this award to Stacie for outstanding leadership in K-12 chemistry education, for challenging and inspiring students in the field of chemistry, for extracurricular work in chemistry to stay current in the field and to make a difference in the community.

L-R: Stacie, Linda, Kathy

We also recognized **Ann Hunt** who is our **2016 ACS Fellow** and **Christopher Porter**, who received a **Professional Photographer Award** for his photos taken at the IMA event. Science education foundation of Indiana (SEFI) guests were also recognized including **Kerrm Yao, Larry Sernyk,** and **Robert Yost.**

The 2017 ACS Executive Committee & Committee chairs who attended were introduced including Tom Xiao, our 2017 Chair; Robert Pribush, our first ACS Fellow, Councilor and Education & Chemistry Olympiad Chair; Brian Mathes (Councilor, Volunteer of the Year, Kids and Chemistry chair); Rob Sammelson (Councilor); Erin Dotlich (Alternate Councilor); Tamiko Porter (Secretary and Impress for Success chair); Paul Morgan (Treasurer); Kathy Stickney (Awards Chair, Salutes to Excellence Award winner); Julie Holland (Accelerator Editor, Salutes to Excellence award winner, and CSI Chair); Erica Posthuma Adams (K12 Outreach Chair, Social Media Chair, and AACT regional representative); our 2023 NMLT Strategic Planning Chair, Frederique Deiss; and our Membership Affairs Committee Co-Chairs, Rebekah Dickerson and Jordan Knotts.

Thomas Wysocki, senior chemist at Eli Lilly, owner of the distillery, gave a tour and had the bar-tender create a special drink for ACS members which was blue and had dry ice smoke exuding from the funnel-shaped glass holder, while the chef arranged charcuterie boards: crostinis, quesadillas, and sun-dried tomato hummus for our enjoyment.

Prizes were awarded to some lucky winners including goggles, an ACS calendar, a broken Beaker t-shirt, a book “Influencer”, a set of beaker glasses from the Broken Beaker, and $50 for the grand prize! NCW t-shirts were handed out to all who wanted one.

A special thanks to Erica Posthuma-Adams who selected the venue and worked with the owners and staff to make it a great event, and Kathy Stickney for designing some fantastic awards for our prize winners. It was the perfect ending to a wonderful year.

BROKEN BEAKER DISTILLERY

Tuesday: 4 - 10pm
Wednesday: 4 - 10pm
Thursday: 4 - 11pm
Friday: 4pm - 3am
Saturday: 2pm - 3am
Sunday: 2 - 7pm
Closed Mondays

Broken Beaker Distillery is located at 643 Massachusetts Ave, Indianapolis, IN 46204.

Perspective from a Project Seed "Science Mom"

This past July, another successful summer of high school student research at IUPUI and Eli Lilly & Company was concluded with an impressive poster session by Indianapolis Project SEED interns. More important than the product of their research, is the impact of the Project SEED experience on the lives and futures of these students, best described in their own words:

"I see myself becoming a research pharmacist in the future"

"What I most enjoyed … was being given the chance to network with other professionals"
"…the biggest benefit of the Project SEED experience will be having lab training and knowing the great people that work in my lab"

"…this is definitely a program that I would recommend and that I would do every year if I could"

"….I most enjoyed…being able to look at research from a totally different perspective than I knew before....It is such a beautiful thing when people work together to help youth accomplish their goals…"

"I loved getting to meet genuinely fun kids from other schools that I wouldn't get to meet otherwise."

"I doubt that my career path will be at all linear, but I know it will be sustained by my inspiration to use my academic knowledge in service of others – a vision attributable in large part to the examples I have seen in the students, staff and mentors of Project SEED."

It is an honor to be part of the Indianapolis Project SEED family.

Shari Harrison
Former scientist, science teacher, and current Project SEED "Science Mom"

In the Beginning Was Milk (Chemistry of Cheese Part I)

By Maria Alvim Gaston

In a small room on top of Kahns Fine Wines and Spirits, 48 guests huddled together to learn about the Chemistry of Cheese on October 14th. It was sold out at 35 people, but more attended than had registered! Fine wines were served with samples of various cheeses and fruit while I

presented my first ACS talk. In the beginning was MILK, then I explained the chemistry of how milk was changed into cheese. Although a pharmaceutical computational chemist, I am not a cheese monger, affineur, or cheese expert, but rather a lover of cheese! Here I present the essence of my presentation. Grab a glass of wine and a chunk of cheese and enjoy reading!

Milk is mixture of fat, protein, and lactose in water. In all milk types, the fat is present in micelles that are composed of both saturated and unsaturated fats. Cow milk has very large fat globules compared to other mammals. In addition to the fat micelles, there are also casein micelles. These are much smaller globs that contain calcium phosphate inside. In an animal, these micelles are meant to carry the calcium phosphate to the infant's stomach. Up to 80% of all the protein in cow's milk is associated with the casein micelles. The molecules of casein are negatively charged, which keeps the very hydrophobic micelles floating in water.

In cheese-making, the goal is to get the micelles interacting with each other so that they will coagulate and form the curds. The production of cheese predates recorded history. Its origin is assumed to lie in the practice of transporting milk in bladders made of ruminants' stomachs, with their inherent supply of rennet.

The production of cheese predates recorded history. Its origin is assumed to lie in the practice of transporting milk in bladders made of ruminants' stomachs, with their inherent supply of rennet.

Cheese-making is a complicated interconnecting series of reactions, leading to a range of different aromas and tastes in matured cheeses. Most cheese is made from cow's milks which is usually pasteurized to kill any undesirable bacteria, then cooled. Rennet and "starter" bacteria are added and the mixture processed for about one to two hours at 85-105 ºF; the bacteria ferment lactose to form lactic acid, reducing the pH to 4.6 where enzymes such as chymosin (rennin) can coagulate the casein forming curds. The warm curds are allowed to set for about two hours before the liquid whey is separated from the curds by cutting the curds into small pieces. Sodium Chloride is added to the cheese to enhance flavor, and control microbial and enzymes activity. Pressing and coating or packing to reduce moisture loss from the surface and prevent contamination

Aging (ripening and curing).

Enzyme-mediated coagulation involves the use of rennet, which is used to make most cheeses. When they are added to the milk, they begin to break up the portions of the casein protein that sticks out of the micelle surface. These portions of the protein are what keeps the hydrophobic micelles floating around in the milk. When they are removed, the micelles become incredibly unstable. The only way for them to stabilize is to start interacting with each other. This forms a gel matrix net which traps all the very large fat globules floating around.

In acid-mediated coagulation, the pH of the milk drops to the acidic range (pH < 4.6). This alters the interaction of the calcium phosphate molecules with the micelles, and they begin to leak out of the globs. Once this happens, the micelles become destabilized and begin to interact with each other, forming a gel matrix. The source of the acid can be exogenous (adding acid such as citric acid or vinegar to the milk) or endogenous (from the lactic acid produced by bacteria).

The molecules we smell come from breakdown of the three types of chemical in the milk - the protein casein; lipids in milk fat; and lactose The volatile compounds formed depend the particular microbes acting as ripening agents, and the type of milk used. Goat and sheep milk are richer in lipids containing short-chain fatty acids, leading to smaller, more volatile, odorant molecules.

Age does indeed matter with cheese, as enzymes continue to degrade the compounds in cheese during storage. RIPENING it refers to the chemical and physical changes occurring in cheese during storage. CURING refers to the humidity and temperature during the aging process. Aging cheese is usually held in a temperature and humidity control room. And ventilation is a must for aging rooms 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. Cheeses that are lower in moisture can be aged for years.

Sharper cheeses are more flavorful and require longer aging process compared to milder cheese, but cheese has to be sold before undesirable flavors crop up or the body softens too much.

Chemically the major flavor components in cheese may be grouped into eleven categories: Acids, Amino acids, fatty acids, alcohols, sulfur containing compounds, aldehydes, ketones, esters, lactones, furans and terpenes.

The most common fresh cheese consumed in the United State are cottage cheese and cream cheese and in Latin America Queso Fresco and Queso Blanco. Soft cheeses in most cases are acid–coagulated varieties and have little flavor since they are not aged. The sources of flavor compounds are lactic acid and citric acid, and their breakdown products formic and acetic acid which 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 volatile and are partly responsible for the aroma. Mesophilic bacteria (but not thermophilic bacteria) metabolize citric acid into diacetyl, which is the primary flavor component in soft cheeses.

The stretch properties of mozzarella depend on the interactions between casein micelles. The more the casein network is interconnected, the more the cheese stretches. Milk is made up of spherical globules of milk fat trapped in a three-dimensional matrix called casein micelles. Most of the milk-water, along with lactose and some minerals, are removed as liquid (whey), during

cheese making. The pH level and temperature play vital roles in influencing the casein interactions. Once you make curd from the milk by adding citric acid and rennet, spaces between the casein molecules are reduced. Continuous stirring, heating and acid development helps to shrink the curd particles. This in turn helps the molecules to come closer together to form what we know and love as mozzarella cheese.

Alcohol in cheeses arise from metabolism of lactose, amino acids and fatty acids. A common alcohol in cheese is 1-octen-3-ol is a significant portion of Mozzarella, and Provolone cheeses flavor (mushroom flavor). Other alcohols that are present in these cheeses through metabolism of lactose are: Ethanol and propanol - Sweet odor, Pentanol - Fruity odor, Hexanol - Fruity and green odor, Heptanol - Unripe fruit odor, 2- Heptanol – Fruit, earthy, green and sweet flavor, 3-methylbutanol – Fruit alcoholic flavor, and Phenol and cresol are also present in cheeses yielding a livestock odor.

About 90°F, the solid milk fat in the cheese begins to liquefy, the cheese softens, and drops of melted fat rise to the surface. As the cheese gets hotter, the bonds holding together the casein proteins break, and the cheese collapses into a thick fluid. 130°F for soft, high-moisture cheeses like Mozzarella and Brie, 150°F for aged, low-moisture cheeses like Cheddar and Swiss, 180°F for hard, dry grating cheeses like Parmigiano-Reggiano. High-moisture cheeses, the proteins are loosely packed with lots of water intermixed between them, so they readily liquefy. But hard cheeses contain so little water that when they melt, they don't completely liquefy. In fresh cheese, the casein molecules are large and stretchy, and they tend to get tangled into ropes, which is why melted fresh mozzarella is stringy. During aging, casein break into small pieces by ripening enzymes. When an aged cheese like Cheddar melts, these little pieces of casein flow without tangling, and the cheese melts smoothly.

Cheddar cheese was first made in England but is now made pretty much everywhere. Cheddar has a flavor that is different from other types of hard and semi-hard cheeses due to the heating the curds, the process of cheddaring, and the aging process. In general, the milk is 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 th 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. The more liquid that drains from the curds, the firmer is the cheese. 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.

Cheddar cheese types include: 1. Farmhouse Cheddar: Cheddar made in the counties of Somerset, Dorset, Devon or Cornwall (England). The European Union recognized true farmhouse cheddar by awarding it Protected Designation of Origin (PDO) status. In addition true farmhouse cheddar is made entirely on the same farm and is aged at least 9 months. 2. Bandage-Wrapped Cheddar: Cheese is wrapped in cheesecloth during the aging process to protect the outside of the cheese but also allows air in, creating a natural rind beneath the cloth. The cloth becomes thick and fairly hard and usually remains on the cheddar when it is sold. 3. Wax-Covered Cheddar: Wax creates an airtight seal that protects the cheese during aging. Wax-covered Cheddar does not have a rind. 4. Aged Cheddar: Some cheddar is aged for a few months, some is aged for a few years. The longer the Cheddar is aged, the more intense the flavor becomes. 5. Orange Cheddar: The color of orange Cheddar comes from annatto, a vegetable extract derived from achiote seeds.

Cheeses with eyes were also discussed. The “holy” (holey) Swiss types originated in the mountains region where the Lactic acid bacteria population is low, resulting in slow acidification and whey expulsion. Sodium chloride is also low because of the cost of hauling salt up to the farms and the wheels are large due to lack of storage facilities for milk. Propionibacteria grow best with low levels of acid and NaCl. In this case this bacteria metabolize lactic acid to propionic acid. Also they produce CO2 gas, which is responsible for the “eyes” within the structure of the cheese. Calcium propionate and Magnesium propionate appears to be responsible for the sweetish flavor of the Swiss-type cheeses. Emmental cheese originated in the thirteen century in Switzerland’s Emmen Valley utilizes Streptococcus thermophilus, Lactobacillus delbruecki (metabolizes glucose and galactose and governs the pH) and Propionibacterium freudenreichi (responsible for the eye formation). Some strains of Lactobacilli generate furans, in particular furaneol, homofuraneaol and stolon. Furans are formed from the breakdown of carbohydrates (lactose degradation in cheeses). Furaneol and homofuraneol are responsible to the caramel aroma in cheese and stolon has a maple syrup aroma.

In Italy, hard cheeses (terpenes) are known as the grainy cheeses, because of their granular texture. The most popular of these cheeses are Parmesan and Romano. Very hard cheeses are most often grated or shaved, but they are also traditionally eaten in chunks broken off with a special knife. All attendees received a copy of my presentation and seemed to enjoy the evening of learning and networking while enjoying wine and cheese samples. True Parmigiano-Reggiano is often referred to as the “king of cheeses”. This cheese is made slowly and requires it to be aged a minimum of fourteen months, although most are aged for twenty-four months.

Because aging depletes cheese of moisture, very hard cheese is drier. Bacteria can't grow as readily in dry environments, making very hard cheeses keep longer shelf life than soft cheeses.

As you can see from the photos, this was a fun way to incorporate science and a social activity!

Chemistry of Cheese Part II: Silver Circle Members Dine while Learning All About Cheese

By Ann Cutler

There was a cool drizzle on the evening of October 20th in Indianapolis. Despite the weather, sixteen of the area's career-experienced chemists and their happy guests were warm and dry at Heritage Research Group headquarters on the west side of the city. This group was attending an invitation-only 'Chemistry of Cheese' event sponsored by the American Chemical Society's Senior Chemists Committee (SCC) in collaboration with the Indiana Local Section.

This well-received occasion was a follow-up to a 'Chemistry of Cheese' event and tasting of the previous week. The earlier event was a presentation and cheese tasting open to the full membership and to the public. The dinner for Silver Circle chemists included a full dinner, a deeper chemistry presentation, and a wonderful chance for fellowship. Dr. Maria Alvim-Gaston, a charismatic computational chemist employed in local industry, was the speaker at both events.

At our dinner, Dr. Alvim-Gaston presented on the remarkable history and the fascinating chemistry of cheese. She also provided her own homemade Brazilian Cheese Bread, a yeast bread based on tapioca flour, for the group's gustatory pleasure. Participants also enjoyed appetizers of a variety of cheeses and grapes, and a dinner of delicious sandwiches, macaroni and cheese, and a delightful dessert of cheesecake.

The assembled group was lively: all participants enjoyed greeting old friends and meeting colleagues with similar backgrounds and interests. The local section leadership spoke about some exciting possibilities for engaging these and other career-experienced section members for science outreach and support of the section.

2017 USNCO Reminders

Registration ends **February 16,** 2017. Email: rpribush@butler.edu

Exam is **March 4**, 2017 at Brebeuf

National Exam is in **April** 2017

Awards Banquet is **May 9**, 2017 at UIndy Hall A, Schwitzer Student Center

Science Outreach Activities in the Indianapolis Area

In addition to the upcoming ACS Local Section sponsored events, there are some other interesting happenings in the Indianapolis area over the next several months.

Science on Tap, brought to you by the School of Science and the School of Science Alumni Association, continues from January until June 2017. Attendees gather at a local brewery for socializing prior to the an interesting speaking engagement. Upcoming topics include "**A Cure for Down Syndrome, Hope or Hype?"** presented by Dr. Randall Roper, ***Psychology*** presented by Dr. Alex Lindsey, and ***Math and Mars*** presented by Dr. Roderigo Perez. For more information on the dates, topics and location, please check **http://science.iupui.edu/science-on-tap**

Also, the science and beer festival ***Pint of Science*** has been renamed ***Taste of Science***. The festival will be held April 23-28. Venues and topics can be found on the website: **https://tasteofscience.org/#about**.

Local Section American Chemical Society Sponsored Events 2017		
Event	**Location**	**Date**
USNCO registration deadline	Email to rpribush@butler.edu. Phone: 317-989-6799	February 17
USNCO Exam	Brebeuf Jesuit Preparatory School	March 4
Passport to Hi Tech	Conner Prairie	March 18
Science Education Foundation of Indiana (SEFI) Science Fair	IUPUI Campus	April 1
252nd National ACS Meeting & Exp	San Francisco, CA	April 2-6
Science Day	Ball State University - Muncie, IN	April 8
USNCO National Exam	Butler University	April (TBD)
Awards Banquet	UIndy Hall A, Schwitzer Student Center	May 9
CERM	Detroit, MI	June 7-9

Baseball Night	**Victory Field - Indianapolis, IN**	**July or August (TBD)**
252nd National ACS Meeting & Exp	**Washington DC**	**August 20-24**
Celebrate Science Indiana	**State Fairgrounds – Indianapolis, IN**	**October 7**
National Chemistry Week	**Indianapolis Children's Museum – Indianapolis, IN**	**November 4**
Volunteer Appreciation and Networking	**TBD**	**December (TBD)**
We look forward to seeing you next year!		

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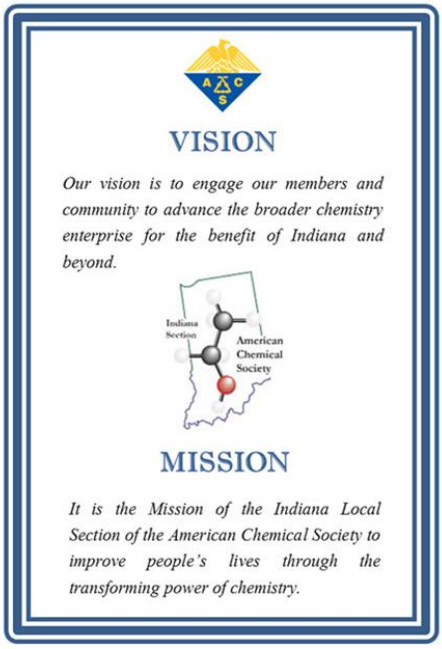

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HAPPY HOLIDAYS AND SAFE TRAVELS TO ALL!

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