ACS Chemistry for Life®

The Minnesota Chemist

Official Publication of the Minnesota Section of the American Chemical Society

Issue 2, Mar - Apr 2015

Greetings from the Chair

Hello MN ACS members. The year has gotten off to a good start with events at Biothera and the University of Minnesota Chemistry Department. Both events were well attended by audiences with varying chemistry and professional interests. A special thank you to Mike Danielson, Chuck Tomlinson, and Mark Distefano for helping set up and coordinate these meetings. In March, the section will be participating in the annual MinnTS meeting at Medtronic. MinnTS is a collection of over a dozen scientific societies in the Twin Cities area that meet annually for a symposium in order to increase networking between society members. The planning committee for this meeting decided to choose infectious disease as this year's topic after the recent Ebola outbreak. Following dinner Dr. Richard Danila will speak on the reasons why there has been a global emergence of infectious diseases over the past two decades. This talk will be followed by Marc Rowe who will speak on the design and use of protective equipment for workers treating patients during an outbreak.

On May 5th, we will have a visitor from the University of Alabama Birmingham, Dr. Tracy Hamilton, speak about the chemistry behind brewing beer. He will be making a stop at two other regional sections (Red River Valley, and Northeastern Wisconsin) so this caused the April meeting to be pushed into early May. This event will be at Bent Brewstillery in Roseville. Tours are available and include a flight of four or five different beers. See the MN ACS website for details. May will be the annual awards dinner. It looks like this year's awards dinner will be held in Northfield, MN but details regarding this event are yet to be finalized. The spring program will wrap up with a June social at the Minnesota landscape arboretum. This event will include a barbeque and admission to the arboretum grounds. This family friendly event will allow members to network and hopefully enjoy a beautiful summer evening in a gorgeous venue. Look for more information on the May awards dinner and June social in the May edition of the *Minnesota Chemist*.

There is much gratitude for all the work done by section members over the past couple of months. Volunteerism through the belief that chemistry can transform people's lives truly lives out our organization's mission. It is good to be a chemist in Minnesota.

Dr. James Wollack
Assistant Professor of Chemistry
St. Catherine University

MN ACS Chair

March 19 - Medtronic

Minnesota Technical Symposium (MinnTS)

Date: March 19, 2015, 5:00 to 9:00 pm

Location: Medtronic Headquarters at 694 & Hwy 65 in Fridley, MN.

Attendance: All interested persons are welcome to attend. Because there are a limited number of seats, sponsoring organization members and guests of members will be given preference if registrations exceed available seating.

Cost: $30.00 ($25.00 for ACS members)

Reservations: Reservations are being taken by sponsoring society membership. To make your reservation go to: http://www.mnacs.org/2015schedule/minntsmarch2015.html or http://www.minnts.org/ . Be sure to scroll down to see registration information.

Speakers:
Dr. Richard Danila
Epidemiology Program Manager and Deputy State Epidemiologist
Division of Gastroenterology
Minnesota Department of Health

Emergence of Infectious Diseases in the Last 20 Years
Dr. Danila will present on the reasons why there has been a global emergence of infectious diseases in the last 20 years with an emphasis on the current Ebola Virus Disease outbreak and its implications for Minnesota.

Marc Roe
Technical Services Specialist
3M Company

Protecting Workers During Infectious Disease Outbreaks: The Challenges
Protecting workers during an infectious disease outbreak presents challenges including selection, training and utilization of appropriate level of personal protective equipment (PPE). Each outbreak is unique and on many occasions there is debate around the potential modes of transmission leading to uncertainty in determining necessary PPE. Moreover, formal guidance from health authorities as to the appropriate PPE ensemble evolves as more information about the infectious disease becomes known. Once the level of protection is identified, selection of the best design for the worker and tasks may provide unique challenges. These challenges will be discussed with regards to PPE design and selection.

Schedule of events:
5:00 - 6:00 Registration, social with refreshments
6:00 - 7:00 Dinner (followed by move into auditorium)
7:00 - 7:15 Welcome message, introductions (Gary Korba)

7:15 - 8:00 Speaker 1
8:00 - 8:15 Break
8:15 - 9:00 Speaker 2

May 5 – Bent Brewstillery

Zymurgy: The Art and Science of Brewing Beer

Dr. Tracy Hamilton, Professor of Chemistry, University of Alabama-Birmingham

The presentation will start with a brief history of brewing, followed by how to brew beer step by step, with pictures. The chemical processes at each step are discussed for the chemists in the audience, making connections to various undergraduate topics such as kinetics, organic chemistry and biochemistry. The talk will be topped off by a list of important flavor compounds (both desirable and undesirable) in beer. The mixture of humor and practical knowledge makes this talk suitable for a general audience. The topic of beer is very popular, and venues where good beer is served enhances attendance significantly.

Speaker Biography

Tracy P. Hamilton obtained a Ph.D. (advisor: Peter Pulay) from the University of Arkansas in 1987, and did four years of postdoctoral research (advisor: Fritz Schaefer) at the University of Georgia. Dr. Hamilton has been a professor at the University of Alabama at Birmingham since 1991. In graduate school, he had to make a difficult choice between theoretical and experimental chemistry, and chose theoretical. As a result, the urge to synthesize irresistibly manifested itself in 1996, when he started brewing beer at home. Dr. Hamilton has been very active in the Birmingham

Brewmasters (http://hbd.org/bbm), a group dedicated to the appreciation of different beer styles and how to brew them. He is also a certified beer judge in the Beer Judge Certification Program.

Schedule:

6 – 7 pm –Pizza dinner, tours
7 – 8 pm – Presentation by Tracy Hamilton
8 – 9 pm – Networking, tours

Menu for Dinner:

Pizza, dessert, soda, water. Beer for purchase.

Cost:

$10 for dinner ($5 for students).
$20 Dinner + tour ($15 for students).
Tour includes a flight of beers (four small glasses of different beer types)

Location:

Bent Brewstillery, 1744 Terrace Drive, Roseville, MN 55113

2015 Joint Great Lakes Central Regional Meeting

The ACS invites you to join them at the 2015 Joint Great Lakes Central Regional Meeting, May 27 - 30, 2015 at the DeVos Place in Grand Rapids, Michigan. Visit the JGLCRM website for up-to-date program information.

Now open:
Online Registration - **Advance registration ends April 19th**

Abstract Submissions - **Abstract submissions close March 23rd**

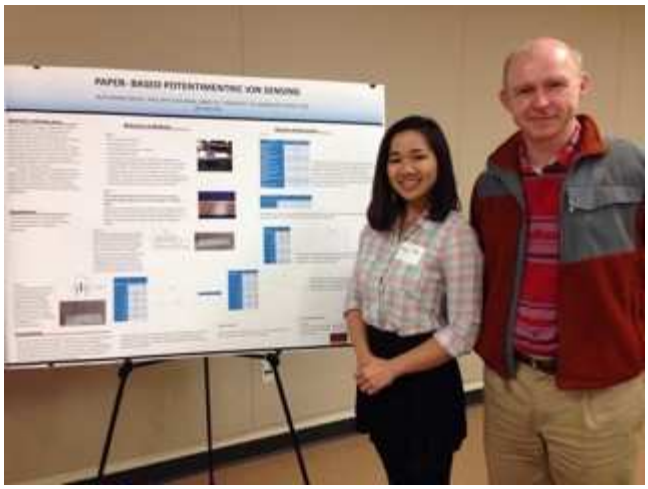
Hotel Reservations - **Discounted rate ends April 19th**
Need a hotel room? A special rate of $134 is being offered at the Amway Grand Plaza Hotel, located next to the DeVos Place, until **April 19th.** Reservations can be made online or by calling the hotel at 800-253-3590.

Project SEED

Sarah Mullins

Project SEED is gathering steam for 2015! The program will run from June 15, 2015 to August 14, 2015 and as in recent years student participants will be hosted by faculty mentors in labs at the University of Minnesota, Twin Cities campus. We are very excited about the impact this program has had on the development of a new generation of scientists. Since 2012, twenty students from St. Paul Public Schools have participated, and all have gone to college. Students who complete the program requirements are eligible to apply for an ACS sponsored scholarship for chemistry majors.

The program focuses on matching smart high school students with scientific aptitude to an immersion experience in hands-on research. Each Project SEED student receives a summer stipend. Program participants are talented but as persons from low-income families, many are first generation to attend college, so mentoring in this unfamiliar setting of a major research university lab is critical. For many chemists, it was a hands-on lab experience that ignited their passion and imagination, and served as essential to planning a path to do chemistry as a career. Project SEED faculty mentors can attest to the growth of the students in just eight weeks! One of the 2014 participants, Kieu Ho, worked with Prof Phil Buhlmann and graduate student mentor Jinbo Hu on development of ion-selective electrodes. Jumping into this project was exciting, but also challenging as the setting is very different from the expectations of high school lab course. Kieu not only learned new science, but was mentored on how to set reasonable expectations on her research progress, and how to communicate with professional scientists and graduate students. This January, Kieu was second author on a research article published in *Analytical Chemistry*!



Picture: SEED student Kieu Ho and UMN faculty Philippe Buhlmann at poster session of the MN section of the ACS, where Kieu presented her work.

Students have used their projects to leverage additional opportunities, including three who were selected for the International Science Fair in 2014. If the student starts “Summer I” after their junior year of high school, there is an option to return for “Summer II” after their senior year. Since they have familiarity with the university lab structure, and they are eager to share the lessons they learned with the Summer I students. We aim to have 50-50 mix of Summer I and Summer II students each year.

Thank you to all the mentors! University Minnesota faculty, graduate students, high school teachers and ACS members all provide critical support that makes Project SEED a great enrichment opportunity for the students. If you want to get involved, we have many opportunities. Student applications will be received until March 15, 2015 – for more information contact Dick Streeper, rdstreeper@comcast.net. Faculty mentors for 2015 have been selected. However, if you would like to be involved in other support activities during this summer (guest speaker, host a student group visit to your company, poster session, etc.), please contact Sarah Mullins, smullins44@gmail.com.

Project SEED Student Publication

Jinbo Hu

A research article recently published in the ACS journal Analytical Chemistry features the work of a high school summer researcher.

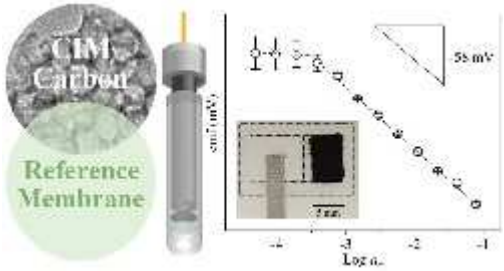
In this article, researchers from the Department of Chemistry at University of Minnesota report an advance in the development of miniaturized ion sensors. High-performance all-solid-state reference electrodes were developed employing colloid-imprinted mesoporous (CIM) carbon as a solid contact material. To achieve sensor miniaturization, this reference system is integrated into disposable paper-based ion sensing devices that are inexpensive and easy to use. These paper-based ion sensing devices offer highly reproducible measurements with sample volumes as low as 10 µL. This work is built on two prior collaborative projects within and outside the department; one between Professors Philippe Buhlmann and Andreas Stein to develop CIM carbon-based all-solid-state ion-selective electrodes (*Anal. Chem.* **2014**, *86*, 7111-7118. U.S. Provisional Pat. App. 62/002526), and the other between Professors George Whitesides from

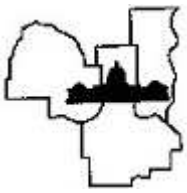
Harvard University and Philippe Buhlmann in the development of paper-based potentiometric sensors (*Anal. Chem.* **2014**, *86*, 9548-9553. U.S. Pat. App. 61/789883).

Major contributors of this work include Jinbo Hu, who is a graduate student under the supervision of Professors Philippe Buhlmann and Andreas Stein, and Kieu Ho, who is a student from a Como Park Senior High School. Kieu worked as a high school researcher in Professor Buhlmann's lab during the summer of 2014. Her project involved testing of different materials for the construction of hydrophobic barriers in paper-based ion sensors, which eventually became a cornerstone of the published work.
"I spent eight weeks experiencing chemistry which I have never had before. I still remember the first day when I came into a lab, all the things such as chemicals and instruments were so exciting to me." said Kieu.

Kieu's research experience was made possible by the American Chemical Society project SEED summer research program, which offers research opportunities in industrial, academic, and federal laboratories for economically disadvantaged high school students. Kieu highly praises the SEED program: "It was the SEED program that made it possible for me to experience what it's like to be a chemist. I felt as if I was catching up to modern technology, which was great. I highly recommend this program to the people I know from school who love chemistry and want some experiences in a real lab."

Kieu is currently applying for the SEED program for another summer, and considering choosing a science major when she enters college. "Being able to work in a lab like this really opened up what I want to do in the future," as she said.





Twin Cities Regional Science Fair

Lynn Hartshorn

The Twin Cities Regional Science Fair was held on Friday, February 27th, 2015 at the University of Minnesota Field House. ACS members Leif Irgens, Lynn Hartshorn, James Wollack and Wayne Wolsey evaluated chemistry projects for the ACS Minnesota Section Award for the best chemistry or biochemistry high school project.

The winner of the award was Carolyn Jons, Grade 11, Eden Prairie High School, for her project "Improved Efficiency of Steam Generation from Seawater Using Carbon Nanoparticles-Year two."

Honorable mentions went to:
Sofie Kim and Jacob Levy, both in 12th Grade, Breck School for their team project "Optimized Syntheses of Novel, Medicinally Applicable 1,2,3-triazole derivatives".

Colton V Van Dorpe, Grade 12, Burnsville Senior High, for his project “Biochemical Degradation of Low Density Polyethylene”.

There were many other excellent projects, and the judges would like to congratulate all the students and their teachers who presented projects at the fair.

Special thanks are due to Wayne Wolsey who co-ordinates the awards for the regional and state science fairs.

Picture: ACS judges at the Twin Cities Regional Science Fair. Front (left to right): James Wollack, Leif Irgens. Back (left to right): Lynn Hartshorn, Wayne Wolsey

The Senior Chemists Group

Lynn Hartshorn

The Senior Chemists group has been reactivated with two events held so far. Lynn Hartshorn obtained a small grant from national ACS that was used to partially fund the first event: a lunch held on Tuesday November 18th at the Green Mill Restaurant on Hamline and Grand Avenue in St. Paul. Volunteer activities were discussed and a discussion followed. Materials prepared by Lynn and Wayne Wolsey were handed out to provide information about potential volunteer activities. There was agreement that the Senior Group should continue.

A second lunch was held on Wednesday, January 14th at the same location. Dr. George Barany provided crossword puzzles for attendees and Barbara Barany discussed them. There was also a brief discussion of volunteer activities. Attendees were surveyed to give some ideas about what kinds of topics and format seniors would like to have.

Discussions of volunteer activities covered the following:
Barb Barany is working with the St. Paul Public Schools in an attempt to set up volunteer/teacher relationships. Once established, the volunteer could apply for the ACS Science Coaches program which gives a grant of $500 to the school involved.

Joe McGrath said that 3M will give a grant of $250 to any public or private school where a 3M retiree or employee is working, after the volunteer has worked for 25 hours in the school (20 hours for a current employee). See the website http://www.3Mgives.com. For questions, email

Volunteer@mmm.com. For information about the ACS Science Coaches program (and other ACS volunteer activities) look at
www.acs.org

Judges are needed for the Minnesota State Science Fair on March 21-23, http://mnmas.org/science-engineering-fair/judges. Go to the web sites to register as a judge. To join the Minnesota section judging teams for the event, email Wayne Wolsey at wolsey@macalester.edu
For Kids in Chemistry or the Chemistry Olympiad, contact Jerry Kersten at jerry-kersten@comcast.net

The Minnesota Local section has two positions available on the Executive Board:
Government relations
Great Lakes Region Board member
If you are interested, please email the section chair James Wollack at jwwollack@stkate.edu

Future Lunches
A survey completed by those present showed that for future lunches, topics in order of preference were:

1. Short (20 minutes) talks about general science topics or recent discoveries (most popular) SUGGESTIONS FOR SPEAKERS ARE NEEDED—PLEASE EMAIL LYNN.
2. A tie between a short talk by one of our volunteers and a purely social lunch, with networking, news and discussion
3. Short talks about their careers by one of our seniors
4. Short talks about current research (least popular)

Most preferred days are Tuesday and Wednesday, though many people could make most days.

Check the local section website www.mnacs.org for news about senior (and other) events.

March Senior Chemists' Lunch

Lynn Hartshorn

The next meeting of the ACS Senior Chemists will be on **Wednesday, March 11th** at 11:30 am at the Green Mill Restaurant on Hamline and Grand Avenues in St. Paul in their private room. We will order from the menu. Please email Lynn Hartshorn at lghartshorn@stthomas.edu to reserve. Please reserve by Monday March 10th. (Seniors are normally defined as those over 50 years old, but all are welcome, including spouses and guests). Come and join us!

Chemists-in-the-Library Program

Source: ACS Chemistry Ambassadors Program (www.acs.org/chemistryambassadors)

"If they can reach up to the height of the table, they're okay. We just adapt the explanation or what we expect of the kids to whatever age they are." So notes Phil Buhlmann, a professor of chemistry at the University of Minnesota, Twin Cities, and chair of the outreach committee of the **ACS Minnesota Local Section**. He is speaking of the section's Chemists in the Library series.

While he laughs when he offers that description of who their events target, he's not necessarily joking. "I think there's a period in junior high, mostly, where science is regarded by some kids as something that's just not cool. And so I think it's important that kids get excited at an early age, that they get a positive view of the sciences."

But how to reach those kids? That was a question that Buhlmann and his fellow section member Janet Tarino faced years ago as they were gearing up to offer a 2004 **National Chemistry Week** event in the Minneapolis/St. Paul region. Following a suggestion from ACS, they reached out to a local library—the St. Paul public library, in this case—and offered to host a chemistry activity. Buhlmann explains that the library staff eagerly accepted. "The librarians don't just want to be the people who put the books on the shelf. They really try to provide a service to the community. They're very eager to organize events for their communities."

The event was a success. So much so that the group jumped straight into a plan of repeating it at a rather aggressive rate. "From there on we decided to keep going and do one every month in a different community library in the Twin Cities area," he says.

Chemistry in the Library… in ALL the libraries

10 years later they've hosted 125 Chemistry in the Library events at more than 20 different libraries in the Twin Cities region. When they are at the main Minneapolis and St. Paul libraries, they can find themselves doing their chemistry with more than a hundred visitors. But, Buhlmann notes, their mission is about more than the numbers. "We make it a point to visit the smaller branches too, and that's driven by the fact that we want to reach out to these different communities." In many of the smaller libraries, that means reaching kids in disadvantaged neighborhoods, which Buhlmann particularly enjoys. "I personally get the most satisfaction out of those libraries where the kids have relatively fewer resources. A lot of those kids get one of their first experiences with science at these events. I realize this is not going to be their last, but I do think it's important that we give these kids the opportunity to have that experience." And unlike programming on TV and the internet, Chemists in the Library does not just make a show but it allows the children to do hands-on-activities themselves, guided by the volunteers.

Students benefit from helping students

Running a monthly outreach operation requires a terrific amount of manpower, and Buhlmann is very quick to point out that he gets help from all quarters. Years ago, students and faculty from neighboring Century College started assisting with the effort. The Century crew now handles the all-important task of ensuring that the materials needed for the different experiments are in stock and on-hand for each event. And then there are the librarians, who Buhlmann says do a masterful job of linking kids in their libraries to these opportunities. "We have amazing librarians who really try to take care of and mentor the kids who come to their libraries. And they'll point out to these kids, 'Hey, the chemists are coming next weekend. You should really be here.'"

Graduate and undergraduate students from the University of Minnesota and neighboring colleges also turn out in force, and the volunteer roster is then filled out by professors, chemists employed by companies throughout the region, and retirees looking to keep a foot in the local chemistry community. Buhlmann calls it a "whole potpourri of volunteers," and notes

that this mix of folks has brought a tremendous, if unplanned, benefit to his student volunteers. “What I started to appreciate over the years is that it’s a really good experience for a lot of our student volunteers. It’s actually a pretty good opportunity for the university chemistry students to get to know their peers and talk with chemists at all stages of their careers about opportunities in the Twin Cities.”

Buhlmann adds that the University of Minnesota students can often find themselves in introductory science classes of over 300 students. “And so these kids really have fewer opportunities to get to know a faculty member and to learn what it means to be a grad student. Well, we have professors and graduate students who attend our events. It gives the undergrads an opportunity to ask questions that would otherwise be harder to ask. We never planned for that, but this whole aspect of providing a network for some of our students is actually a really important feature of this program.”

Now taking reservations for 2016

By Buhlmann’s count, the Chemistry in the Library series has now conducted over 125 events, more than 100 of which he has personally attended. And to judge by the continued demand for their efforts, that number will keep rising steadily. Buhlmann explains, “Every one-and-a-half years I send out an email to the libraries and say, ‘I’m organizing the schedule again. If you want us, let us know.’ And I usually get so many answers from libraries that want us back with that one email that I fill up out program for the next one-and-a-half years.”

Outreach tips from Phil Buhlmann:

- Learn as you go: At its outset, Chemists in the Library set out to target middle school, and perhaps even high school, students. But Tarino, Buhlmann, and their peers quickly realized that the libraries attracted a much younger audience, and so they adjusted the program to match the crowd.
- Accept volunteers from all quarters: Chemists in the Library’s monthly schedule would not be possible without the help of a large and diverse group of volunteers, and the participation of two higher education institutions.
- Look for, and then encourage, ancillary benefits: This program was intended to help the young kids at the libraries, pure and simple. But as things developed, Buhlmann saw that his university students were also benefitting tremendously. He now encourages those interactions, and cites that aspect of the program in grant applications and other outreach.

Interviewed November 2014.

Volunteers needed in Schools

Lynn Hartshorn

We have a great opportunity to help teachers in the St. Paul Public Schools. The St. Paul Schools’ Science Supervisor is going to try to match our volunteers with teachers. They need scientists to assist science teachers in classrooms, as tutors, or for extracurricular activities. If you can volunteer for a few hours from time to time (the amount of time is up to you) please let me know, and we will put you in touch with a teacher in the location you prefer.

Woodbury High School has also requested the help of volunteers: (a) as tutors and (b) to help with the Science Olympiad.

Please let Lynn Hartshorn know if you are interested. Email lghartshorn@stthomas.edu

State Science Fair

The Minnesota Academy of Science is in need of additional project judges for the Minnesota State Science and Engineering Fair on Saturday, March 21 at the Double Tree Hotel in Bloomington. Contact information: http://www.mnmas.org/science-engineering-fair/judge

Analytical Chemistry Division of the ACS

Stephen Scypinski

The membership chair of the Analytical Chemistry Division of the American Chemical Society, Stephen Scypinski, is trying to build a committee to build and enhance membership in the division as well as promote services that the division offers. If you are interested in being on or learning more about the division membership committee, contact Stephen Scypinski at Stephen.scypinski@bms.com
Office: 732-227-5972
Cell: 908-698-9109

2015 STEM Scholarship Applications

Tim Barrett

We are currently accepting applications for the Minnesota High Tech Association Foundation (MHTF) Scholarship. The scholarships are for Minnesota undergraduate students in science, technology, engineering and math (STEM) disciplines. These awards include $2,500 and $5,000 awards and can include internship opportunities at MHTA member companies. MHTF supports diversity in this application and award process.

Eligibility requirements:

- Must be pursuing an undergraduate degree in a STEM field or in STEM teaching
- Only students with sophomore through senior academic status in the current school year may apply. Sophomore status may include students who have achieved this status through advanced placement (AP) credit or post-secondary options (PSEO)s
- Applicants must be enrolled at an accredited, Minnesota-based higher education institution.
- In addition to traditional STEM fields, health science majors whose studies will not lead to participation in direct patient care are welcome to apply.
- Scholarships will be awarded in the fall term of 2015 and presented to recipients at MHTA's Tekne Awards in November. Students must be enrolled at time of award.
- **Deadline for application is April 1, 2015.**

The application form and more detailed information are available at our website:
http://www.mhta.org/educate/stem-scholarships/

If you have content for the Minnesota Chemist, please send it to Becky Guza, Editor (becky.guza@hbfuller.com)