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# The Minnesota Chemist

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## May Awards Banquet - Minnehaha Academy

Barbara Barany, Wayne Wolsey, James Wollack

### 2016 Award for Excellence in High School Chemistry Teaching David W. Tweeten

The High School Chemistry Teaching Award is given every three years by the Minnesota Section of the American Chemical Society for outstanding contributions to chemistry education at the high school level.

The 2016 recipient is Dr. David Tweeten, currently of Minnehaha Academy in Minneapolis. Dr. Tweeten is a graduate of Bethel University in St. Paul and received his Ph.D. in physical chemistry from the University of Minnesota, Twin Cities, working with Professor Sandy Lipsky. He began his career as a research chemist, including 13 years with 3M, as well as with the Air Force Research Lab at Tyndall AFB in Florida. He is an inventor on eight U.S. patents and has published papers in the areas of ink jet media, photophysics, photochemistry, and radiation chemistry. Returning to Minnesota, he began his teaching career at Harding High School in St. Paul.

Dr. Tweeten's joy in and knowledge of chemistry are evident to his students who are attracted by carefully planned and executed demonstrations. "Do it again!" is an often heard refrain. Laboratory exercises in his classroom also give students first-hand observation of chemical principles as well as experience in the techniques and methods of chemical experimentation. He has taught physical science and chemistry to a diverse group of 9<sup>th</sup> through 12<sup>th</sup> graders at all levels of background and experience, including college level International Baccalaureate and Advanced Placement chemistry courses. He is quick to share his demonstrations and labs with other high school teachers, many of whom do not have the background to develop them on their own. While at Harding, Tweeten designed and began teaching a course in forensic science. Some of the students in his course were able to engage with science for the first time, despite being juniors or seniors in high school.

A leader in extracurricular science, at Harding he established a Friday afternoon science club, which drew students interested in fun, research experience or both. Dr. Tweeten remarkably mentored Harding students in five different projects that qualified for the International Science and Engineering Fair (2007, 2013 and 2014). Dr. Tweeten also coached Science Bowl and Science Olympiad teams to successful outcomes in district-wide competition.

Always the curious investigator, Tweeten consistently takes note of new developments in chemistry and relates them to high school curricula. For this and for his teaching and mentoring of students in and out of the classroom, he is the valued recipient of the 2016 High School Chemistry Teaching Award.

## **2016 MN ACS Lyle Hall Senior Chemist Award**

### **Todd R. Williams**

Dr. Todd Williams has been chosen as the 2016 recipient of the Lyle Hall Senior Chemist Award of the Minnesota Section of the American Chemical Society. Lyle Hall was a long-time Faculty member in the Chemistry Department of the University of Wisconsin—River Falls, as well as an active member of the MN ACS Section. For over 20 years, he served as Co-Chair of the Senior Chemists committee and was active in selecting retired chemists for this honor; a criterion for the award being active professionally and/or volunteer involvement since formal retirement.

Todd Williams received his B.A. in Chemistry from Cornell University in 1967, followed by his Ph.D. in Organic Chemistry at the University of California, Los Angeles in 1971, under Nobel Laureate Professor Donald Cram. Following a post-doctoral period at Syntex, he joined the 3M Company in 1972.

At 3M, he was associated with the Biosciences Research Laboratory, the TelComm Products Div., the Live Sciences Sector Research Lab, the Microreplication Technology Center, and after a sabbatical with the Commercial Graphics Division, he spent the last 8 years as a Staff Scientist with the Microreplication Technology Center and Graphics Business Lab, retiring in 2006. He had a most productive scientific career, publishing 3 papers with Professor Cram, two papers on prostaglandins, others on silicon-acrylate copolymers and UV-cured microstructure composites. A testimony to his versatility is his record of 31 patents ranging from Prostaglandin analogs to Scratch resistant optical films and Thermoplastic lenses, to High refractive pressure sensitive adhesives to Surface modified nanoparticles. He has been an ACS member and a member of the Society of Plastic Engineers.

Since retirement he has been involved in several MN ACS outreach activities. He has been a member of the MN ACS Special Awards project judging team at the MN State Science Fair for about 8 years, occasionally also serving as a judge for oral paper presentations. He was a leader of the 2009 Special Awards team in deciding to do something about the noticeable lack of proper usage of statistics in Science Fair projects. A letter was composed which got the attention of the Directors of the State Science Fair, the MN Department of Education, and the national ACS Committee on Education (SOCED). A statistics session began to be offered at subsequent science fairs. The very active ACS Chemists in the Library group has included Todd among its volunteers. He is also part of the team of retirees which has reactivated the MN Section participation with the Chemistry Olympiad program.

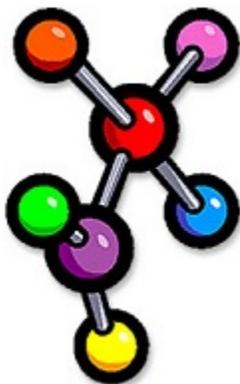
Todd has also been active with STEM mentorship of students through MentorNet and consulting via YourEncore. A hobby of woodturning has turned into a small business and active membership in the America Association of Woodturners and the Minnesota affiliate. A search for *Todd Williams woodturner* will permit one to view and order his pieces online. Additional volunteering finds him helping out with his church and Solid Ground, a White Bear Lake transitional housing group. In view of Todd Williams' retirement professional and science-related activities, it is most appropriate that he receive the 2016 Lyle Hall Senior Chemist Award.

## **2016 Janet Tarino Volunteer Award**

### **Becky Guza**

Becky Guza has been a key volunteer in the local section. She began her volunteer work as a *Minnesota Chemist* editor. As editor she successfully transitioned the newsletter from a paper edition to an electronic edition. This not only saved the section over \$10,000 a year in printing and mailing fees but also allowed the section to publish the newsletter on a bimonthly rather

than quarterly basis. In addition to continuing to edit the *Minnesota Chemist*, she became the communications chair in 2013 and served a term as local section chair in 2014. In 2015, she served as interim webmaster to oversee final conversion to a new section website. In addition she helped plan the inaugural MN ACS mommy chemist event, revived ACS leadership seminars in the section, and has been a key partner in the annual career fair. For this tremendous amount of service and dedication to the section Becky Guza is the 2016 Janet Torino Volunteer Award winner.



## Life Size Kid's Chemistry - September 10th

Arianna (Kooyman) Ahl

An event specially put on for parents who are also chemists to share their love of chemistry with their children while networking with other moms, dads, and professionals in chemistry!

Enjoy a larger than life sized afternoon with your children, grandchildren, nieces and nephews, cousins, or any other children in your life. The event will open with a **growing** chemistry demo sure to engross the audience, followed by many fun and safe demos and activities your children can do on their own or with some help. There will be kids as atoms, **BIG SCALE MOLECULAR MODELS**, magic sand, polymerization, **color changing milk**, a pool of **obleck**, and **much more!** For the break, liquid nitrogen ice cream will be made and used to test the kids' knowledge of what they have learned. The event will close with a raffle for science related prizes and one last HUGE activity.

### When:

Saturday, September 10th, 2016

1:00 – 1:10 pm: Opening demo

1:10 – 1:40 pm: Kids activities and demos

1:40 – 2:00 pm: Liquid nitrogen ice cream

2:00 – 2:30 pm: Kids activities and demos

2:30 – 3:00 pm: Closing demo and raffle

### Where:

Mendakota Park Picnic Shelter

2171 Dodd Road

Mendota Heights, MN 55120

### Cost: Free

**RSVP:** Please email Arianna Ahl at [amkooyman@gmail.com](mailto:amkooyman@gmail.com) with the number of adults and children attending and with any questions by September 7<sup>th</sup>. Volunteers are needed and welcome!

Science, sweets, and prizes put on by the local MN ACS and made possible through the Young Chemists and Innovative Project Grant.



## Upcoming Chemists-in-the-Library Events

Philippe Buhlmann

July 30 at 1:30 PM – Rice Street Library

August 27 at 1:30 PM – Golden Valley Library

September 17 at 1:30 PM – North Regional

October 5 at 5:00 PM Franklin Ave



## ACS Senior Chemists' Group

Lynn Hartshorn

The Senior Chemists' group held its last lunch of the spring session on May 18th. Dr Smarajit (Sam) Mitra gave a very interesting short talk about the work of Gilbert Lewis on the covalent bond. Lynn Hartshorn passed around a survey to solicit the group's ideas about future meetings. Members of the group stated that they enjoy the Senior Chemists' lunch meetings, and want the group to continue. There was a suggestion that we could do tours from time to time. Anyone who has a suggestion for a tour, or a speaker or other idea for future lunches please contact Lynn at [Lghartshorn@stthomas.edu](mailto:Lghartshorn@stthomas.edu) with your suggestion.

The next lunch meeting will be in September. Details will be announced by email (so if you change your email please let us, and ACS National, know otherwise you will not hear from us) and also on the MNACS new website: [www.mnacs.sites.acs.org](http://www.mnacs.sites.acs.org)



## What Does the Committee on Nomenclature, Terminology and Symbols (NTS) Actually Do?

Wayne Wolsey

*Wayne C. Wolsey is a Professor Emeritus, of Macalester College in St Paul, Minnesota and a Councilor for the Minnesota Section. Dr Wolsey is an ACS Fellow. He is an Associate Member of the Committee on Nomenclature, Terminology, and Symbols, and discusses some of the work that this committee does, including a possible new definition of the mole and the kilogram.*

This article describes the operation and scope of the NTS committee, and that of similar groups in other countries that work together to set standards used worldwide. It also discusses proposed new definitions of the mole and the kilogram.

The ACS has long had a committee dealing with nomenclature, establishing a committee on Nomenclature and Notation in 1886, just 10 years after ACS was founded. In 1911, the committee's scope was modified to Nomenclature, Spelling, and Pronunciation. Further changes led to the current NTS title. There has been a continuing relationship with Chemical Abstracts.

The responsibilities of the NTS Committee include (1) advising the ACS Council on such matters as usage of nomenclature, terminology, symbols and units; (2) coordination of such activities within the ACS; (3) consulting with and advising editors of ACS publications; (4) initiating, reviewing and recommending adoption of proposed documents, as appropriate; (5) establishment and continuation of liaison with other national and international organizations, committees and commissions with similar concerns; and (6) provision of a means for ACS members to participate in the consideration of these matters.

This broad charge involves a committee of 18 members, 7 associates, 2 consultants, and 26 "friends of the committee." Committee meetings are held at each ACS national meeting. Four subcommittees deal with Long-Range Planning, Communication and Outreach, Education and Liaison. The committee membership includes persons of all professional and educational levels from government, academia and industry. There are experts in various fields of nomenclature, terminology, symbols and units. We are currently establishing liaison relationships with several other ACS Committees and Divisions.

In addition, members of our committee either serve on or are in liaison with committees of the International Union of Pure and Applied Chemistry (IUPAC), the world authority on chemical nomenclature, standardized methods for measurement, atomic weights and related matters. IUPAC was founded in 1919, in the era of international harmony that existed after World War I. A need for agreements on organic nomenclature was the impetus for international meetings in Geneva (1892) and one as early as 1860 led by August Kekule. The official body representing

the U.S. is the National Research Council of the Academy of Sciences, via its National Committee for IUPAC, which in turn seeks input from organizations such as the American Chemical Society and the National Institute of Standards and technology (NIST).

An NTS member was responsible for the writing and final editing of the 1,600 page Nomenclature of Organic Chemistry, IUPAC Recommendations and Preferred Names 2013, the new edition of the IUPAC Blue Book (a twenty year project). Projects are underway in other areas, including polymers, nanomaterials, flavonoids, enzymes, carbohydrates, and small molecules of biological interest. The Committee is interested in, and has representatives report on developments in SI (International System of Units), names for new elements, and metrology in chemistry and biology.

A controversial current topic, which has engendered considerable discussion, inside and outside the Committee, is one from the Consultative Committee on Amount of Substance—Metrology in Chemistry and Biology (CCQM), a part of the International Bureau of Weights and Measures (BIPM). This issue involves proposed redefinitions of the Mole and the Kilogram. There is a strong desire for many scientists connected with metrology to have all units defined in terms of a reference measurable physical constant such as the speed of light, rather than comparison with physical objects. The majority of readers will undoubtedly recall that for mass, there is a standard kilogram made of platinum and iridium at NIST (formerly the Bureau of Standards), a copy of the original International Prototype of the Kilogram (IPK) in Paris. A problem with these “standard kilogram masses” is that there appear to be mass changes, on the order of micrograms (ca. 50  $\mu\text{g}/100$  yr) thought to be due to atmospheric contamination or losses due to periodic “cleaning.” The CCQM and BIPM are recommending that the kilogram be redefined relative to Planck’s constant. One can obtain a value for the kilogram via an instrument (a watt-balance) that determines the velocity of a mass moving under the influence of gravity—both mechanical and electrical measurements [M. Stock, “Watt Balance Experiments for the Determination of Planck’s Constant and the Definition of the Kilogram”, *Metrologia* (2013), 50(1), R1-R16]. NIST, under the current leadership of Dr. Willie May, is at the forefront of watt balance development.

Similarly, the international committee is proposing that the mole (actually they prefer to talk about “amount of substance”) be defined in terms of the Avogadro “constant” instead of the present “amount of a species having the same number of units as atoms within 12.0000. g of carbon-12.”

The Committee has cosponsored symposia on various aspects of these issues at national ACS meetings since 2010. Articles have also appeared in *Chemical and Engineering News* [P.F. Rusch, “Redefining the Kilogram and Mole”, *C&EN*, (2011), 89(22), 58, May 11] and the *Journal of Chemical Education* [R.S. Davis, “What is a Kilogram in the Revised International System of Units (SI)?” *J. Chem. Educ.*, (2015), In Press].

Thus, it can be seen that the NTS Committee deals with items of interest not only for specialists but also items that are of interest to the greater chemistry community. Senior chemists can make contributions to all ACS committees. Anyone is invited to become a friend of the committee and/or attend, participate, volunteer, etc. at any of our sessions. Meetings are held on Monday afternoons at National ACS Meetings. Visitors are allowed at the Chair’s discretion. For further details, contact [wolsey@Macalester.edu](mailto:wolsey@Macalester.edu).

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If you have content for The Minnesota Chemist, please send it to Becky Guza, Editor ([becky.guza@hbfuller.com](mailto:becky.guza@hbfuller.com))

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