

The Chemical Bulletin

<http://chicagoacs.org>

MAY • 2015

**THE ONE HUNDRED AND FOURTH PRESENTATION OF THE
WILLARD GIBBS MEDAL
(Founded by William A. Converse)
to
PROFESSOR JOHN F. HARTWIG
sponsored by the
CHICAGO SECTION
of the
AMERICAN CHEMICAL SOCIETY
FRIDAY, MAY 15, 2015**

LaMirage
3223 West Algonquin Road
Rolling Meadows, IL 60008

Directions to LaMirage on page 2.

RECEPTION 6:00 P.M.
Hors-d'oeuvres
2 complimentary drinks

DINNER 7:00 P.M.
Dinner reservations are required and can be obtained at our website (www.chicagoacs.org) or call the Chicago Section office at 847-391-9091 by Friday, May 8 and pay \$50 at the door. No refunds will be made after noon on

Friday, May 8, 2015. Please note the early date for responses. PLEASE HONOR YOUR RESERVATIONS. The Section must pay for all food orders. No shows will be billed.

AWARD CEREMONY 8:30 P.M.
Introduction of the Medalist
Dr. Tobin Marks
Professor of Chemistry,
Northwestern University

Presentation of the Medal
Dr. Diane Grob Schmidt
President, American Chemical Society



Professor John F. Hartwig, Henry Rapoport Professor of Chemistry, University of California, Berkeley

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The mission of the Chicago Section of the ACS is to encourage the advancement of chemical sciences and their practitioners.

The Citation:

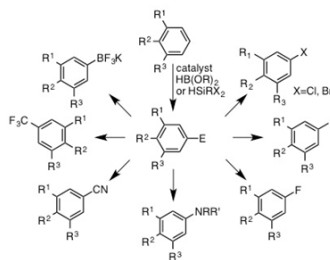
For ground-breaking advances in organometallic and synthetic organic chemistry related to transition metal-catalyzed construction of carbon-carbon and carbon-heteroatom linkages.

For achievements in synthesis, characterization, and mechanistic studies of novel reactive organometallic complexes, and development of new practical catalytic synthetic methods.

ABSTRACT: From Prozac to perfume, sustainable plastics to solar energy, catalysis enables our current standard of living and controls our potential to progress sustainably. The reduced emissions of modern cars, the abundance of fresh food at our stores, the beginnings of green energy, and the new pharmaceuticals we use to treat disease are made possible by chemical reactions controlled by catalysts. But how well can we design a new catalyst or a needed catalytic reaction? If we could design fundamentally new catalytic reactions, then new approaches to the synthesis of organic molecules could be realized. The design of such catalysts and catalytic reactions is widely viewed as a grand challenge of synthetic chemistry.

Research in my group has sought to design catalysts that create an approach to chemical synthesis by conducting reactions at typically inert portions of organic molecules. Organic molecules contain clusters of atoms called "functional groups" where most chemical reactions occur. The sections of the molecules containing carbon-hydrogen (C-H) bonds are typically considered inert. We have discovered catalysts that create new chemical reactions that occur at these typically inert C-H bonds and, thereby, create new strategies for the construction of organic molecules and new methods to modify the composition of structurally complex organic molecules.

This lecture will discuss the principles by which these new catalysts are designed. Examples of important catalysts used today, and examples of catalysts developed through discovery and design in my own research laboratory will be described.

**THE MEDALIST:**

Prof. John F. Hartwig is the Henry Rapoport Professor of Chemistry at the University of California, Berkeley (U.C. Berkeley) where he has taught since August 2011. Before moving to U.C. Berkeley in 2011, he was Professor of Chemistry at Yale University for 14 years (1992-2006), during which he was named the Irénée DuPont Professor of Chemistry from 2004 to 2006. He then was the Kenneth L. Reinhardt Jr. Professor of Chemistry at University of Illinois, Urbana-Champaign for 5 years (2006-2011). He obtained an A.B. from Princeton University in 1986, a Ph.D. from U.C. Berkeley in 1990, and completed a Postdoctoral Scholar from Massachusetts Institute of Technology in 1992. His primary research interests focus on the discovery and understanding of new reactions of organic compounds catalyzed by transition metal complexes. These findings result from a combination of organic synthesis, organometallic synthesis and mechanistic analysis of catalytic systems. He is a member of the National Academy of Sciences in the United States, and has received numerous international awards in recognition of his research, including a Cope Scholar Award, the Award in Organometallic Chemistry, and the H.C. Brown Award for Creative Methods granted by the American Chemical Society, among other International Awards, such as the Nagoya Gold Medal, Janssen Pharmaceutical Prize, and Mukaiyama Award. He has given over 480 invited seminars, including many distinguished lectureships. He also has authored one textbook, and written more than 10 book chapters. He has authored or coauthored over 330 research articles in prestigious high impact journals such as *Science*, *Nature*, *Journal of the American Chemical Society* and *Angewandte Chemie International Edition*, and holds 11 patents. He has served as thesis adviser for 29 graduate students and worked with 105 postdoctoral research associates.

DINNER MENU:

- Cream of Mushroom Soup
- Caesar Salad
- Red and White Wine
- Choice of
 - o Beef Tenderloin Brochette with Wild Mushroom Sauce
 - o Gulf Coast Red Snapper Filet broiled and served with Roasted Red Pepper Sauce
 - o Angel Hair Pasta with Wild Mushrooms and light Parmesan Sauce with Vegetable Medley
- Chocolate Cake

COST

\$ 50 for members and guests
\$ 0 for lecture only

WCC COLUMN**WCC CHICAGO SECTION MIX AND MINGLE
THURSDAY JUNE 18**

Women Chemists Committee Chicago Section will have a Mix and Mingle jointly with Iota Sigma Pi during the social hour at 5:30 PM before the Thursday June 18, 2015 monthly dinner meeting. WCC invites all social hour attendees to join them in a game-show format with chemistry-based questions that will be fun and informative. The meeting will be held at Zhivago's Restaurant, 9925 Gross Point Rd, Skokie. Please make reservations on-line at <http://chicagoacs.org/index.php> or call the Chicago Section office at **847-391-9091**. Cost will be \$30 for dinner. Join us!

MARGY LEVENBERG

DIRECTIONS TO THE MEETING**From Chicago**

Take I-90 west to Highway 53 North. Exit Algonquin Rd., Rt. 62 east and go to LaMirage Restaurant on the right.

From I-294 North/South

Take I-294 north or south to the I-90 junction near O'Hare. Travel west on I-90 and follow the directions above.

From I-290/I-355/Rt. 53

Travel north past I-90 as 355 turns into 53. Exit Algonquin Rd., Rt. 62 east and go to LaMirage Restaurant on the right.

PARKING: Free

WILLARD GIBBS AWARD

The **Willard Gibbs Award**, has been presented by the Chicago Section of the American Chemical Society since 1910. It was founded by William A. Converse (1862-1940), a former Chairman and Secretary of the Chicago Section and named for Professor Josiah Willard Gibbs (1839-1903) of Yale University. Gibbs, whose work with Maxwell and Boltzmann developed the field of Statistical Mechanics and is known to millions of undergraduates for Gibbs Free Energy (developed in 1933), as he solved the question of the maximum amount of work that can be done by a system on the universe during a change in state of the system ($\Delta G_{\text{sys}} = -T\Delta S_{\text{unv}}$) and ultimately the more familiar $\Delta G = \Delta H - T\Delta S$.

The purpose of the award is "To publicly recognize eminent chemists who, through years of application and devotion, have brought to the world developments that enable everyone to live more comfortably and to understand this world better." Gibbs was chosen to be the model for the award as an outstanding example of creativity in scientific investigation. Medalists are selected by a national jury of twelve eminent chemists from different disciplines elected by the Chicago Section ACS Board. The nominee must be a chemist who, because of the preeminence of their work in and contribution to pure or applied chemistry, is deemed worthy of special recognition.

Mr. Converse supported the award personally for a number of years, and then established a fund for it in 1934 that had subsequently been supported by the Dearborn Division of W.R. Grace & Co. Considerable contributions to the award have also been made by J. Fred Wilkes and his wife. The award consists of an eighteen-carat gold medal having, on one side, the bust of J. Willard Gibbs, for whom the medal was named. On the reverse is a laurel wreath and an inscription containing the recipient's name.

Most of the awardees that you see below are familiar to chemists regardless of specialty. This fame may result from later recognition, including, in many cases, the Nobel Prize, or the reason may be that textbooks have permanently associated many of these names with classic reactions or theories.

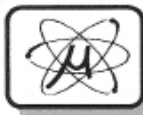
PAUL BRANDT

- 1912 Theodore William Richards
- 1913 Leo H. Baekeland
- 1914 Ira Remsen
- 1915 Arthur Amos Noyes
- 1916 Willis R. Whitney
- 1917 Edward W. Morley
- 1918 William M. Burton
- 1919 William A. Noyes

- 1920 F. G. Cottrell
- 1921 Mme. Marie Curie
- 1922 no award
- 1923 Julius Stieglitz
- 1924 Gilbert N. Lewis
- 1925 Moses Gomberg
- 1926 Sir James Colquhoun Irvine
- 1927 John Jacob Abel
- 1928 William Draper Harkins
- 1929 Claude Silbert Hudson
- 1930 Irving Langmuir
- 1931 Phoebus A. Levene
- 1932 Edward Curtis Franklin
- 1933 Richard Willstätter
- 1934 Harold Clayton Urey
- 1935 Charles August Kraus
- 1936 Roger Adams
- 1937 Herbert Newby McCoy
- 1938 Robert R. Williams
- 1939 Donald Dexter Van Slyke
- 1940 Vladimir Ipatieff
- 1941 Edward A. Doisy
- 1942 Thomas Midgley, Jr.
- 1943 Conrad A. Elvehjem
- 1944 George O. Curme, Jr.
- 1945 Frank C. Whitmore
- 1946 Linus Pauling
- 1947 Wendell M. Stanley
- 1948 Carl F. Cori
- 1949 Peter J. W. Debye
- 1950 Carl S. Marvel
- 1951 William Francis GIAUQUE
- 1952 William C. Rose
- 1953 Joel H. Hildebrand
- 1954 Elmer K. Bolton
- 1955 Farrington Daniels
- 1956 Vincent du Vigneaud
- 1957 W. Albert Noyes, Jr.
- 1958 Willard F. Libby
- 1959 Hermann I. Schlesinger
- 1960 George B. Kistiakowsky
- 1961 Louis Plack Hammett
- 1962 Lars Onsager
- 1963 Paul D. Bartlett
- 1964 Izaak M. Kolthoff
- 1965 Robert S. Mulliken
- 1966 Glenn T. Seaborg
- 1967 Robert Burns Woodward
- 1968 Henry Eyring
- 1969 Gerhard Herzberg
- 1970 Frank H. Westheimer
- 1971 Henry Taube
- 1972 John T. Edsall
- 1973 Paul John Flory

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- 1974 Har Gobind Khorana
- 1975 Herman F. Mark
- 1976 Kenneth S. Pitzer
- 1977 Melvin Calvin
- 1978 W. O. Baker
- 1979 E. Bright Wilson
- 1980 Frank Albert Cotton
- 1981 Bert Lester Vallee
- 1982 Gilbert Stork
- 1983 John D. Roberts
- 1984 Elias J. Corey
- 1985 Donald J. Cram
- 1986 Jack Halpern
- 1987 Allen J. Bard
- 1988 Rudolph A. Marcus
- 1989 Richard B. Bernstein
- 1990 Richard N. Zare
- 1991 Günther Wilke
- 1992 Harry B. Gray
- 1993 Peter B. Dervan
- 1994 M. Frederick Hawthorne
- 1995 Sir John Meurig Thomas
- 1996 Fred Basolo
- 1997 Carl Djerassi
- 1998 Mario J. Molina
- 1999 Lawrence F. Dahl
- 2000 Nicholas Turro
- 2001 Tobin J. Marks
- 2002 Ralph Hirschmann
- 2003 John I. Brauman
- 2004 Ronald Breslow
- 2005 David A. Evans
- 2006 Jacqueline K. Barton
- 2007 Sylvia T. Ceyer
- 2008 Carolyn R. Bertozzi
- 2009 Louis Brus
- 2010 Maurice Brookhart
- 2011 Robert G. Bergman
- 2012 Mark A. Ratner
- 2013 Charles M. Lieber
- 2014 John E. Bercaw



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REPORT OF ACS COUNCIL MEETING DENVER ON MARCH 25, 2015

The following Chicago councilors were present: Charles E. Cannon (Local Section Activities), Kenneth P. Fivizzani (Community Activities), Michael Koehler (alternate) (Chemical Safety), Fran Karen Kravitz (Local Section Activities), Josh W. Kurutz (alternate), Margaret Levenberg, Milt Levenberg (Public Relations and Communications), Avrom Litin (alternate) (Community Activity), Inessa Miller and Susan Shih (Education).

The Council meeting began with a resolution honoring those councilors and staff (Cherlynlavaughn Bradley, Maureen Chen and Rodney N. Hader) who have passed since the last council meeting. The minutes from the Fall 2014 meeting were approved. Alan A. Ehrlich was elected as Vice-Chair of CPC.

The **Committee on Nominations and Elections** (N&E) presented the nominees for 2016 ACS President-Elect: G. Bryan Balazs, Allison A. Campbell, David J. Lohse and Christopher J. Welsh. Each candidate was given three minutes to present their statement. Council voted to accept G. Bryan Balazs of Lawrence Livermore National Laboratory and Allison A. Campbell of Pacific Northwest National Laboratory to be placed on the Fall 2015 ballot mailed out to the membership as candidates for 2016 President-Elect along with any petition candidates.

N&E announced the results of the election to select candidates from the list of nominees to serve as Director from District I and District V on the Board of Directors for the term 2016-2018. The Councilors from these districts selected Thomas R. Gilbert and Laura E. Pence as District I candidates; and John E. Adams and Kenneth P. Fivizzani as District V candidates. Ballots will be distributed on October 2, 2015.

N&E announced the selection of the following candidates for Director-at-Large for the 2016-2018 terms: Willem R. Leenstra, Ingrid Montes, Mary Jo Ondrechen and Thomas W. Smith. The election of two Directors-at-Large from the candidates and any selected via petition will be distributed to the Council on October 2, 2015.

N&E solicited Councilor' input for qualified candidates for President-Elect and/or Directors for future consideration. Suggestions should be sent to nomelect@acs.org.

Reports from officers included the following:

1. Diane Grob Schmidt, President, will invite faculty from PhD granting US institutions to give ACS membership as an award to outstanding students in chemistry. She will match each gift by paying a student's membership from her Presidential funds.
2. Donna Nelson, President-Elect, discussed starting task force on mismatched jobs versus job seekers. Contact her at djnelson@ou.edu if you are interested.
3. Thomas M. Connelly Jr, Executive Director, discussed that both CAS and the ACS Publications Division are showing strong growth.

The **Council Policy Committee** (CPC). Vice Chair Alan Ehrlich reported the long range planning committee will continue the new councilor orientation meeting at future meetings. They still need experienced councilors to help with the mentoring program.

There has been an increase in Councilor reimbursement for both Section and Divisions. The Society will contribute up to \$1400/meeting or \$2800/year with the Local Sections and Divisions responsible for an additional 20%.

CPC has set the divisors which will be used to determine how many Councilors each Local Sections and Divisions is entitled for 2016-2019. Official notification will be sent to all Local Sections and Divisions within two weeks of the Council meeting.

The **Committee on Committee** (ConC), Wayne E. Jones, Jr. reported that eleven new committee chairs were trained in Dallas at the Leadership Conference in January. The 2016 Committee appointments have begun. All Councilors, including new Councilors, are reminded to complete their online committee preference form during the period of March 30 to June 5, 2015 at <http://www.yellowbook.acs.org>. Finally, ConC proposed and Council approved continuance of the Committee on Ethics and the Committee on Science. Continuation on Science will also require Board concurrence.

The **Committee on Budget and Finance** (B&F), Kristen Omberg reported that in 2014, the ACS generated a Net from Operations of \$17.9 million, which was \$4.2 million favorable to the budget. Total expenses were \$499 million, \$0.7 million or 0.1% higher than budget. Expenses ended the year at \$481.1 million, \$3.5 million favorable to the budget. This variance was largely attributable to continued emphasis on expense management across the Society. Despite favorable operating results, the Society's financial position weakened in

2014, with Unrestricted Net Assets declining \$62.3 million, to \$144.7 million at year-end.

The Council voted to set the member dues for 2016 at the fully escalated rate of \$162. This rate is established pursuant to an inflation-adjustment formula in the ACS Constitution and Bylaws.

The **Committee on Education** (SOCED), Diane Krone reported that more than 1900 individuals have joined the American Association of Chemistry Teachers (AACT) which launched last year, 88% of whom are K-12 teachers of chemistry. The Dow Chemical Company was announced as the Sole Founding Partner of AACT with a gift of \$1 million.

The **Committee on Science** (ComSci), Barry Streusand reported that ComSci has collaborated with several ACS committees to develop five public policy statements which were approved by the Board in December 2014. They have led the development of a new draft ACS policy statement on hydraulic fracturing which will be considered by the Board. They are revising the ACS policy statements on energy, climate change and forensic science. They are focusing on the topic of new materials for the Boston meeting. The Board approved a Society nominee for the National Medal of Science based on the recommendation on Grants and Awards and ComSci.

The **Committee on Meetings and Expositions** (M&E) reported on the attendance of the meeting as of Tuesday evening, March 24. There were 7307 attendees, 5141 students, 847 exhibitors, 360 expo only and 285 guests for a total of 13940.

M&E recommended that early member registration fee for 2016 national meeting be \$415, per the National Meeting Long-Range Financial Plan. Following a long discussion, the ACS Council respectfully requested that the Board of Directors the implementation of the increased registration fees until M&E presents additional data at the Boston meeting. M&E has decided to discontinue free distribution of the hard copy of the program book starting in 2016 as part of the continuing ACS sustainability effort and to encourage the use of the mobile app and online program. Those who pre-register may purchase the program book for \$10 and copies will be available at the meeting for \$20.

M&E has changed the 2021 Boston meeting to Atlanta based on cost. The 2026 meeting will be held in Atlanta. M&E has a mobile app for regional meetings.

The **Committee on Divisional Activities** (DAC) voted to fund ten Innovative Project Grants (IPG) totaling \$54,000.

(continued on page 5)

(continued from page 4)

The committee will consider another set of IPG proposals during the Boston meeting in August 2015. The deadline for submissions is July 1, 2015.

The **Committee on Local Section Activities** (LSAC) awarded 15 Innovative Project Grants for a total of \$38,389 and is continuing to offer mini-grants to Local Sections that attended the 2015 Leadership Institute to partner with neighboring sections to host an activity that would bring value to all members in a specific region. LSAC will fund 16 grants totaling \$4000 for Bridging the Gap: Teachers of Chemistry K-12 Nano-Grants. The following local sections celebrated: 50 years – Southern IL; 75 years – Western Maryland; and 100 years – Ames and Virginia.

The **Committee on Membership Affairs** (MAC) approved a recommendation from staff to ask individuals who have been receiving 50% graduate student discount for four years or more if they are still a graduate student so they can receive the correct dues. Currently there is no mechanism to change their status except for the student contacting ACS member services.

The **Committee on Economic and Professional Affairs** (CEPA) reported the 2014 New Graduate Survey Results show that the unemployment rate for new graduate chemists has dropped from 14.9% in the 2013 survey to 12.4% as of 2014. The drop is due to more new bachelor's degree chemists finding employment. ACS members experienced three successive years of lower unemployment. Salaries remain stagnant. The ACS Career Navigator is growing with over 10,000 interactions. CEPA approved of two new career consultants which makes a total of 70 career consultants.

The ACS Career Fair had 715 seekers, 27 employers, 85 positions, and 10 booths. The Virtual Career Fair had 918 seekers, 6 employers, and 38 positions. There were 368 resume reviews, 218 mock interviews and 23 Career Pathway workshops conducted during the meeting.

The **Committee on Constitution and Bylaws** (C&B) certified 23 bylaws in 2014. This was the second largest number certified in any year. The committee has already certified an additional 6 bylaws in 2015. The committee reviewed bylaws for 10 local sections and 5 divisions since fall of 2014. There are two new petitions for the Boston meeting. New petitions must be received by the Executive Director no later than April 29 to be included in the Council Agenda for consideration at the fall meeting in Boston. Contact C&B at bylaws@acs.org

The **Women Chemists Committee** (WCC) celebrated 10 early to mid-career women chemists as recipients of the 4th Annual WCC Rising Star Awards, and

eight WCC/Eli Lilly Travel Grant award-recipients. WCC is collaborating with Merck to develop a new Research Award that will fund 8 women graduate students to present their research at the fall national meeting in Boston. WCC has been involved as contributing authors and editors for the second more diverse and inclusive edition of "Mom, the Chemistry Professor" being published by Springer.

Professional Training (CPT) reviewed 39 periodic reports from currently approved programs and held conferences with two departments beginning the process of applying for ACS approval. CPT reviewed four site visits reports and approved three new programs. There are 681 colleges and universities offering ACS approved bachelor's degree programs in chemistry. The new 2015 ACS Guidelines for Bachelor's Degree Programs were approved and recently published on the ACS website.

International Activities (IAC) are 1) building international Network of YCC; 2) providing support to countries; 3) increasing awareness of chemistry in the world; 4) continue to help with scientific mobility issues; 5) supporting student exchanges and programs and 6) interacting and collaborating with sister societies. The committee reviewed and approved annual reports from ACS International Chemical Sciences Chapters in Hong Kong, Hungary, Malaysia, Romania, Saudi Arabia, and Shanghai. The committee reviewed and approved new chapter applications initiated by members in Brazil, Nigeria, Peru and the United Arab Emirates.

The Council approved petitions to charter the India International Chemical Sciences Chapter and the Taiwan International Chemical Sciences Chapter.

Environmental Improvement (CEI) awarded Local Section Sustainability Grants to three local Sections: Cornell, Kalamazoo, and Midland. The committee cosponsored with the Division of Chemical Education the symposium featuring the winners of the ACS-CEI Award for Incorporation of Sustainability into Chemical Education. CEI and the Division of Environmental Chemistry established a project to provide grant support for programming around climate change at regional meetings. CEI approved recommendations to establish new public policy statements on Hydraulic Fracturing and on Water Treatment and Conservation.

Chemistry and Public Affairs (CCPA) highlighted the power of ACS member engagement in government affairs by relating the bipartisan effort, despite partisan roadblocks, to secure a resolution for National Chemistry Week in the US Senate by Senator Chris Coons, a

Democrat from Delaware and Republican Senator Pat Toomey of Pennsylvania. ACS members in Pennsylvania ensured that the resolution had bipartisan sponsorship.

Senior Chemists Committee (SCC) is concerned about employment of senior chemists who are retired. 1) Retired chemists can consult for their previous employers. Many employers have reduced their staff to the extent that they have lost essential knowledge about their business. By using retired employees as consultants they can regain this expertise at reduced cost while the chemists have gainful income; 2) Small companies need expertise they don't have and are willing to hire retired chemists at reasonable costs to gain the needed expertise; 3) Local Sections might develop a registry of retired chemists which would contain their expertise profiles and could be accessed by local industry to provide senior chemists employment as consultants or part time workers.

There are 25 local section Senior Chemists Committees, including Chicago. There are two new ChemLuminary Awards being presented by SCC in 2015: 1) Most Innovative Activity in a Local Section by Senior Chemists and 2) Best Ongoing Senior Activity in a Local Section that Benefits the Community, Local Schools or Legislative Government.

Please direct any questions and/or comments about this report to one of the Sections' Councilors or Alternate Councilors.

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For more information, call
the Section office
(847) 391-9091
or email at
chicagoacs@ameritech.net

ARTICLES NEEDED

The *Senior Chemists Newsletter* is soliciting articles from senior chemists. The articles may be about chemistry or other science, topical subjects, careers, retirement activities, etc. Articles should be between 500 to 1000 words in length and be in either .doc or .docx format with photos in .pdf or .jpeg format. Please email articles to Cheryl Brown at c_brown@acs.org. The current circulation of the newsletter is 46,283 members.

"CHEM SHORTS" For Kids

A Peep Into the Speed of Light

Kids, did you know that you can calculate the speed of light using common materials in your kitchen? The speed of light is **299,792,458** meters per second, or **670,616,629** miles per hour. According to an entertaining NPR video from Skunk Bear, the speed of light is easy to calculate using Peeps and a microwave oven.

First, what are microwaves? Microwaves are a type of radiation and, like all radiation, microwaves are part of the electromagnetic spectrum. "Microwaves" also are kitchen appliances that heat food by exposing them to microwave radiation.

What you'll need:

- chocolate, egg whites, cheese, marshmallows or something else that will melt easily and unevenly; Peeps are perfect.
- flat-bottomed, microwave-safe oblong cake pan (11 x 8")
- oven mitts
- microwave oven
- ruler
- calculator or basic math skills

Like all waves, microwaves are defined by their frequency and wavelength. How do you determine the frequency of the radiation in your microwave oven? Look at the manufacturer's sticker and the abbreviations MHz or GHz. (The hertz is the unit of measurement for frequency.) A common frequency value is 2,450 MHz, or 2.45 GHz. This means 2,450,000,000 Hz.

How do you determine the wavelengths of the radiation in your microwave?

1. Take a glass oblong cake-baking pan and pack it full of Peeps; different colors are fine.
2. Heat the Peeps pan in the microwave on fairly low heat, without turning. Don't heat it too much—you want it to warm unevenly and to have "hot spots."
3. Take out the plate and measure the distance between hot/goosey areas. Poke the Peeps with toothpicks to find the goosey areas. The average distance between these areas is about half a wavelength.
4. Find the wavelength by multiplying the average distance by two.

In our calculation the average distance between hot spots was about 6.1 centimeters. So, the wavelength was about 12.2 centimeters.

Now multiply the frequency (2,450,000,000) by the wavelength. You should get pretty close to the speed of light in inches per second or centimeters per second.

Use this site to convert inches-per-second to miles-per-hour:

<http://www.kylesconverter.com/speed-or-velocity/inches-per-second-to-miles-per-hour>

Multiply your answer by 0.01 to convert centimeters-per-second to meters-per-second. Using our data:

- $12.2(2,450,000,000) = 29,890,000,000$. That's centimeters-per-second.
- $29,890,000,000(0.01) = 298,900,000$. That's meters-per-second. And this is very close to the constant 299,792,458!

References:

Many thanks to David Czaplewski of Argonne National Laboratory for making us aware of this experiment. <https://www.youtube.com/watch?v=HwREvdUWSKE>
<http://blog.education.nationalgeographic.com/2015/04/15/a-peep-into-the-speed-of-light/>

Submitted by

DR. KATHLEEN CARRADO GREGAR

To view all past "ChemShorts for Kids" go to: http://chicagoacs.org/articles.php?article_category=1

LECTURER POSITION IN CHEMISTRY

The Chemistry Department at the Illinois Institute of Technology (IIT) seeks candidates for a full-time position starting August 2015 (earlier start date is possible and negotiable). Applicants must have a Ph.D. in chemistry. The primary responsibilities include teaching undergraduate level courses especially general chemistry and organic chemistry. Additional responsibilities include oversight and maintenance of chemistry teaching laboratory and associated instruments. The initial appointment will be for one year with possibility of a longer -term renewable contract based on performance and mutual satisfaction. Please visit <http://science.iit.edu/chemistry> for further information. Applicants should send a cover letter, a curriculum vitae, a statement of teaching philosophy including experience with undergraduate lab oversight and instrument maintenance. All applications should be submitted electronically as

a single pdf file to chemistry_search@iit.edu. Applicants should also arrange to have three letters of references submitted electronically to the same e-mail address or as a hard copy to Professor Rong Wang, Department of Chemistry, Illinois Institute of Technology, Chicago IL 60616. Review of applications will begin immediately and will continue until the position is filled. IIT is an equal opportunity/affirmative action employer. Individuals from underrepresented groups in physical sciences are strongly encouraged to apply.

\$600 IPG GRANT AWARDED TO CHICAGO SECTION FOR AACT PUBLICITY EVENT

In the Committee on Local Section Activities at the 2015 ACS Leadership Institute in January, groups of local sections met to plan potential joint activities. The Chicago Section was grouped with contiguous local sections which came up with a joint activity to introduce the new American Association of Chemistry Teachers (AACT), a professional community by, and for, K-12 teachers of chemistry, (<https://www.teachchemistry.org/content/aact/en.html>) to our respective local chemistry teachers.

Shortly after the Leadership Institute, the Chair-Elect of the Indiana LS graciously took the lead and quickly applied for an ACS Innovative Project Grant (IPG) entitled "K-12 Chemistry Teacher Appreciation Luncheon/Intro to AACT" to implement our joint activity. In March, the Local Section Activities Committee (LSAC) approved the IPG proposal in the amount of \$3,000. Funds should be sent within 4-6 weeks and \$600 each will be distributed to the Chicago, Indiana, Cincinnati, Dayton, Indiana-Kentucky Border and St. Joseph Valley (Indiana) Local Sections.

Even before the IPG was approved, representatives from the local sections were meeting by teleconference to exchange ideas about this joint activity. Russ Kohnken of the High School Education Committee has participated in the meetings and has been a major contributor of ideas to the group. We meet next on May 22 to continue planning and to discuss IPG fund use restrictions. Anyone interested in participating, especially high school teachers, are encouraged to contact Russ Kohnken or Mary Jo Boldingh.

MARY JO BOLDINGH

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- ☐ Keeps oil residue from sticking to furniture, walls and floors

Vacuum pump oil mist contaminates the surrounding air, settles on surfaces and you breathe it. Eliminate this problem by installing MV oil mist eliminators on your vacuum pumps. It will save you time and money.

The high-capacity oil mist eliminator is made of stainless steel and is designed for large vacuum pumps. It measures only 10" dia. x 13.5" high. The coalescing filter elements remove oil mist at 0.1 micron with an efficiency of 99.999%.

The MV Visi-Mist eliminates oil mist and is designed for smaller vacuum pumps. Contact MV Products for the oil mist eliminators best suited for your requirements. They install in minutes and require little maintenance.

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CALENDAR

May 2: Marie S. Curie Girl Scout Chemistry Day – College of Lake County, Grayslake.

May 15: Chicago Section ACS Willard Gibbs Award Banquet. Dr. John Hartwig, University of California, Berkeley, is the recipient of the 2015 Willard Gibbs medal. **See details in this issue.**

May 16: \$tart \$mart at Loyola University for women chemists. <http://chicagoacs.org/meetinginfo.php?id=89&ts=1424731030>.

May 23: Chicago Section Scholarship Exam at North Central College.

May 27-30: Great Lakes Regional Meeting in Grand Rapids, MI. The theme is "Chemistry: A Grand Enterprise". For further details see <http://www.jglcrm2015.com>

June 14-16: The 19th Annual Green Chemistry & Engineering Conference (GC&E), Bethesda, MD. The theme is "Catalyzing Innovation – Smarter Research, Greener Design, Better World". For details, visit <http://www.gcande.org/>

June 18: A Women Chemists Committee (WCC) Mix and Mingle event with Iota Sigma Pi. **See details in this issue.**

August 14-23: The Illinois State Fair in Springfield. Come volunteer at the ACS booth. <http://chicagoacs.net/statefair/index.html>

August 16-20: The 250th National ACS Meeting in Boston. The theme will be "Innovation from Discovery to Application." See details at <http://www.acs.org/content/acs/en/meetings/fall-2015.html>

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