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NESACS

THE NUCLEUS

December 2009 *Vol. LXXXVIII, No. 4*

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Report from NERM 2009

Morton Z. Hoffman,
Boston University [hoffman@bu.edu]
NESACS Representative to the Board of Directors, Northeast Region of the ACS, Inc.

The 36th Northeast Regional Meeting (NERM) was held on Wednesday-Saturday, October 7-10, 2009, in Hartford, Connecticut, at the Hilton Hotel. Julianne Smist (Springfield College), served as its General Chair. Tyson Miller (University of Connecticut) and Edward Fitzgerald (Trinity College) served as Program Co-Chairs. About 380 oral and poster papers across a wide range of the chemical sciences, including nanotechnology, environmental and green chemistry, medicinal and biochemistry, and chemical education, were presented for more than 500 registrants that included graduate and undergraduate students. A full day of workshops for high-school teachers took place on Saturday at the Connecticut Science Center. In addition, the meeting exhibition featured 12 vendors.

Acknowledgement and thanks were given to NESACS in the program book and on the meeting website <http://membership.acs.org/n/nerm/> for its financial support of the symposium, "Persistent Organics in the Environment – Sources, Levels, Transport, and Fate," organized by Melita Lihzis and Gary Hunt (TRC Environmental, Lowell, MA).

The official opening reception for all attendees and guests took place on Wednesday evening at the Science Center after a reception sponsored by the Connecticut Valley Local Section, the host of NERM 2009. District I Director Anne O'Brien and Director-at-Large (and candidate for re-election) Valerie Kuck sponsored a lunch for attendees at which issues of ACS governance were discussed. The candidates for the District I Director position, Richard Cobb (Rochester Local Section) and Neil Jespersen (New York Local Section), were featured at an ice cream social. The following Northeast Region awards were presented at the banquet on Friday evening: the ACS Division of Chemical Education Award for Excellence in High School Teaching to Diana Simpson (Seton Catholic Central High School, Binghamton, NY); the E. Ann

Winners of Northeast Region Awards: (l-r) Steven Suib (University of Connecticut), Achievements in the Chemical Sciences; Diana Simpson (Seton Catholic Central High School, Binghamton, NY), Excellence in High School Teaching; Willem Leenstra (University of Vermont), Volunteer Service to the ACS.
Photo by Morton Z. Hoffman

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The Northeastern Section of the American Chemical Society, Inc.

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1-800-227-5558

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Cover: *A photo taken at the Tenth Connections to Chemistry event held by NESACS on October 14, 2009 at Burlington High School. (L-R): Patrick Gordon (NESACS Chair-Elect), Bruce Bursten (Immediate Past-President, American Chemical Society), Ruth Tanner (Chair, NESACS Education Committee), Steve Lantos (Chair, NESACS High School Education Sub-Committee). Photo by Morton Z. Hoffman.*

Deadlines: *February 2010 Issue: December 9, 2009*
March 2010 Issue: January 12, 2010

THE NUCLEUS

The Nucleus is published monthly, except June and August, by the Northeastern Section of the American Chemical Society, Inc. Forms close for advertising on the 1st of the month of the preceding issue. Text must be received by the editor six weeks before the date of issue.

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Chemistry Crusaders

by Stefan G. Koenig, Ph.D.

Catholic educational institutions in the U.S. have a storied history in athletics, as well as in academics, dating back to 1789. Holy Cross, the oldest Catholic college in New England (1843), sits in a hilltop setting in the city of Worcester, Massachusetts (www.holycross.edu). The school is focused exclusively on a broad liberal arts undergraduate education with 2700 students on campus pursuing bachelor's level degrees. Its chemistry department is American Chemical Society-certified, and regularly produces a steady stream of well-trained undergraduates, typically more than twenty per year. Motivated by Jesuit traditions that emphasize open inquiry, a sense of purpose, and service to others, Holy Cross has made a major impact on science, locally and beyond.

On campus, Holy Cross students participate in a two-decade-old Discovery Program, four semesters of chemistry that introduce material and laboratory work to students via a "guided inquiry approach." New facilities on campus include a 40,000 square foot chemistry building as well as a renovated 100,000 square foot "integrated science complex," which is due to open in January, 2010. According to Rick Herrick, Ph.D., chemistry professor and science coordinator, the $65 million complex "will benefit all science departments." Herrick also guides the Clavius program of National Science Foundation (NSF) S-STEM grant-supported scholarships that enable students to "focus on their studies and become involved in research. This will help them pursue careers in science after they leave Holy Cross."

Ken Mills, Ph.D., an associate professor and co-chair of the biochemistry concentration, has been at Holy Cross for 9 years. His laboratory research focuses on protein splicing and his undergraduate co-workers each work on their own independent research projects. The goal of this arrangement, funded by a five-year grant from the NSF, is to facilitate independent scientific thought. Mills believes that if students can "learn to analyze and interpret data…and dig into the scientific literature, they can learn to be nimble thinkers," better preparing them for their careers.

In the area of community engagement, Holy Cross has collaborated with the Worcester Public School system since 1988. In the summer of 2009, Holy Cross invited 19 Worcester middle-school teachers to the College Street campus to engage with Herrick and mathematics professor Sharon Frechette, Ph.D., on the interface of chemistry and math. This second of three annual workshops was made possible by a $150,000 grant from the Massachusetts Department of Higher Education. The grants mission is to help teachers improve students' quantitative skills as they relate to science. The program is designed to positively influence students' classroom experiences and encourage them to pursue

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Monthly Meeting

The 901st Meeting of the Northeastern Section of the American Chemical Society

Joint Meeting: Northeastern Section ACS and Medicinal Chemistry Group

Symposium

Recent Developments in RNAi Therapeutics

Thursday - December 10th, 2009

Marriott Hotel, One Burlington Mall Road, Burlington, MA

3:00 pm Refreshments

3:15 pm Welcome
Raj (SB) Rajur, Program Chair, CreaGen Biosciences, Woburn, MA

3:20 pm Introductory Remarks
Norton P. Peet, Director of Chemistry, Microbiotix, Worcester, MA

3:30-5:45 Lectures

Confirmed Speakers:

Dr. Sudhir Agrawal, Idera Pharmaceuticals
Synthetic DNA- and RNA-based therapeutic agents: Paying tolls through TLRs

Dr. Muthiah Manoharan, Alnylam Pharmaceuticals
Chemical Strategies for Harnessing RNAi

Invited speakers:

Dr. Michael Czech, University of Massachusetts Medical School

Dr. Bob D. Brown, Dicerna Pharmaceuticals

5:45 pm Social Hour

6:30 pm Dinner

7:45 pm Lecture: TBD

Dinner reservations should be made no later than noon, Wednesday, December 3rd, 2009. Please contact Marilou Cashman at (800) 872-2054 or (508) 653-6329 or e-mail at MCash0953(at)aol.com. Reservations not cancelled at least 24 hours in advance must be paid. Members, $30; Non-members, $35; Retirees, $20; Students, $10.

Directions to the Burlington Marriott

Please use MapQuest to reach the hotel: the Marriott Hotel is located at One Burlington Mall Road, Burlington, MA

Driving Directions from Boston and I-95 South: Take I-93 North to Exit 37B to I-95 South. Take Exit 33B (Burlington) straight through the lights. Hotel is on the left.

Driving Directions from points South and West: Take I-95 North to Exit 33B. Left onto Mall Rd. Hotel is on left.

THE PUBLIC IS INVITED

Biographies

Confirmed Speakers (11/2/09):

Sudhir Agrawal, D. Phil.
President, Chief Executive Officer and Chief Scientific Officer, Idera Pharmaceuticals

Synthetic DNAs and RNAs are being used as therapeutic agents based on various mechanisms of action, including antisense, siRNA, aptamer, ribozyme, decoy, and as agonists and antagonists of TLRs. Nucleotide base compositions and chemical modifications of DNA and RNA are key parameters for desired mechanism of action. Nucleic acid-based compounds are commonly taken up by cells by endocytosis and internalized in endosomal compartments. In Endosomal compartments four Toll-like receptor (TLR) 3, 7, 8, and 9 are expressed that recognize pathogen associated nucleic acid molecular patterns and induce immune responses. TLR3 recognizes viral and synthetic double-stranded RNAs, TLR7 and 8 recognize viral and synthetic single-stranded RNAs, and TLR9 recognizes bacterial, viral and synthetic DNA containing unmethylated CpG dinucleotide motifs. Based on our work on first and second generation antisense and insights gained, we have identified novel DNA-based compounds that act as agonists of TLR9 and RNA-based compounds that act as agonists of TLR7, TLR8 and dual TLR7 and 8. We have also identified novel DNA-based compounds that act as antagonists of TLR7 and TLR9. Agonists of TLR7, 8, and 9 have broad therapeutic applications including for cancer, asthma, allergies, and infectious diseases and as adjuvants with vaccines. Antagonists of TLR7 and 9 have applications for the treatment of autoimmune and inflammatory diseases, including lupus, rheumatoid arthritis, psoriasis, multiple sclerosis, and colitis.

Biography: Since joining Idera Pharmaceuticals in 1990, Dr. Agrawal has served in various capacities including Vice President of Discovery, Senior Vice President of Discovery, and Act-

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Call for Nominations

The 2010 James Flack Norris Award for Outstanding Achievement in the Teaching of Chemistry

Deadline: April 15, 2010

Nominations are invited for the 2010 James Flack Norris Award, which consists of a certificate and an honorarium of $3,000 and is given annually by the Northeastern Section (NESACS). The presentation will take place at a ceremony and dinner in November, 2010, and will include a formal address by the awardee. The Award was established in 1950 by NESACS to honor the memory of James Flack Norris (1871-1940), a professor of chemistry at Simmons College and M.I.T., chair of NESACS in 1904, and ACS President in 1925-26.

Nominees should have served with special distinction as teachers of chemistry at any level: secondary school, college, and/or graduate school. Since the presentation of the first award in 1951, awardees have included many eminent teachers at all levels whose efforts have had a wide-ranging effect on chemical education. The recipient will be selected from an international list of nominees who have served with special distinction as teachers of chemistry with significant achievements.

A nomination in the form of a letter should focus on the candidate's contributions to and effectiveness in teaching chemistry. The nominee's curriculum vitae should be included, as well as, where appropriate, a list of honors, awards, and publications related to chemical education. Supporting letters may also be included; these should show the impact of the nominee's teaching in inspiring colleagues and students toward an active life in the chemical sciences, and attest to the influence of the nominee's other activities in chemical education, such as textbooks, journal articles, or other professional activity at the local, national, and international level.

The nomination materials should consist of the primary nomination letter, supporting letters, and the candidate's curriculum vitae. Reprints or other publications should NOT be included. The material should not exceed thirty pages, and should be submitted electronically in Adobe PDF format by April 15, 2010 to Ms. Marilou Cashman, NESACS Administrative Secretary <mcash0953@aol.com>. For more information about the Award, see <http://www.nesacs.org/awards_norris.html>.

Questions about the award or the nomination process should be directed to the Chair of the Norris Award Committee, Prof. Mary Shultz, Tufts University <mary.shultz@tufts.edu>. ◇

Call for Nominations

Philip L. Levins Memorial Prize

Deadline: March 1, 2010

Nominations for the Philip L. Levins Memorial Prize for outstanding performance by a graduate student on the way to a career in chemical science should be sent to the Administrative Secretary of NESACS, 23 Cottage St., Natick, MA, 01760, by March 1, 2010.

The graduate student's research should be in the area of organic analytical chemistry and may include areas of organic analytical chemistry such as environmental analysis, biochemical analysis, or polymer analysis.

Nominations may be made by a faculty member, or the student may submit an application. A biographical sketch, transcripts of graduate and undergraduate grades, a description of present research activity and three references must be included. The nomination should be specific concerning the contribution the student has made to the research and publications (if any) with multiple authors.

The award will be presented at the May, 2010 Section Meeting. ◇

Historical Notes

Maria Leipelt Bade 1925—2008

Sadly we report the death of Maria Leipelt Bade on September 5, 2008 in Concord, MA. She was born in 1925 in Hamburg, Germany to Konrad and Katrina Leipelt, and lived under the horrors of the Nazi regime. Beginning in 1938, her family was persecuted as "Jewish Half Breeds." Her grandmother died in the Theresienstadt concentration camp, and after her father died she and her mother were imprisoned. Her mother committed suicide. Her older brother, Hans, was decorated with the Iron Cross for service in Poland and France, but then discharged as a "Half Jew Soldier." He became a student organizer of the White Rose, an underground resistance movement, but was betrayed and executed. Maria was in solitary confinement for a year between 1943-45 and was scheduled to be executed "for treason" on the day she was liberated by Patton's 9th Armored Division. Maria immigrated to the USA in 1946, after working as an interpreter for the US Counter-intelligence Corps and the United Nations Relief and Rehabilitation Administration in 1945-46.

She completed high school in New Jersey and received her B.S. in Physiology in 1951, an M.S. in 1954 from the University of Nebraska, and a Ph.D. degree in Biochemistry from Yale in 1960. Her life's work centered on understanding the properties of chitin and chitosan, and the medical and industrial applications of the purified polymers. She held patents in the US, Europe and Japan on her process for linear chitin.

She was an NIH Postdoctoral Fellow at Harvard and MIT, and served as a Professor in the Biology Department at Boston College from 1967 to 1993. In 1984-85 she was the recipient of a Boston College Faculty Research Fellowship. She served as guest lecturer

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Connections to Chemistry

By Ruth Tanner

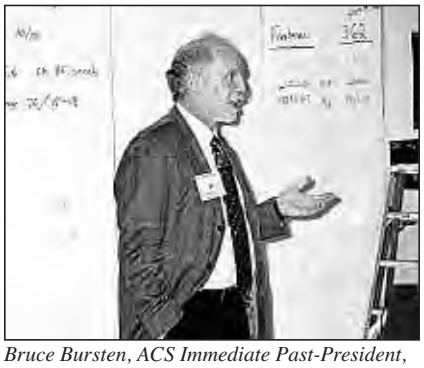
The Tenth Annual *Connections to Chemistry* program took place at Burlington High School (Burlington, MA) on Wednesday, October 14th, 2009. The program is aimed at connecting high school chemistry teachers with the educational resources of the American Chemical Society. Each registrant participated in two of five different workshops which included a pedagogical workshop on Process-Oriented Guided Inquiry Learning (POGIL) by David Cunningham of UMass Lowell and Cheryl Lavoie of Simmons College; a workshop based on the laboratory practical portion of the U.S. National Chemistry Olympiad (USNCO) exam by Steve Lantos, chairperson of the Laboratory Practical Task Force to USNCO, and Matt Fierman of Brookline High School; a National Chemistry Week workshop celebrating the 140th anniversary of Mendeleev's Periodic Table led by Daniel Schmidt and Erick Dunkerley, of the Plastics Engineering and Nanomanufacuring Center at UMass Lowell on nanosheets and the elements that form them; and a workshop on radioactivity by Clayton French, Director of Radiological Sciences at UMass Lowell.

In addition, a workshop was given by Dr. Bruce Bursten, co-author of *Chemistry – The Central Science,* Dean of the College of Arts and Science at the University of Tennessee, Knoxville, and the Immediate Past-President of the American Chemical Society. Dr. Bursten, who was also the keynote speaker for the evening, discussed many aspects of his well-known book, including how authors try to stimulate students critical thinking, which he views as the biggest challenge for students transitioning from high school to college.

Registrants, totaling 110, were from high schools in 4 different states –Massachusetts, New Hampshire, Rhode Island and Maine. The participants were welcomed by Ruth Tanner, *Connections* Program Chair and Chair of the NESACS Education Committee, and by Steve Lantos, Chair of the NESACS High School Education Committee. Following the workshops and dinner, the keynote address was given by Dr. Bruce Bursten entitled *The Central Science Live!* which focused on the central aspect of chemistry in our lives.

His address was followed by our traditional raffle of American Chemical Society items and subscriptions to the *Journal of Chemical Education* (2 of which were donated by the journal) and memberships in CTC (Chemistry Teacher Connection) which includes an online subscription to the J*ournal of Chemical Education* along with membership in the ACS Division of Chemical Education.

All of the participants received a one year's subscription to *ChemMatters*, an award–winning magazine for high school chemistry, published by the ACS. In addition, the Merck Co. generously donated copies of the Fourteenth Edition of the *Merck Index* to the participants, in celebration of National Chemistry Week. ◇



Bruce Bursten, ACS Immediate Past-President, conducting his workshop on "The Central Science Live!"

Bruce Bursten, ACS Immediate Past-President, delivering the keynote address, "The Centrality of Chemistry."

Steve Lantos (Brookline High School), conducting his workshop on "Challenge Your Students."

Cheryl Lavoie (Simmons College), at left, and David Cunningham (University of Massachusetts Lowell) at their workshop on "Using POGIL in the High School Classroom."

Rosemary White, at left, and Susan DeSensi (both from Boston University) leaving with their ***Connections*** *tote bags, certificates of attendance, and copies of the* ***Merck Index.***

Book Review

Flash Chemistry, Jun-ichi Yoshida, ed. (John Wiley & Sons Ltd., 2008)
234 pp., ISBN: 9780470035863, $150.00, (hardcover)

Reviewed by Anthony Belanger; Harvard Medical School,
Department of Radiopharmaceutical Chemistry, Brigham and Women's Hospital, Boston, MA 02115

The scale of chemical reactions can vary enormously, and yet most laboratories seem to be stuck carrying out chemistry in "fist size" reaction vessels. As the author of *Flash Chemistry* points out, what may have seemed the most appropriate scale of chemistry one hundred or so years ago does not necessarily provide the ideal molecular environment for reactions. From a practical standpoint, ever-growing concern for research's environmental impact and laboratory operating costs (solvents costs continue to increase and some are scarcely available) further enhance the appeal of flash chemistry.

Yoshida defines flash chemistry as "a field of chemical synthesis where extremely fast reactions are conducted in a highly controlled manner to produce desired compounds with high selectivity." These techniques typically utilize a "continuous flow system" in which the desired reaction is often carried out within a millisecond time frame. The book's introductory chapters cover these concepts and demonstrate how microflow systems can grant chemists a clearer view of the otherwise masked kinetics of ultrafast reactions.

Chapters five and six, entitled "Methods of Activating Molecules" and "Control of Extremely Fast Reactions," leave the reader with an appreciation for the potential impact of flash chemistry. Here Yoshida discusses the advantages of flash variants of photo, electrochemical, microwave, and chemical activation over traditional non-flash (macrobatch) methods. He then details the major factors impacting the outcomes of these flash reactions, such as mixing, temperature control, and reaction time (also known as residence time). Yoshida takes time to describe the importance of these seemingly simple processes, which all too often are lumped under the category "chemical intuition." This approach provides readers not only with working knowledge for optimization of flash chemical reactions, but also with fresh perspective on the reactions that they have been carrying out their entire lives.

In chapter seven Yoshida offers an overview of the different styles of microfluidics devices and microflow systems typically used in flash chemistry. Accessible even to a non-chemist, this chapter provides insight into beautifully executed solutions to heat-transfer and mixing challenges. After reviewing the theory and engineering behind flash chemistry, Yoshida highlights published work in which flash chemistry triumphs over the challenges that have historically plagued macrobatch reactions. This sentiment continues through a discussion of flash polymer chemistry until Yoshida points out that because long reaction times are required, even at high temperatures, "living-radical polymerization is not a suitable technique for flash chemistry." This antithetical statement sparks curiosity as to why more limitations of flash chemistry are not discussed further. While it is inspirational to learn of flash chemistry's ability to overcome the challenges of traditional macrobatch chemistry, in the interest of experimental time and effort, it is equally valuable to understand its limits and failures. Perhaps a chapter dedicated to this topic would prove useful to chemists looking to employ flash chemistry in their laboratories.

Throughout the book Yoshida offers a large number of black-and-white schemes and diagrams which

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This Month in Chemical History

Harold Goldwhite, California State University, Los Angeles
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Some of my most prized acquisitions of material related to history of chemistry – perhaps because they cost very little – have been obtained at thrift shops and flea markets. In early 2008 I was browsing at a thrift shop in Eugene, Oregon when I came across one of these treasures and snapped it up for a quarter. It is titled "Nuclear Milestones": speeches by Glenn T. Seaborg, Chairman U.S. Atomic Energy Commission 1961-1971. This particular compilation was presented to participants of the 1990 "Instrumentation" Institute for Chemical Education held at the Lawrence Hall of Science and the Department of Chemistry, University of California at Berkeley. My copy (perhaps like all the copies?) is autographed by Seaborg. In this column and the next I will be looking at some of the interesting contents of this paperbound volume. It is generously illustrated with many photographs of historical interest; e.g., the frontispiece shows some of those present at the Atomic Pioneer Award Ceremony in February 1970. The awardees at this unique ceremony were Vannevar Bush, James B. Conant, and General Leslie Groves – certainly among the most important of the U.S. pioneers in support of nuclear research – and the presentation was made in the presence of Seaborg and President Richard M. Nixon, both of whom are in the photograph.

The first section of the book, "307 Gilman Hall …Some Reminiscences" is a talk given in February, 1966 at the dedication of this modest room at UC Berkeley as a National Historic Landmark (long before the ACS began its Historical Chemical Landmark program). The date of this dedication was the 25th anniversary of the discovery of plutonium, not only in Room 307, but in adjacent laboratory spaces. As Seaborg said "a less significant or historical looking room hardly existed on the campus …. The little cubbyhole with its low slanting ceiling directly under Gilman Hall's roof, where we kept our electroscope and various samples, is still an appendage to the room."

Seaborg's story of the discovery of plutonium is attractively personal, and he dates it back to 1936, when he gave a graduate student seminar reporting on the now-famous work of Fermi and Segre in Rome and Hahn and Strassman in Berlin on the radioactivities observed when uranium was bombarded with neutrons. The accepted explanation at the time was the production of new transuranium isotopes. It was not until 1939 that the explanation of the new activities in terms of fission was put forward by Meitner and Frisch. Seaborg became fascinated by this new research and appreciated in 1939 that, in fact, no transuranium isotopes had yet been identified. Other workers at Berkeley were not so sure! McMillan and Abelson observed that some of the radioactivities behaved anomalously, in particular a beta-decay with a half-life of about 2.3 days. In further work they confirmed that they did indeed have in hand an isotope of element 93 and by spring, 1940, they had isolated and discovered the first isotope of a transuranium element, which came to be called neptunium. This followed a tradition of naming some heavy elements after planets, like uranium after Uranus. McMillan began to look for other transuranium elements, and began experiments on bombarding uranium with deuterons in the Berkeley cyclotron, but he was called away to work on radar at M.I.T. and agreed that his close colleague, Seaborg, should continue the search.

Seaborg and Wahl in December 1940 bombarded a target of uranium oxide on a copper plate with fast moving deuterons. They detected a plutonium isotope plus another material that was, significantly, an alpha emitter. They deduced that they had produced

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December Historical Events in Chemistry

by Leopold May, The Catholic University of America, Washington, DC

December 1, 1909
One hundred years ago on this date, the first production of calcium cyanamide in North America was started by American Cyanamid Co.

December 2, 1859
One hundred and fifty years ago, Ludwig Knorr was born. He synthesized heterocyclic compounds.

December 6, 1778
Two hundred years ago Joseph L. Gay-Lussac discovered the law of combining volumes of gases. He was born on this date.

December 7, 1909
One hundred years ago, the patent for the first thermosetting man-made plastic from a reaction of phenol with formaldehyde was granted.

December 9, 1919
William N. Lipscomb, researcher on boranes, was among the first to describe 3-dimensional structure of enzymes and proteins. In 1976 he received the Nobel Prize in Chemistry for his studies on the structure of boranes illuminating problems of chemical bonding. He was born on this date.

December 12, 1866
Alfred Werner, who was born on this date, was a researcher in coordination chemistry. He was awarded the Nobel Prize in Chemistry in 1913 for linkage of atoms in molecules, complex inorganic compounds, stereochemistry, & coordination theory of valency.

December 14, 1909
One hundred years ago, Edward L. Tatum was born on this date. He discovered the genes that regulate certain chemical processes and shared the Nobel Prize in Physiology or Medicine (1958) with George W. Beadle for their discovery that genes act by regulating definite chemical events and with Joshua Lederberg for his discoveries concerning genetic recombination and the organization of the genetic material of bacteria.

December 16, 1809
Two hundred years ago, Antoine F. de Fourcroy died. With Antoine L. Lavoisier and Claude L. Berthollet, he devised chemical nomenclature. He described salts such as calcium chloride and was born on June 15, 1755.

December 17, 1920
Allied Chemical and Dye Corp. incorporated.

December 19, 1813
Thomas Andrews, who discovered that every gas has a critical temperature above which it cannot be liquefied, was born on this date.

December 20, 1890
Fifty years ago, Jaroslav Heyrovsky received the Nobel Prize in Chemistry for his discovery and development of the polarographic methods of analysis. He was born on this date.

December 22, 1884
One hundred and twenty-five years ago, St. Elmo Brady, the first black man to earn a Ph. D. in chemistry, was born on this date. He received his degree in 1916 from the University of Illinois and authored three monographs on Household Chemistry for Girls.

December 24, 1834
One hundred and seventy-five years ago on this date, Augustus G. Vernon-Harcourt invented a standard lamp of 10 candle-power using pentane.

December 26, 1838
Clemens A. Winkler who discovered germanium (Ge, 32) in 1886 and also researched the analyses of gases, and was born on this date.

December 29, 1800
Charles Goodyear, who was born on this date, invented the vulcanization of rubber. It was in the year 1839,

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NERM 2009

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Anne O'Brien, retiring District I Director, flanked by the candidates for her position on the ACS Board: Richard Cobb (Eastman Kodak), at left, and Neil Jespersen (St. John's University).
Photo by Morton Z. Hoffman

Nalley Award for Volunteer Service to the ACS to Willem Leenstra (University of Vermont); the Award for Achievements in the Chemical Sciences to Steven Suib (University of Connecticut).

NERM was also the occasion for the annual meeting of the Board of Directors of the Northeast Region of the ACS, Inc., which includes the following local sections: Binghamton, Central Massachusetts, Connecticut Valley, Cornell, Corning, Eastern New York, Green Mountain, Maine, Mid-Hudson, New Haven, Northeastern, Northern New York, Norwich, Penn-York, Rhode Island, Rochester, Syracuse, Western Connecticut, Western New York. The Board reelected Julianne Smist as Chair and Richard Cobb (Eastman Kodak) as Vice Chair of the Region; Christopher Masi (Westfield State College) and Wayne Jones (Binghamton University) will continue as Secretary and Treasurer, respectively, for another year.

The Board received a final report on NERM 2008 (Burlington, VT) from its General Chair, Willem Leenstra, and an interim report on NERM 2009 from Julianne Smist. The Board also announced the following future NERMs: 37th: Potsdam, NY, June 2-5, 2010 <http://membership.acs.org/n/nny/NERM2010.htm>; 38th: Worcester, MA, June 12-15, 2011; 39th: Rochester, NY, June or October, 2012. Expressions of interest to host NERMs in 2013 or 2014 were made by the New Haven and Binghamton Local Sections. The Board will meet next at NERM 2010. ◇

Dec. Chemistry Events

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by an accident, that he discovered the true process of vulcanization, which cured not the surface alone but the whole mass. He was trying to harden the gum by boiling it with sulphur on his wife's cook stove when he let a lump of it fall on the red-hot iron top. It vulcanized instantly.

December 31, 1921

Gilbert Stork, born on this date, did research in alkylation, acylation, and vinyl ring radical cyclization. He also developed the theory of concerted polyene cyclization.

Additional historical events can be found at Dr. May's website, at http://faculty.cua.edu/may/ChemistryCalendar.htm. ◇

Historical Notes

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and visiting professor at many institutions, including Duke University Medical School, Harvard Medical School, Alexandria University in Egypt, the USMA at West Point, and the University of Western Ontario, and concluded her career as a Visiting Scientist at MIT. Professor Bade was a member of Phi Beta Kappa, the American Chemical Society (50-year member), American Society of Biological Chemists, American Physiological Society, Sigma Xi, Society for Complex Carbohydrates, and a Fellow of the American Institute of Chemists.

In 1949 she married Dr.William "Bill" Bade, a theoretical physicist, and in 1958 their son, W. Christopher was born. Bill died in 2005 after a 30-year battle with cryptococcal meningitis. Maria is survived by her son, Christopher, his wife, Faith, and three grandchildren: Ben, Elaina and Katherine. Maria Bade was an indomitable lady with a courageous heart.

MSS ◇

Chemistry Crusaders

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careers in math and science.

Science Ambassadors is a Holy Cross student outreach program that "regularly performs science demonstrations at local schools." Jude Kelley, Ph.D., a third-year associate chemistry professor and the group's current adviser, states that "it is not…tied to one department" and that the program "brings in students with a broad range of backgrounds." One of the more popular attractions, the annual 'Hogwarts at Holy Cross', draws hundreds of children and their parents for hands-on activities, as well as a science show in which "Holy Cross students and faculty (some dressed as their favorite [Harry Potter] characters)…perform more sophisticated experiments."

In 2008, Kelley appeared in a History Channel episode of *Modern Marvels*. The show, which included demonstrations and interviews, focused on the importance of iron as a component of steel and its impact throughout history. Also highlighted were the significance of the metal in astronomy, biology, chemistry, geology, and physics. Says Kelley, "The project was a fun fusion of art and science, very much in line with the Holy Cross experience."

Holy Cross appears to have chemistry in its blood, consistently acting to spread that knowledge to students expressing an interest in science, both at the school and in the greater community. An amusing story on the origin of the schools' color – purple – has it that a student, looking to resolve a conflict between devotees of two other, more well-known New England universities, diplomatically mixed solutions of iron oxide (crimson, Fe_2O_3) and copper sulfate (deep blue, $CuSO_4$) to form Holy Cross' signature color. Or perhaps it was derived from the color of ancient nobility. Whatever the origin, the college chemistry department keeps the crusade of science education alive and well. ◇

Biographies

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ing Chief Executive Officer. He was appointed Chief Scientific Officer in January 1993, President in February 2000, and Chief Executive Officer in August 2004. Dr. Agrawal has led the Company's transition into the discovery and development of targeted immune therapy based on toll-like receptors.

Dr. Agrawal received his D. Phil. in Chemistry in 1980 and carried out his post-doctoral research at the Medical Research Council's Laboratory of Molecular Biology in Cambridge, U.K. While working at the Worcester Foundation of Experimental Biology, he carried out work in antisense technology with Paul Zamecnik, MD. Based on this technology, Idera Pharmaceuticals was founded.

Dr. Agrawal has published over 275 research papers/reviews and has edited two volumes on oligonucleotide chemistry and one on antisense therapeutics. He is listed as an inventor on over 300 patents, issued or pending worldwide.

Muthiah (Mano) Manoharan, Ph.D.,
Vice President, Drug Discovery, Alnylam Pharmaceuticals

Dr. Manoharan was formerly the Executive Director of Medicinal Chemistry at Isis Pharmaceuticals, Inc., a leading biotechnology company focused on nucleic acid-based therapeutics, where he had a 12-year tenure. With a distinguished career as a world-leading nucleic acid and bioconjugate chemist, Dr. Manoharan is an author of over 130 publications and over 200 abstracts, as well as an inventor on over 115 issued U.S. patents. Prior to his work at Isis Pharmaceuticals, he earned his Ph.D. in chemistry at the University of North Carolina-Chapel Hill and conducted post-doctoral work at Yale University and the University of Maryland.

Invited Speakers (11/2/09):

Michael P. Czech
Professor and founding Chair of the Program in Molecular Medicine, University of Massachusetts Medical School

Michael P. Czech is Professor and founding Chair of the Program in Molecular Medicine, University of Massachusetts Medical School. Molecular Medicine currently includes 37 faculty research laboratories, several Howard Hughes Investigators and over 400 scientists and staff. His research addresses mechanisms of signal transduction and insulin resistance in Type 2 diabetes and obesity. His laboratory has recently applied RNAi to discover novel drug targets and to develop therapeutic strategies for alleviating inflammatory and metabolic diseases.

Dr. Czech earned the Ph.D. degree in biochemistry in 1972 at Brown University, and completed postdoctoral study at Duke University Medical Center. He became Assistant Professor at Brown in 1974, rising to the rank of Professor in 1980. In 1981 Dr. Czech moved to the University of Massachusetts Medical School as Professor and Chair of the Department of Biochemistry and Molecular Pharmacology, which he led until his appointment as Director of Molecular Medicine in 1989.

Dr. Czech has authored approximately 275 publications, serves on several editorial boards, and has served on several NIH Study Sections and Review Panels of the Howard Hughes Medical Institute. He has received the Outstanding Scientific Achievement Award of the American Diabetes Association, 1982; the David Rumbough Scientific Award of the Juvenile Diabetes Foundation in 1985; an NIH MERIT Award, 1997-2005; the Elliot P. Joslin Medal in 1998, the 2000 CIIT Founder's Award, the 2000 Banting Medal and the 2004 Albert Renold Award of the American Diabetes Association.

Bob D. Brown
Senior Vice-President of Research Dicerna Pharmaceuticals

Bob joined Dicerna after a long career at Genta, where he was Vice President, Research and Technology and had over 75 issued patents and patent applications. There Bob became one of the only R&D executives in the biotechnology industry to follow a systemically

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Book Review

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effectively depict the topics being discussed. Numerous photographs help to convey a sense of size and capture details which could be lost in a drawing. It is clear from the tone of book that Yoshida is passionate about his research interests. In the final pages he boasts: "Flash chemistry is expected to produce a paradigm shift not only in chemical synthesis, but also in the industrial production of chemicals and drugs." This bold statement is made plausible by the practical and controllable nature of microflow reactors. Flash chemistry's development in a world dominated by macrobatch reactions is reminiscent of Henry Ford's contributions to the auto industry, as microflow reactors distinctly resemble an assembly line. Like the proliferation of Ford's revolutionary process to many other corners of industry, flash chemistry will undoubtedly continue to grow. Yoshida's *Flash Chemistry* can provide chemists, both industrial and academic, with the knowledge base necessary for further exploration of this fast and tiny field. ◇

Biographies

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administered oligo-nucleotide therapeutic (Genasense™) from the research bench, through Phase 1, 2, and 3 clinical trials and NDA review. At this time, Genasense remains the only systemically administered oligonucleotide ever subjected to FDA NDA review. At Genta Bob actively participated in and drove technology creation and development, preclinical research, and very specific clinical trial design features. He worked directly with clinicians and key opinion leaders performing the studies on trial design, execution, and interpretation of results. Before joining Genta, Bob was co-founder and VP of Research and Development at Oasis Biosciences. He holds a Ph.D. in Molecular Biology from the University of California, Berkeley, and a BS in Chemistry and a B.S. in Biology from the University of Washington. ◇

Chemical History

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an isotope of element 94 with a mass number of 238 and a half-life of under 100 years; it was consequently strongly radioactive. In late January, 1941, they sent a note, with authors McMillan, Wahl, Kennedy, and Seaborg, which was later published in "Physical Review". By late February Wahl and Seaborg had produced chemical evidence, via oxidation studies, that element 94 was chemically different from 92 or 93. These experiments were described in a manuscript sent in March, 1941, that confirmed that a new transuranium element had been discovered. By March, 1942, after a year in which the new element was called variously just element 94 or even "copper", for security reasons, it was decided to name the new element after the then-planet Pluto. After lengthy discussions trying to decide between "plutium" and "plutonium" the latter, more euphonious, name was chosen along with the symbol Pu. By this time the Seaborg group had also isolated the more stable and fissile isotope of plutonium of mass 239 and half-life 24,000 years.

In a report to the "Uranium Committee" in March, 1942, by which time the U.S. was at war, Abelson wrote: "It is probable that the cost of isotope separation will be great. The decision to spend perhaps a million dollars on a separation plant may well hinge on the results of these experiments." As Seaborg observes: "We had no idea that our work would play a major role in a program that would eventually cost more than two billion dollars within a few years." ◇

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Bench to Pilot Plant

by Stefan G. Koenig, Ph.D.

To most, talk of making chemical and biological processes scalable would cause eyes to glaze over. Yet it is impossible for any pharmaceutical or biotechnology therapy to reach patients without practical methods to make large amounts of the active substances. On Friday, October 23, 2009, our local section (NESACS) and the Royal Society of Chemistry, U.S. Chapter (RSC-US) hosted the inaugural Advances in Chemical Sciences "Bench to Pilot Plant" Symposium. This well-attended event did an exceptional job shining light on the oft-forgotten development phase of medical research, the challenge of going to large scale. Topics ranged from creative, traditional chemical and biological processes with lessons learned to implementing breakthrough technologies such as biocatalysis, process analytics, and flow processes. This development symposium, looking to become an annual October event, was an outgrowth of the more established discovery conference, the fourth installment of which will take place on April 9, 2010. Be sure to attend both next year (www.acssymposium.com). ◇

The NESACS website

Updated frequently · Late-breaking news · Position Postings
Back issues of the Nucleus · Career-related Links · Awards and Scholarships

www.nesacs.org

Calendar

Check the NESACS home page for late Calendar additions: http://www.NESACS.org

Note also the Chemistry Department web pages for travel directions and updates.
These include:
http://chemserv.bc.edu/seminar.html
http://www.bu.edu/chemistry/events/
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http://www.unh.edu/chemistry/seminars.html

Dec 02

Dr. Long Y. Chiang (U. Mass. Lowell)
"Design and Synthesis of Ultrafast Photoresponsive C60-(antenna) Nanostructures for Linear and Nonlinear Photonic Applications"
UMass Dartmouth, Building Group II, Room 114
4:00 pm

Dec 03

Robert Silbey, Massachusetts Institute of Technology
TBA
Harvard Univ., Pfizer Lecture Hall
4:00 pm

Dec 04

9th Sukant Tripathy Annual Memorial Symposium
University of Massachusetts Lowell, MIL Conference Room
Wannalancit Mills, 600 Suffolk St., Lowell, MA 01854
8:15 AM - 4:30 pm

Dec 08

Dr. Anthony F. Jacobine (Henkel-Loctite)
Univ.New Hampshire, Iddles, Rm L103
11:10 am
Prof. Chris Vanderwal (University of California, Irvine)
"Synthesis and Study of the Chlorosulfolipids and
Complex Molecule Synthesis Inspired by the Zincke Ring-Openings of Pyridines"
Boston College, Merkert 130
4:00 pm

Dec 09

Professor Phillip Messersmith (Northwestern University)
Brandeis University, Gerstenzang 122
3:45pm

Notices for The Nucleus Calendar of Seminars should be sent to:

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