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NORTHEASTERN SECTION • AMERICAN CHEMICAL SOCIETY
NESACS

THE NUCLEUS

November 1999 *Vol. LXXVIII, No. 3*

Monthly Meeting

Norris Award to J.J. Lagowski

James Flack Norris

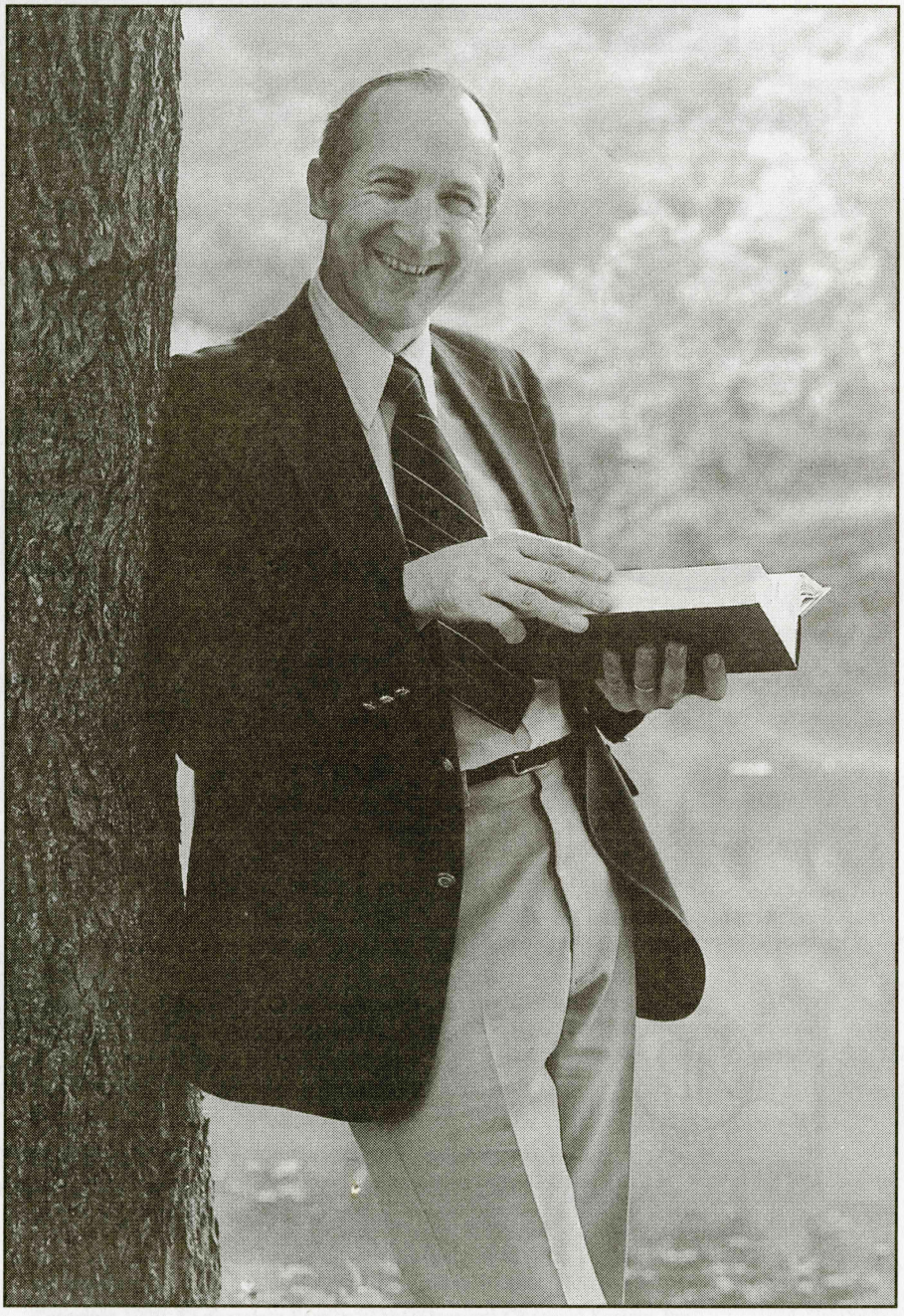
A biographical sketch from the archives

Software Review

RasMol and CHIME for visualizing molecular structures

Peer Mentoring

A two-way street



The Northeastern Section of the American Chemical Society, Inc.

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Cover: *Joseph J. Lagowski, the 1999 James Flack Norris Awardee (photo by Gray Hawn & Associates, Austin Tex.)*

Deadlines: *January 2000 issue: November 15, 1999*
February 2000 issue: December 16, 1999

THE NUCLEUS

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The James Flack Norris Award

for Outstanding Achievement in the Teaching of Chemistry

by M.S. Simon[1]

When the will of Anne C. Norris was read, the Northeastern Section was informed that it was a beneficiary, with an outright gift of $10,000 and the sharing of the residue of her estate in equal parts with the Massachusetts Institute of Technology. The will stated, "*It is my wish that the Directors of said Society shall use the money in any way they may see fit to perpetuate the memory of my said husband, James F. Norris.*" Professor Norris had died in July, 1940, and the desire had not been satisfied for a way to honor the man who had made such a mark as teacher, confidential counselor, research scientist and personal friend during his years of teaching and research at Simmons College and MIT. His widow's bequest in 1948 provided the impetus.

A committee under the leadership of Gustavus J. Esselen, the Section's senior adviser, was set up to explore how best to use the money. The expectation was that the income from the bequest would amount to over a thousand dollars a year, a tidy sum, and in the April 1949 *NUCLEUS* Esselen requested suggestions from the Section's members. By June he had received twelve proposals and his committee consisting of Chester M. Alter (Boston University), Theodore C. Browne (Dewey and Almy), Ernest C. Crocker (ADL), Kenneth L. Mark (Simmons), Avery A. Morton (MIT) and John O. Percival (Monsanto) worked the problem for the rest of the year. The decision was announced in January, 1950.The statement read "The James Flack Norris Award shall be made for outstanding achievement in the teaching of chemistry, particularly when demonstrated at college or secondary school levels rather than shown in research." This approach to memorialize Norris recognized the emphasis he placed on teaching, and the Committee's fear that another award for outstanding research would be lost in the crowd.

The announcement which appeared in the NUCLEUS for January, 1950 read:

"The first national award for outstanding achievement in the teaching of chemistry is announced by the Northeastern Section of the American Chemical Society, Inc. in memory of the late James F. Norris. Teachers from schools, colleges and universities will be eligible. This is in accordance with the wishes of the late Anne C. Norris of Cambridge who left the Northeastrn Section a bequest of $10, 000 plus half of the residue of the estate, to be used to perpetuate the memory of her

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Directions

Simmons College

From the Mass. Turnpike: Exit at the Cambridge Exit, #18. Follow signs to Cambridge. At the second set of lights turn right unto **Storrow Drive**. Exit at the "Fenway/Route 1 South" Exit. Stay left and up the ramp. Take the right branch, just before the traffic light ("Boylston Street outbound, Riverway 1"). Stay in the left lane and at the light make the left turn into Park Drive. Follow Park Drive cross Brookline Ave. at a traffic light. * Stay left and turn left at the next light, a U-turn to eastbound Fenway. Recross Brookline Ave. Stay right and turn into the first street right, Avenue Louis Pasteur. The entrance to the Simmons College Parking lot is the first driveway on the left. From the parking lot enter the long main college building at the stairs. The Conference Center is on the third floor, East Wing. The evening meeting is in the lecture room on your left, first floor, as you enter, Room C-101.

From Kenmore Square: Take Brookline Avenue to the first traffic light at the Boylston St. intersection. Turn RIGHT into Park Drive. Follow * above.

By Public Transportation: Take the Green Line to Kenmore Square. Take the stairs to the Bus platform and take the Chestnut Hill bus. The bus follows Brookline Ave. Exit at the Fenway stop, cross Brookline Ave. and to the southern branch of The Fenway. Turn left into The Fenway. Walk past Emmanuel College, cross the first street on the right, Avenue Louis Pasteur and enter the main entrance of Simmons College. Take the stairs to the third floor Conference Center, East Wing for the Social Hour and Dinner. The evening meeting is in Room C-101, first floor, opposite the main entrance. ◇

Monthly Meeting

The 810th Meeting of the Northeastern Section of the American Chemical Society

James Flack Norris Award Meeting

Thursday, November 11, 1999

Simmons College, 300 The Fenway, Boston, Mass.

5:30 pm Social Hour; Third Floor Conference Center, East Wing. A table of Career Services Literature and Aids will be available

6:30 pm Dinner

8:00 pm Award meeting, Rm. C-103, First Floor
Dr. Donald O. Rickter, Chair, presiding
James Flack Norris Dr. Myron Simon
Introduction of the Awardee by Dr. Robert W. Parry, University of Utah
Presentation of the Award by Dr. Saul G. Cohen, Chair, James Flack Norris Award Committee, Brandeis University
Norris Award Address by Dr. Joseph J. Lagowski *Lessons for the 21st Century*

Dinner reservations should be made no later than November 4, noon. Please call or fax Marilou Cashman at 800-872-2054. Reservations not canceled at least 24 hours in advance must be paid. Members, $30.00; Non-members, $35.00; Retirees, $20.00; Students, $8.00. THE PUBLIC IS INVITED.
Anyone who needs special services or transportation, please call Marilou Cashman a few days in advance so that suitable arrangements can be made.
Free Parking: Enter from Avenue Louis Pasteur

Biography

J. J. Lagowski was born in Chicago, spent his early years in the upper midwest and started the odyssey that brought him and his wife, Jeanne, to Texas in 1959. B.S. University of Illinois; M.S. University of Michigan; Ph.D., Michigan State University. The interface years between East Lansing and Austin were spent as a Marshall Scholar at Cambridge University, from which institution he was awarded a second Ph.D. At The University of Texas (Austin), Lagowski embarked on a program of work that has been described by one of his contemporaries as "the complete package," stressing teaching and scholarship in both bench chemistry and chemical education.

Research Interests, Chemistry. Over the years, Lagowski's broad research interests have included solution phenomena in non-aqueous solvents, with special emphasis on liquid ammonia, and organometallic chemistry with regard to the effect of the organic moiety on the properties of the metal site.

Lagowski's interest in organometallic species started at Cambridge, where he worked with perfluoroalkylmercurials and showed that the inductive effect of a CF_3 -group was sufficient to make the mercury atom in $(CF_3)_2Hg$ a good Lewis acid. Early organometallic work at Austin involved the chemistry of the borazine ring, which led to the isolation and characterization of the first "π-complex" of this ring system $[(CH_3)_3N_3B_3(CH_3)_3Cr(CO)_3]$. He and his students have exploited the metal atom synthesis technique to prepare a variety of metal-substituted arene π-complexes. They have shown that the redox potential of the $Cr(arene)_2^{0/+}$ system can be varied over a range of 1.5

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Abstract

Lessons for the 21st Century

From one point of view, there is a reasonable expectation that the 20th Century will be marked as an ever increasing recognition that chemistry is the central science because it deals with the molecularity of the world. The core chemical ideas interact strongly with associated disciplines, e.g., the biological sciences and a number of engineering subjects, and, in doing so, provide great insight into important research questions in those disciplines. This popularity of chemistry has been reflected in an ever increasing number of students in the basic courses in the curriculum–general chemistry, organic chemistry, and indeed, often in physical chemistry. Thus, an increasing proportion of the resources of chemistry departments is expended in teaching service courses–courses for science majors who are non-chemistry majors. This burgeoning teaching responsibility dictates new approaches to the chemical education of science students at a time when (the relative) available resources seem to be shrinking. In addition, the educational environment seems to be shifting from being predominately teaching-centered to predominately learning. Many have fixed on a variety of digital technologies as possible solutions to the perceived educational problems. All this activity presages fundamental changes in chemical education-the way we teach chemistry and, indeed, all the basic sciences. The nature, reality, and implications of these changes are discussed. ◇

Conference

Federal Environmental Policy Making: Responding to New Evidence

November16-17,
MIT Faculty Club
50 Memorial Dr., Cambridge, MA

Nov. 16, 1PM Policy Making and New Evidence at the Center for Disease Control and the National Toxicology Program

Sanford L. Weiner, MIT, Chair

John Whysner, Henry Falk, Sergio Piomelli, Barbara Beck

Nov. 17, 9 AM Policy Making and New Evidence at the EPA

Larry McCray, MIT, Chair

Robert O'Keefe, Don Ryan, Roy Epstein

11:45 Lunch, *Clyde Hertzman, U. of Brit. Columbia: Influences on Child Development*

1:30 PM, New Evidence and Organizational Change

Harvey Sapolsky, Chair

James Foster, Sanford L. Weiner, Larry McCray

Sponsored by MIT with program support from the Ford Motor Company, Exxon Corp., Nat'l Multi-Housing Council, Nat'l Apartment Assn., Norsk Hydro and the Lead Industries Assn.

To register or for full program:
Send name, title, address, daytime phone, fax numbers and e-mail address to: 617-253-9330 (FAX), e:mail: abriemer@mit.edu

Registrations accepted on a space-available basis until Nov. 12, 1999

Biography

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volts by an appropriate substitution of the arene ring. These π-complex are also potential precursors of organometallic polymers in which metal atoms occupy discrete positions in the polymer chains.

Lagowski's work with non-aqueous solvents has focused on the influence of the solvent on the chemistry of unusual species. For example, a number of his earlier papers in this area addressed the nature of the solvated electron in amine solvents, especially liquid ammonia. His interest then shifted to the *chemistry* of the solvated electron in ammonia; this work has led to the characterization of the first bare transition metal anion, Au^-. His students also have characterized Ag^- in liquid ammonia. He and his students investigated, both theoretically and experimentally, the conditions under which other metal anions might he stabilized. The most recent work in non-aqueous solution chemistry involves the electrochemical characterization of metal anion clusters, the Zintl ions. Early work in liquid ammonia also was the basis for establishing a quantitative acidity scale in this solvent.

Research Interests, Chemical Education. In the early 1960s, Lagowski became interested in the use of interactive computing to assist the educational process. In a series of theses and dissertations, he and his students have identified those areas of teaching for which computer-based methods are maximally effective, especially for large classes. As a result of these studies he has been able to implement the most effective uses of computer-based methods of education in a number of chemistry courses at the freshman level—lecture courses for both science and nonscience rnajors as well as laboratory-oriented courses for science majors. His current activity in this area includes the use of the Internet to deliver a full course of general chemistry instruction.

Lagowski's service to the chemical community includes ACS-oriented activities—twice general chair of Southwest regional meetings, early work with the ACS Examination Institute and the Division of Chemical Education. He was Editor of the *Journal of Chemical Education* (1979-1996), and was the recipient of a CMA Catalyst Award (1981) and the ACS Award in Chemical Education (1989). He was elected a Fellow of AAAS (1992) and has served on the Board of Directors of Sigma Xi. In 1996 he was the recipient of the Southwest Regional Award. In 1999 he became Chair of the Division of Chemical Education of the American Chemical Society ◇

Norris Award

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husband, James F. Norris

Believing in the importance of excellence in teaching as a contributing factor in the progress of chemistry, the Board of Directors of the Northeastern Section have selected this form of award as a memorial to Professor Norris, himself a teacher of great repute. The award will consist of a suitably inscribed certificate and a sum of money, and will ordinarily be given biennially, in the years when the Richards Medal for achievement in research is not awarded by the Northeastern Section.

Professor Norris was a student of Ira Remsen, one of chemistry's greatest teachers. (Norris) gained his outstanding reputation as a chemistry teacher at Harvard and Clarke (sic) Universities, as Professor at Vanderbilt University and Simmons College, and at the Massachusetts Institute of Technology where he became Director of the Research Laboratory of Organic Chemistry. He was Chairman of the Northeastern Section, was twice President of the American Chemical Society and served on its Board of Directors for eleven years."

The early recipients were chosen by a secret committee, again led by Esselen, who remained active in promoting the memory of Norris for the next couple of years until his death in October, 1952. Open election of the Norris Award Committee did not begin until 1954, when it was realized also that the capital funds were adequate to give the award annually, instead of biennially.

The first presentation was made in May, 1951 at the Harvard Club to George Shannon Forbes, an old friend of Norris, an outstanding teacher at both Harvard and, in retirement, at Northeastern Universities.

[1] From The NUCLEUS, 1996 LXXV (3),4 ◇

James Flack Norris

By Avery A. Ashdown[2], M.I.T.

When James F. Norris began his assistantship in the Chemistry Department of the Massachusetts Institute of Technology in October 1895, he was twenty-four years old and fresh from the doctorate awarded by Johns Hopkins University in June of that year. Born in Baltimore, Maryland, January 20, 1871, he was one of nine children of the Reverend and Mrs. Richard Norris (Methodist). His elementary schooling was at Miss Jennie Gardner's School for Boys in Georgetown, D. C., where his father was serving as a pastor. Later he attended the Central High School in Washington. While in this school, he was a member of the Drum Corps, High School Cadets. Secondary education completed, he enrolled in Johns Hopkins University in 1889 and remained through years of graduate study, leading to the doctorate in chemistry in 1895. At what exact age chemistry began to hold his interest is not certain but it must have been before 1892 when he was teaching this subject in the University of Maryland. His final year at J.H.U., 1894-5, was brightened by an appointment as a Fellow (stipend $375, plus tuition). His life long pursuit of travel in summer, chiefly in Europe, began at this time. In 1892 he became the official delegate of the students of Johns Hopkins University to the 300th Celebration of the University of Dublin. In the summer of 1894 he worked with the U.S. Coast Survey, stationed at Lynn, Massachusetts. The summer of 1896 saw him, with Henry Fay (M.I.T.), touring England, France and Germany.

Not only teaching in the University of Maryland, but coaching classes in mathematics and science, in his final graduate year, at Johns Hopkins had, in a sense, prepared him for a life long devotion to teaching and research. In his first classes at M.I.T. he was associated with James Mason Crafts (of the Friedel and Crafts reaction) and gave a course in Organic preparations. The next year he added a series of lectures on the history of chemistry. In 1899 he gave the brief course in organic chemistry and became associated with Arthur Amos Noyes in the laboratory pursuit of organic preparations and reactions. The year 1900 saw him advanced to the rank of assistant professor of organic chemistry and engaged to Anne Bent Chamberlin, a student at the Museum of Fine Arts in Boston.

On February fourth, 1902, Anne and he were married in St. John's Church, Washington, D. C. where her parents made their home while she was a student at the Museum. Henry Fay, also a young professor at M.I.T. and a close friend, was best man at the wedding. The new Norris family took up residence at 124 Anawan Avenue, West Roxbury (Boston), near the home of Professor Frank H. Thorp of M.I.T., already working on his *"Outlines of Industrial Chemistry,"* a text book for students, destined to be widely used. (First edition, October 1898, the third edition, in 1916, in collaboration with Warren K. Lewis, Professor of Chemical Engineering at M.I.T.)

The life-long friendship with Henry Fay began when both men came to M.I.T. as assistants in chemistry in 1895. Together they published their method for the *"Iodometric Determination of Selenous and Selenic Acids"* in volume 18, 1896, of the American Chemical Journal. This paper was the first bearing the name of Dr. Norris. It was followed at once by his thesis for the doctorate, *"The Action of Halogens on the Methylamines"* with Ira Remsen, appearing in the same journal, volume 19, 1896. These two papers head the list of seventy publications, mostly in the American Chemical Journal and the Journal of the American Chemical Society. Four books, all published by McGraw Hill, also came from his pen. The first, *"The Principles of Organic Chemistry"* 1912, third edition, 1933, total issue over 70,000. The second book, *"Experimental Organic Chemistry,"* 1915, third edition, 1933, total issue also over 70,000. His textbook, *"Inorganic Chemistry for Colleges"* was published in 1921, third edition with Professor Ralph C. Young of M.I.T. in 1938. *"Laboratory Exercises in Inorganic Chemistry,"* co-author Professor Kenneth L. Mark of Simmons College, appeared in 1922.

In 1900, advancement to Assistant Professor of Organic Chemistry at M.I.T. gave him a larger share in the chemistry department. In spite of this favorable development, his official connection with M.I.T. was interrupted in 1904 by appointment to Professor of Chemistry at Simmons College, organized in Boston in 1899 and destined to be known, for a time, as the M.I.T. for women students. Through eleven years he devoted himself to building up the chemistry department at Simmons. While at Simmons, he took a sabbatical leave in 1910 to study physical chemistry with Professor Fritz Haber in the Technische Hochschule at Karlsruhe in Baden, Germany. With Mrs. Norris be took up living quarters; in a pension in Karlsruhe. Dr. Norris always took great satisfaction from this phase of his post-doctoral experience. He found, increasingly, that the physical chemical points of view he gained, gave him new insight into organic chemistry. The year was not all laboratory work. Dr. and Mrs. Norris passed a winter vacation in Berlin and Dresden. In the spring recess they traveled in Italy. During the summer of 1911, three of Dr. Norris' sisters joined them for a grand tour, including Paris, Holland, England, and Scotland.

Came the year 1915, Dr. Norris resigned his position at Simmons to accept the professorship of chemistry in Vanderbilt University in Nashville, Tennessee. Association with this outstanding University in the Southland, although very rewarding, was to be for only one year.

In June, 1916, he was asked to return to M.I.T. where, in October, he became Professor of General Chemistry. When he left Vanderbilt, students and staff combined to present him with a silver cigarette case, bearing the

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[1] From The NUCLEUS, 1996 LXXV (3), 4

James Flack Norris

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inscription "Sunny Jim." This appellation he accepted with great pleasure. In fact, all of his associates, both at that time and thereafter, recognized his new name as most descriptive of his general disposition and character.

By the autumn of 1916, World War I, increasing in fury in Western Europe for two years, had been building up a condition of deep concern for the United States. In October 1917, Dr. Norris was granted leave of absence from M.I.T. for one year, to "render special service to the government in the present emergency." He worked first at the Bureau of Mines in Washington, D. C., on gas problems. Later he was in charge of "Offence Chemical Research" at the Bureau. Early in 1918 he was appointed Lieutenant Colonel, Chemical Warfare Service, U.S. Army. His headquarters were in London. In 1919 he was appointed to the Interallied Gas Conference. Finally, (1919) Dr. Norris was in charge of investigating the manufacture of war gases in the German chemical plants. His final war service was with the American University at Beaunne, France. Honorably discharged from the service in July 1919, he returned to Boston to resume duties at M.I.T.

This renewed association with M.I.T. was to be enjoyed for twenty-one years, until his death on August 3, 1940. He remarked of his position, as Professor of Organic Chemistry, that it was the kind of job he had wanted all his life. Graduate students came from far and wide to work with him on researches leading to advanced degrees.

Dr. Norris' service to chemistry broadened with his association with M.I.T. He was an early chairman of the Northeastern Section (1904). All of his life he remained very loyal to his home section. In 1924 he became chairman of the Section on Chemistry and Chemical Technology of the National Research Council in Washington, D.C. He was granted a leave of absence from M.I.T. for this work. However, he was in Boston two days each week and thus able to keep in contact with his graduate students. In 1925 he was made an Honorary Member of the Royal Institution of Great Britain. In the same year he was elected President of the American Chemical Society, a position he held for a second term. For three years, 1925-1928, he was Vice President of the International Union of Pure and Applied Chemistry. Eventually, association with the Union took him on several trips abroad, to Rumania in 1925, to Warsaw in 1927, to Lucerne, Switzerland, in 1936, and to Rome, Italy, in 1938. His long term as a Director of the national American Chemical Society ended in 1934 with a testimonial luncheon in New York

Two other activities were also in this period. First came the address on *"Chemistry in National Defense"* before the Institute of Politics at Williamstown, Massachusetts, in August 1926. Second, in June, 1928,

James Flack Norris

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he was chosen a member of the educational Delegation to the USSR, of which John Dewey of Columbia was chairman.

From early years, Dr. Norris was asked to be a special lecturer on organic chemistry at several different colleges. The first of these lectureships was at Simmons College in 1903. Next came Harvard for two years, 1912 to 1913. Among his students at Harvard was Louis P. Hammett, who, inspired by Dr. Norris, became the founder of physical organic chemistry in America. In 1913 he lectured on organic chemistry at Clark University in Worcester, Massachusetts. He had three periods of extended association with Bowdoin College, at Brunswick, Maine. This was the college of Hawthorne, Longfellow and President Franklin Pierce. In January 1925 Dr. Norris was named visiting professor at Bowdoin. In 1929 and in 1931 he was again a visiting Professor at Bowdoin. The college conferred on him her honorary Sc.D. in 1925.

A very important part of the life of Professor and Mrs. Norris was the several summers they passed at North Bridgton on Long Lake in western Maine. There they built a house in 1906 after plans drawn by Professor Harry W. Gardner of the Department of Architecture at M.I.T. They named their summer home "Good Cheer." The center of social life of their home was the "porch" where, often, there were record dances in the evening. Dr. Norris had a den for study and writing detached from the main house where he worked every morning, writing on his books. After lunch he swam in the lake with companions and in the evening mingled with guests on the porch.

Dr. and Mrs. Norris were patrons of the art galleries both in the United States and in Europe. Dr. Norris was an ardent movie fan and a devoted follower of Sir Harry W. Lauder, Scottish comedian and entertainer for half a century. Many people, still living [that was in 1965!, ed.], will recall such Harry Lauder songs as, "I Love a Lassie," "Roamin' in the Gloamin'" and "It's Nice to Get Up in the Mornin' but its Nicer to Lie in My Baid."

Many honors came to Dr. Norris. He was elected to the Society of the Sigma XI, Phi Beta Kappa and Alpha Chi Sigma, the professional chemical fraternity. He was a member of the American Academy of Arts and Sciences, the National Academy of Sciences and a fellow of the American Association for the Advancement of Science. He held honorary membership in the Chemical Society of Rumania and in the Royal Institution of Great Britain. He was elected vice-president of the American Academy of Arts and Sciences in 1936. He was Chairman of the Faculty of M.I.T., 1937-1939. Dr. Norris was very proud of the award of the Medal of the Institute of Chemists, conferred on him in May, 1937. In accepting the award he wrote to Dr. M. L. Crossley of the Institute of Chemists.

"I appreciate very much the high honor and will be much pleased to accept the Medal. I was gratified to learn that the award was made for both teaching and research. So far as I know, the Medal, awarded by your Institute, is the only one in which emphasis is placed on a man's influence, as a teacher, on young men electing to enter the profession of the chemist. I feel that a man can do a great deal in this world in influencing those who are undertaking a professional life."

The troubled situation in Europe in 1939, fomented by Hitler, argued against a walking tour in Germany, or Austria or Switzerland. Instead, Professor and Mrs. Norris toured Hawaii, California and Northwestern United States in June of that year.

The next summer, June 1940, the development of a cataract in his right eye, necessitated surgery which was successful. However, his troubles were not over. On July 1, 1940, phlebitis set in. On July 18th he was back in the Phillips House of the Massachusetts General Hospital for blood transfusions. In spite of all the resources of the hospital, his condition worsened steadily. He died on August 3, 1940, half way through his seventieth year. Funeral services were held at Mt.

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James Flack Norris

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Auburn Cemetery, on August fifth, in Cambridge, Massachusetts, where his grave is in the Norris lot. The day was bright and full of sunshine as if to capture some of the "Good Cheer" of the North Bridgton home and of the encouragement Dr. Norris had given his students and colleagues and friends over many years.

The original article was accompanied by eight pages of photographs and a listing of 41 students who received doctoral or master's degrees for work under his guidance.◇

NESACS Directory

The 1999 NESACS Directory will be available shortly at no charge to members for their personal use.

Send request to:

Karen Piper, Business Mgr.
19 Mill Rd. Harvard, MA 01451-1314

FAX: 978-456-8949

Note: Not for commercial use or for solicitations

Council Report

New Orleans, August 25, 1999

The item which was discussed most vigorously was the proposal to the Board of Directors by the Committee on Meetings and Expositions to increase registration fees for National Meetings, especially, to gradually increase undergraduate student's registration fees to up to 25% and graduate student's registration fees up to 50% of member registration fees. After heated discussion, the proposal was approved by a large majority.

The Bylaw amendments which were approved unanimously simplify the provisions for affiliation of the Society or Local Sections or Divisions with other technical organizations; establish an anniversary date for new and reinstated members as of the date of entry into the membership roll, to spread payment of dues over the year for new and reinstated members; moving the mailing surcharge for C&ENews to foreign members from the Bylaws to Society Regulations. A petition which would have raised the allowable imbalance in member population in the six geographic regions from 10% to 15% was defeated overwhelmingly after the Committee on Nominations and Elections had solved the imbalance for some years to come by shifting some Sections from one Region to another, which was accepted by the Council. Our Region I would lose Puerto Rico and would gain the Lehigh Valley Section (1,009 members), the Susquehanna Valley Section (252 members), and the Central Pennsylvania Section (577 members). The Regions are of importance only in electing Regional Directors. Regional Meetings are not tied directly to the electoral regions, but overlap them loosely.

In other actions, the Council approved a change in name and responsibilities of the "other" Committee on Nomenclature to Committee on Nomenclature, Terminology and/or Symbols.

The Committee on Publications is to include the duties of the Committee on Copyrights, which is to be dissolved. This proposal was also approved.

Similarly, the Council approved changing the status and charge of the Committee on Public Relations from "Other Council Committee" to "Joint Board-Council Committee", to be called the Committee on Public Relations and Communications.

On the proposal to increase meeting fees, referred to above, your representatives M. Chen, T. Gilbert, A. Light and T. Light voted in favor, D. Lewis and D. Phillips abstained, and C. Costello, A. Heyn, E. Hopkins and M. Singer opposed the proposal.

C. Costello attended meetings of the International Activities Committee and the Constitution and Bylaws Committee. T. Gilbert chaired the Committee on Meetings and Expositions and has also attended a Task Force on National Meeting Finances in July in Washington. A. Heyn attended the C&B meeting as guest. E. Hopkins attended the Committee on Environ-

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The 5th Andrew H. Weinberg Memorial Lecture

Distinguished Visiting Professor
Richard D. Klausner, MD
Director, National Cancer Institute, Bethesda, MD

Drug Development in the Treatment of Cancer

Wednesday November 10th, 1999 at 4:00pm

Dana-Farber Cancer Institute
Jimmy Fund Auditorium, 35 Binney Street
Boston, MA 02115

Sponsored in part by the Medicinal Chemistry Group, NESACS

For further information, please contact: Kelly Liedike, Department of Pediatric Oncology, Dana Farber Cancer Institute (617) 632-3971; (617) 632-5710 FAX; e-mail: Kelly_Liedike@dfci.harvard.edu

This annual event functions to highlight achievements and focus on the development of new strategies in the treatment of cancer patients

Also see the article in the October issue, p.9.◇

Puzzle Column

A Gambler and his Money...

A man took a certain amount of money and went to a small town in the desert that had four gambling casinos. As he entered the first casino he tipped the doorman ten dollars, for luck (to no avail, as it turned out). He lost half of his remaining money at the roulette table; as he left the casino he gave the coatroom attendant a ten dollar tip to improve his luck.

He entered the second casino, tipped the doorman ten dollars, lost half of the money he had left, and tipped the coatroom attendant ten dollars as he left the casino.

He repeated the same procedure in the third and fourth casinos. As he left the fourth casino after giving the coatroom attendant a ten dollar tip, he found that he had no money left.

How much money did he have to begin with? ◇

See the Solution to the October crossword puzzle on p.15

In Celebration of National Chemistry Week

The Eighth Annual ACS Northeast Regional Undergraduate Day

Saturday, November 13, 1999

Hosted by the Department of Chemistry, Boston University, and Chemia
Sponsored by the Northeastern Section of the American Chemical Society

9:00 Registration (640 Commonwealth Avenue)

9:30 Welcoming Remarks

Professor John Snyder, Associate Chair, Chemistry Dept., Boston University

Dr. Donald Rickter, Chair, Northeastern Section

Nicholas Geisse, President, Chemia (ACS Student Affiliates Chapter at B.U.)

9:45 Keynote Address

Professor Evan Kantrowitz, Boston College: *New Insights into Enzymatic Catalysis and Regulation*

10:30 Location change: (640 to 590 Commonwealth Ave.)

10:45 Seminars (choose one)

Prof. Warren Giering, Boston University: *Choosing a Graduate School*

Dr. Patricia Hamm, The EdY Group: *Planning for a Career in Industry*

11:30 Workshop and Technical Talk (choose one)

Professor James Golen, UMass Dartmouth: *Hands-on Chemistry with Children Workshop*

Professor Patricia Ann Mabrouk, Northeastern University: *A Solvent Engineering Approach to the Problem of Biomolecular Recognition in Heme Proteins*

12:00 Résumé Review: Dr. Frank Wagner, Strem Chemicals

Graduate School and Industry Fair

2:30 Lunch

2:00 Seminar and Technical Talk (choose one)

Prof. Warren Giering, Boston University: *Choosing a Graduate School*

Prof. Timothy F. Jaimeson, M.I.T.: *Title to be arranged*

2:45 Student Affiliates Workshop

Prof. Morton Hoffman, Boston University: *Reviving a Shallow-Breathing SA Chapter*

3:30 Adjournment

There will be a $5 registration fee to cover partially the cost of lunch and workshop materials.

If you would like more information, or if your school or company would like to send a representative to the Graduate School and Industry Fair, please contact Kevin Burgoyne at 617-353-2503; fax: 617-353-6466; internet: burgoyne@chem.bu.edu

Synergies in College/Pre-College Chemistry Education

Saturday, November 13

Simmons College
Conference Center

This symposium marks both the Simmons College Centennial and National Chemistry Week. This event celebrates Simmons' long tradition of preparing women for careers in the laboratory sciences by bringing together chemistry educators from college/university and pre-college classrooms to discuss issues of common interest.

8:30 am Registration, coffee

9:00 am Plenary address:
Jerry A. Bell
Senior Scientist, American Chemical Society

Special guest:
Susan Libes Chair,
Department of Marine Sciences
Coastal Carolina University

10:00 am Group roundtable discussions
- the environment as laboratory
- outreach programs
- field trips/site visits
- research opportunities
- mentorship via the Internet
- summer activities
- the role of the ACS

11:45 am Lunch at roundtables

1-2:00 pm Reports from roundtables; synthesis

Please RSVP by November 1 to
Dr. Len Soltzberg,
Department of Chemistry
617-521-2728
lsoltzberg@simmons.edu ◇

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Software Review

Showing off your "Pet" Molecule

A Review of RasMol and CHIME

By Frank R. Gorga,
Dept. of Chemical Sciences, Bridgewater State College, fgorga@bridgew.edu

Editor's note: We try to marry the needs of the chemical scientists of the Section to computer technology which may have an impact on their science. Many members did not attend Professor Martz's lecture at the monthly meeting in May and therefore may not have found the information page in the September issue useful. The following review by Professor Gorga may prove helpful in bridging the gap.

Have you ever wanted to show off your favorite molecule to students, colleagues or even the web-browsing public? If so, RasMol and CHIME are the tools you need!

RasMol (written by Roger Sayle of Glaxo-Wellcome) and CHIME (from MDL Information Systems, Inc.) are flexible, versatile programs for visualization of molecular structures. Both programs are available at no cost (CHIME for academic/personal use only at this price.) and are available for many popular computing platforms (Windows, Mac and some "flavors" of UNIX). I am most familiar with the Windows versions of these programs so my comments may miss some of the differences between the various versions.

RasMol was designed originally to display protein and nucleic acid structures and has special features for displaying these structures. It is, however, also able to display small molecules with equal ease. The program has a fairly gradual learning curve. The basic features of the program are accessible via menu commands. The program also contains a command line interface that allows more sophisticated manipulation of the molecular models. Finally, the program is capable of reading commands from script files. This allows the user to reproduce a complex view of a molecule without retyping the commands.

RasMol is able to open and display structural information in a number of different formats. The native data format is the *pdb* file commonly used for biological macromolecules. Many other "small molecule" formats are also supported. Once a file is open, molecules can be displayed in many ways that are familiar to chemists, including stick structures, ball and stick structures and spacefilled (or *CPK*) structures. More specialized models for proteins and nucleic acids are also available. Once a model is displayed it can be manipulated in many ways. The model can be rotated in three dimensions, its size can altered and it can be color-coded. RasMol's command line interface allows very sophisticated control over the appearance of a model. Different parts of a model can be selected and treated differently. For example, one could show a model of an enzyme-substrate complex in which the enzyme is shown as an α-carbon trace, with catalytically important side chains shown as ball and stick models in a different color and the substrate shown as a spacefilled model in the standard *CPK* colors.

Once a suitable representation of the molecule is obtained it can be printed, copied to the *clipboard* or saved as a *picture* in a number of common formats. (The last two options allow easy incorporation of molecular models into word processing, and other documents.) Molecular models developed with RasMol can also be displayed in web pages using CHIME.

CHIME, a web browser plug-in based on RasMol, allows one to incorporate "live" molecular models into a web page. By adding a few lines of HTML code to your web page a user who has installed CHIME on their computer can see and manipulate a molecular model much as he or she can with RasMol. The combination of RasMol and CHIME represent a very powerful tool for the communication of chemical information. With these tools one can combine "live" molecular models with any other web data type (e.g. text and static graphics) into one integrated information source.

Users interact with CHIME in two ways. "Right clicking" on a CHIME model brings up a menu containing many of the commands available from the RasMol menus. In addition, users

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Software Review

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may run RasMol scripts (prepared by the author) by clicking on small buttons within the web page. Thus the user is both free to "play" with a model and is able to be "guided" to specific views of a model by the web page author.

Adding a CHIME model to a web page is not difficult; it involves adding one line of HTML code to your document. It does, however, require the ability to edit raw HTML code and careful attention to syntax. The code to generate a simple CHIME model looks like this:

<embed src="cmpd.pdb" width=120 height=120
display3D=spacefill color3D=cpk name="example"
options3D=specular script="zoom 125">

The HTML code to add a button that alters the CHIME model generated by the above command looks like this:

<embed type="application/x-spt" width="12"
height="12" button="push" target="example"
script="rotate x 90">

Explanations of all of the parameters for CHIME are available in the documentation available from MDLI and although there is a small learning curve, if one is familiar with RasMol it is not overwhelming. One way to minimize the learning curve involved in preparing scripts for CHIME is to use the powerful set of scripting "wizards" provided by Robert M. Horton of Attotron Biosensor (see *Bio Techniques*, Vol. 26, No. 5, pp. 874-876 for a detailed description). This JavaScript™ application is available over the Internet at http://www.attotron.com/pub/cs . The Script Wizard allows one to generate (and test) fairly complex RasMol / CHIME scripts by choosing options from menus and filling in text boxes. The resulting HTML code can be easily copied into your web document. These wizards do not eliminate the need to learn something about RasMol / CHIME commands, but they do greatly

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Board of Directors

Notes of the Meeting of May 13, 1999

NOTE: Board Meetings are held on the Monthly Meeting day at 4:30 p.m. Section members are invited to attend.

Officers' Reports:

***Chair*:** Dr. Donald Rickter announced that he had appointed Dr. Ernest Becker to represent NESACS on the NERM steering committee. Dr. Rickter also announced that the Medicinal Chemistry Group was told to address their request of achieving a more permanent status to the C&B Committee, as was a similar request from a proposed Laboratory Robotics Group and the Younger Chemists Committee.

The Chemical Historical Landmark designation of Conant Hall at the University of New Hampshire will take place on October 29 at Durham.

The national ACS office has informed us that Local Section Officers are not covered by the liability insurance which does, however, cover Section events.

Dr. Patricia Hamm has been appointed to chair the Employment Services Committee. It was MOVED and VOTED to recognize Truman and Arlene Light for their past services in establishing and heading this service for a number of years.

Chair-Elect: Dr. Doris Lewis announced that the Boston Chapter of the Electrochemical Society is planning to hold a joint meeting with NESACS in September.

Treasurer: The monthly summary was distributed and ACCEPTED. Dr. James Piper announced that the National ACS office has notified the Section that the ACS Norris Award for Physical Organic Chemistry, sponsored by NESACS, must be increased from the current $3,000 to $5,000 in order to conform with the other ACS awards.

Trustees: Dr. Esther Hopkins stated that the ACS Treasurer had been consulted about a proposal by the broker who handles NESACS Trust invest-

Board of Directors

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ments for going on a fee-for-service basis. The ACS Treasurer recommended against this, but recommended that, the funds be turned over to the national ACS for their administration. The Trustees recommended no change in the present arrangement.

Archivist: Dr. Myron Simon announced that the National Historical Chemical Landmark designation of Conant Hall at the University of New Hampshire will feature a speaker who will discuss the work of Prof. James in rare earth chemistry.

Councilors: Dr. Morton Hoffman suggested that those representing NESACS at the New Orleans Council Meeting be given information about voting before the meeting. Dr. Michael Hearn reported on a meeting of the ACS Committee on Chemistry and Public Affairs which was held in Washington which he attended. The meeting addressed one-on-one interactions with members of Congress on the critical federal role of funding for research.

Standing Committees:

Bd. Of Publications: Dr. E. Joseph Billo announced that *NUCLEUS* staff had been reappointed for a year, effective July 1: Editor: Dr. Arno Heyn; Business Manager: Karen Piper; Advertising Manager: Vincent Gale. On a MOTION the Board APPROVED these appointments.

Dr. Billo noted a change of the web address for the NESACS web page. The new address will be listed in the *NUCLEUS*. The NESACS Web Page is also available via the link on the national ACS Web Page.

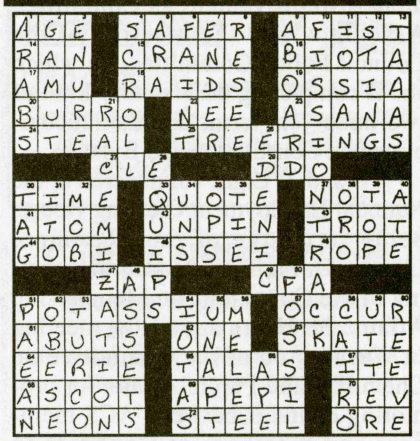
Chemistry Education: Dr. Ruth Tanner stated that the Student Research Conference in April was very successful. It was hosted by M.I.T and there were about 100 attendees.

Other Committees:

Continuing Education: Dr. Al Viola reported that, although the ACS Short Course on ISO 9000 was not well attended, yet there will be a surplus of $ 800-900 because all those attending were non-ACS members registered at the higher fee.

New Business: Dr. Esther Hopkins pointed out that two National Medals in Science and Technology have been awarded in our area to: Dr. George Whitesides of Harvard and Biogen Company. She suggested that letters of congratulation be sent. ◇

PUZZLE SOLUTION OCTOBER, 1999



Council Report

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mental Improvement as Committee Associate, and the meeting of the Council Policy Committee, on which she is completing the statutory limit of two three-year terms and its Subcommittee on Constitution and Bylaws.

A. and T. Light volunteered at the National Employment Clearing House, being in charge of the Resource Library. D. Phillips attended the meeting of the Committee on Membership Affairs. M. Hearn attended a meeting in Washington of the Committee on Chemistry and Public Affairs for promoting contacts between ACS members and members of Congress to emphasize the importance of scientific research funding. ◇

Calendar

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Prof. Elena Rybak-Akimova (TuftsUniv.)
"Transition Metal-containing Platforms for Molecular Tweezers"
Brandeis University
Gerstenzang 122, 4 PM

Nov. 16

Prof. Bruce Lipshutz (Univ. CA, Santa Barbara)
Title TBA
Boston College
Merkert Chemistry Ctr., Rm.127, 3 PM

Prof. Phillips Robbins (BU Goldman Sch. of Dental Med.)
"Regulatory Issues in Glycosylation and Chitin Synthesis"
Boston Glycobiology Discussion Group
MIT Faculty Club, 6 PM
Call (781) 642-0025 for dinner reservations

Prof. Walter Gilbert (Harvard Univ.)
"Introns, Exons, and the Evolution of Genes"
Tufts University
Pearson Bldg., Rm. 106, 4:30 PM

"Genetic Analysis and PCR Symposium"
CLAS Seminar and Workshop
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PE Biosystems.
Contact: Dr. E. Sigillo (781) 647-3799, x274

Nov. 17

Prof. Bruce Lipschutz (Univ. CA, Santa Barbara)
"New Chemistry and Synthetic Applications of Group 10 Metal Homo- and Heterogeneous Catalysis"
Boston University
Metcalf Sci. Ctr., Rm. 352, 2 PM

Prof. F. Ann Walker (Univ. Arizona)
"Novel NO-Releasing Heme Proteins from the Saliva of a Blood-Sucking Insect"
Mass. Inst. of Tech.
Rm. 6-120, 4 P

Prof. Christopher Spilling (UMissouri, St. Louis)
"From Chemoenzymatic Synthesis to Enzyme Inhibitors: Chemistry of Allylic Hydroxy Phosphonates"
UMass, Dartmouth
Science & Eng. Bldg., Rm. 305, 4 PM

Nov. 18

Prof. Stewart Novick (Wesleyan Univ.)
"Laboratory Astrochemistry: Spectroscopy of Radicals"
Dartmouth College
107 Steele, 10:30 AM

Prof. Kay Brummond (West Virginia Univ.)
Title TBA
Mass. Inst. of Tech.
Rm. 6-120, 4 PM

Nov. 22

Prof. Alex Klibanov (Mass. Inst. of Technol.)
"Control of Enzymatic Stereoselectivity in Organic Solvents"
Brandeis University
Gerstenzang 122, 4 PM

Nov. 23

Prof. Steven Bernasek (Princeton Univ.)
"Hydrocarbon Adsorption on Transition Metal Surfaces: Physisorption, Chemisorption and Internal State Effects"
Tufts University
Pearson Bldg., Rm. 106, 4:30 PM

Nov. 29

Prof. Peter Wipf (Univ. Pittsburgh)
"Total Synthesis and Stereochemistry Assignment of Marine Natural Products"
Boston University
Science Center Auditorium, 4 PM

Nov. 30

Prof. Joseph Zyss (École Normale Superieure de Chanan, France)
Title TBA
Brandeis University
Gerstenzang 122, 4 PM

Prof. Matthew Zimmt (Brown Univ.)
"Electron Transfer Across Organized and Disorganized Media"
Tufts University
Pearson Bldg., Rm. 106, 4:30 PM

Software Review

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facilitate the process of generating error free HTML code.

Another method for obtaining HTML code to control CHIME is to "borrow" and modify another author's code. Most Web browsers have a *view page source* command that shows the "raw" HTML code for generating the page. One can easily copy a section of code from an existing page, paste it into a new page and modify it to suit a new purpose.

So where does one get "virtual compounds" to display using RasMol/CHIME? One can either "synthesize" them using a computational chemistry program or one can "order" them from a supplier. There a number of "libraries" available on the internet that allow downloading of structural data. For macromolecules the Protein Data Bank (http://www.rcsb.org) is the most extensive. A number of individuals also maintain libraries of files containing the structures of small molecules derived from calculations (see http://www.umass.edu/microbio/rasmol/whereget.htm for an extensive listing). Dave Woodcock at Okanagan University College maintains one of the most extensive libraries (http://www.sci.ouc.bc.ca/chem/molecule/molecule.html).

"Virtual compounds" can by "synthesized" using a number of the common computational chemistry packages for PC's. Any program that can write a *pdb* file (or another format recognized by RasMol/CHIME) can be used. The author has used both PC/Spartan and Chem3D for this purpose without trouble. For most purposes, a simple molecular mechanics calculation yields a structure that is good enough for display.

Further information about RasMol and CHIME is available on the Internet. Eric Martz, at the University of Massachusetts, Amherst, maintains an essential and extensive source of information about both RasMol and CHIME. (http://www.umass.edu/microbio/rasmol/index.html). Instructions for downloading RasMol can be found here. MDL Information Services Inc. also maintains an extensive support site for CHIME (http://www.mdli.com/support/chime/default.html). Instructions for downloading and installing the latest version of CHIME can be found here. Links to web sites that use CHIME may be found at both of these web sites. ◇

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Calendar

Oct. 20

Eckard Münck (Carnegie Mellon Univ.)
Title TBA
Harvard Univ.
Rm. MB23, 5 PM

Prof. Omowunmi Sadik (SUNY, Binghamton)
"Rational Design of Chemical and Biological Sensors"
UMass, Dartmouth
Science & Eng. Bldg., Rm. 305, 4 PM

Oct. 21

Prof. Carmela Amato-Wierda (Univ. NH.)
"Chemical Vapor Deposition of TiN and T-Si-N Diffusion Barriers"
Dartmouth College
107 Steele, 10:30 AM

Prof. Ron Naaman, (Weizmann Inst.)
Title TBA
Harvard Univ.
MB23, 5 PM

Oct. 22

Prof. Reza Ghadiri (Scripps Res. Inst.)
Title TBA
Mass. Inst. of Tech.
Rm. 6-120, 4 PM

Oct. 25

Prof. Eric Jacobsen (Harvard University)
"Studies in Asymmetric Catalysis"
Boston University
Science Center Auditorium at 4 PM

Prof. Scott Miller (Boston College)
"Discovery of Minimal Peptides for Asymmetric Catalysis and Organic Synthesis"
Brandeis University
Gerstenzang 122, 4 PM

Oct. 26

Prof. Felicia Etzkorn (Univ. VA)
Title TBA
Boston College
Merkert Chemistry Ctr., Rm.127, 3 PM

Dr. Mark Roberts (Seradyn)
"Magnetic Streptavidin and Oligo(dT) particle Binding Capacities in Genomic Research"
CLAS Seminar
Dana Farber Cancer Inst.
Jimmy Fund Auditorium, 3:15 PM
Contact: Dr. D. Drum
dedrum@bics.bwh.harvard.edu

Prof. Craig Wilcox (Univ. Pittsburgh)
"Molecular Designs and Syntheses for Organic and Bioorganic Chemistry"
Tufts University
Pearson Bldg., Rm. 106, 4:30 PM

Oct. 27

Prof. Kenneth Karlin (Johns Hopkins Univ.)
"Copper and Heme-copper Complex O_2-Reactivity: Chemical Models for Dioxygen Processing by Copper Proteins"
Mass. Inst. of Tech.
Rm 6-120, 4 PM

Oct. 28

Dr. Paul Anderson (DuPont)
A Molecular Approach to Managing Drug Resistance to HIV"
Dartmouth College
107 Steele, 10:30 AM

Prof. Christopher Reed (Univ. CA, Riverside)
"Super Anions and Superacids"
Boston College
Merkert Chemistry Ctr., Rm.127, 4 PM

Nov. 1

Prof. Arthur Ellis (Univ.WI, Madison)
"Elements of Curriculum Reform: Putting Solids in the Foundation"
Boston University
Science Center Auditorium, 4 PM

Prof. Alex Jen (Northeastern Univ.)
"Highly Efficient Second-Order NLO Materials: From Molecular Design to Device Applications"
Brandeis University
Gerstenzang 122, 4 PM

Nov. 2

Prof. Arthur Ellis (Univ.WI, Madison)
"Chemical Sensors Based on Semiconductor Photoluminescence"
Boston University
Biology Res. Bldg., , Rm. 113, 9:30 AM

Prof. Michael Chan (Ohio State Univ.)
"Molecular Enzymology by Protein Crystallography"
Dartmouth College
107 Steele, 10:30 AM

Prof. Gregory Swain (Utah State Univ.)
"Structure-Reactivity Studies of Diamond Electrochemical Interfaces: Applications of this New Electrode Material in Electroanalysis"
Tufts University
Pearson Bldg., Rm. 106, 4:30 PM

Prof. J. C. Warner (UMass, Boston)
"Green Chemistry: Theory and Practice"
UMass, Boston
Science Bldg., 1st Fl., Rm. 089, 4:30 PM

Nov. 3

Prof. Ishita Mukerjee (Wesleyan Univ.)
"DNA Structure Probed by UV Resonance Raman Spectroscopy"
UMass, Dartmouth
Science & Eng. Bldg., Rm. 305, 4 PM

Nov. 4

Prof. Barbara Imperiali (Mass. Inst. Tech.)
"Chemistry and Biology of Asparagine-Linked Protein Glycosylation"
Boston College
Merkert Chemistry Ctr., Rm.127, 4 PM

Prof. John Baldwin (Univ. Syracuse)
"Thermal Isomerizations of Vinylcyclopropanes"
Dartmouth College
107 Steele, 10:30 AM

Nov. 8

Prof. Oren Becker (Tel Aviv University)
"Protein Modeling and Protein Design"
Boston University
Science Center Auditorium, 4 PM

Prof. Christopher Cummins (Mass. Inst. of Technol.)
"A Metallaziridine Story"
Brandeis University
Gerstenzang 122, 4 PM

Nov. 9

Prof. John Buchanan (Ariad Pharmaceuticals)
Title TBA
Boston College
Merkert Chemistry Ctr., Rm.127, 3 PM

Prof. Stephen Weber, University of Pittsburgh
"Application of Molecular Recognition in Analytical Chemistry: How Selective Can An Extraction Be?"
Tufts University
Pearson Bldg., Rm. 106, 4:30 PM

Nov. 10

Prof. Craig Martin (UMass, Amherst)
"Structural and Mechanistic Studies of Transcription Initiation by T7 RNA Polymerase."
UMass, Dartmouth
Science & Eng. Bldg., Rm. 305, 4 PM

Prof. Daniel Mindiola (Mass. Inst. of Tech.)
"Chromium and Niobium Nitrides: Anthracene Elimination, Inter-Metal N Atom Transfer and Reductive Dinitrogen Cleavage Reactions"
Mass. Inst. of Tech.
Rm 6-120, 4 PM

Nov. 11

Prof. Maurice Brookhart (Univ. NC, Chapel Hill)
"Olefin Polymerizations Using Late Metal Catalysts: Synthetic and Mechanistic Studies"
Boston College
Merkert Chemistry Ctr., Rm.127, 3 PM

Prof. James Coward (Univ. Michigan)
"The Bioorganic Chemistry of Protein Glycosylation"
Dartmouth College
107 Steele, 10:30 AM

Prof. Daniel Kahne (Princeton Univ.)
Title TBA
Mass. Inst. of Tech.
Rm. 6-120, 4 PM

Nov. 12

Prof. Fred McLafferty (Cornell Univ.)
"Tandem High Resolution Mass Spectrometry of Biomolecules"
Dartmouth College
107 Steele, 3 PM

Prof. Harry Tuller (Mass. Inst. of Tech.)
"Nanocrystalline Oxides - How Different Are They Really?"
Tufts Univ., Chemical Eng. Dept.
4 Colby St., Rm. 136, 11:30 AM

Prof. Arthur Felix (Ramapo College)
"Growth Hormone-Releasing Factor"
UMass, Boston
Science Bldg., 1st Fl., Rm. 089, 4:30 PM

Nov. 15

Dr. Kazumi Shiosaki (Millennium Pharmaceuticals)
"Genomics in Drug Development"
Boston University
Science Center Auditorium, 4 PM

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