



THE

CHESAPEAKE CHEMIST

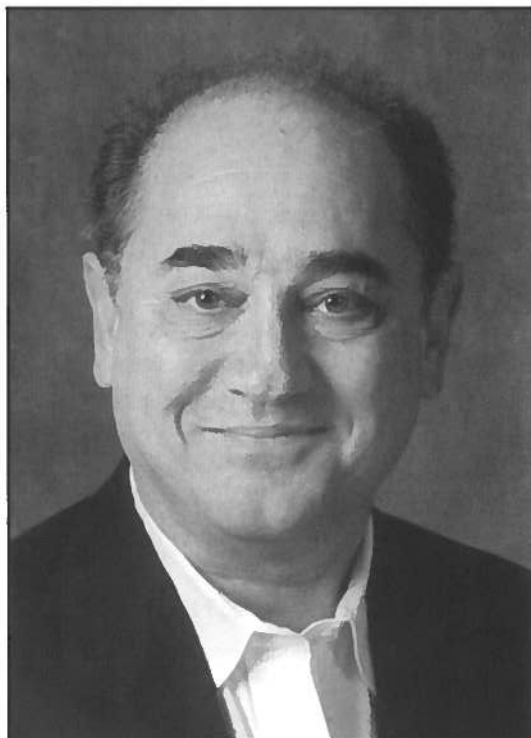
MARYLAND SECTION
AMERICAN CHEMICAL SOCIETY

VOL. LVI

MAY, 2000

NUMBER 5

2000 REMSEN AWARD



ALEXANDER PINES

CALL FOR 2001 EAS Award Nominations

EAS is soliciting nominees for its
2001 Awards for Outstanding
Achievement in:

- Fields of Analytical Chemistry
- Near-Infrared Spectroscopy
- Separation Science
- Magnetic Resonance
- Chemometrics

The deadline for receipt
of nominations is
June 30, 2001.

These awards will be
presented at the 2001
Eastern Analytical Symposium,
to be held in Atlantic City,
New Jersey.

A primary letter of recommendation should be submitted by someone familiar with the nominee's work and should be no more than six pages in length. It should include a discussion of his or her work's significance, a list of publications, presentations, and awards, and a statement of the nominee's willingness to present their work at an EAS Award Symposium. Each Award consists of an honorarium, plaque, travel expenses, and the opportunity for the awardee to present his or her work to the attendees at an Award Symposium.

Nomination materials should be addressed to:

Chairman, EAS Awards Committee

P. O. Box 633, Montchanin, DE 19710-0633 USA

For more information visit our web site:

<http://www.eas.org>



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THE 55th REMSEN LECTURE

WHEN: JULY 9, 2000

WHERE: PATAPSCO STATE PARK, PAVILION #501
McKeldin Area (Marriotsville Road)

TIME: Noon to Dusk

The ACS Maryland Section will again sponsor a family picnic. The Section will provide hot dogs, hamburgers, soda, beer, condiments, paper goods, cups, utensils etc. The McKeldin Area has a ball diamond, basketball court, volleyball court, hiking trails, horseshoe pits, wading stream and more. Bring your sports equipment.

There will be a guided nature walk.

To make a special food fest, we invite families to bring a food dish. Please use the initials formula shown below:

A-F snack; G-L salad; M-R side dish; S-Z dessert

Fees: \$15.00 per family; \$7.50 per individual.

Reservations: Please send checks, payable to Maryland Section, ACS, to Dr. Shirish Shah, College of Notre Dame, 4701 North Charles St., Baltimore, MD 21210 by June 25th. Late reservations call 410-532-5712.

Entrance to the park is free to seniors (62 & up) and for children under sixteen. There is a small fee for others.

THE REMSEN AWARD

The annual Remsen Memorial Lectures were inaugurated in May, 1946 by the Maryland Section of ACS to honor Ira Remsen, first Professor of Chemistry and second President of the Johns Hopkins University. The Remsen Memorial Lecturers are chemists of outstanding achievement, in keeping with Ira Remsen's long and devoted career as an exponent of the highest standards in teaching and research in chemistry.

PREVIOUS REMSEN AWARD WINNERS

1999 Thomas J. Meyer	1981 Koji Nakanishi	1963 Harold C. Urey
1998 Peter B. Dervan	1980 Roald Hoffman	1962 George Porter
1997 William Hughes Miller	1979 Harry B. Gray	1961 Herbert C. Brown
1996 David Evans	1978 John Charles Polanyi	1960 Henry Eyring
1995 Alfred C. Redfield	1977 Ronald Breslow	1959 Edward Teller
1994 Edward I. Solomon	1976 William N. Lipscomb, Jr.	1958 Robert B. Woodward
1993 Christopher T. Walsh	1975 Henry Taube	1957 Melvin Calvin
1992 William Klemperer	1974 Elias J. Corey	1956 Farrington Daniels
1991 Rudolph Marcus	1973 Frank H. Westheimer	1955 Willard F. Libby
1990 Robert G. Bergman	1972 Charles H. Townes	1954 Vincent du Vigneaud
1989 K. Barry Sharpless	1971 George C. Pimentel	1953 Edward L. Tatum
1988 Mildred Cohn	1970 George S. Hammond	1952 W. Mansfield Clark
1987 Stephen L. Lippard	1969 Albert L. Lehninger	1951 Hugh S. Taylor
1986 Gilbert Stork	1968 Har C. Korana	1950 Edward C. Kendall
1985 Richard N. Zare	1967 Marshall W. Nirenberg	1949 Joel H. Hildebrand
1984 Earl L. Muetterties	1966 Paul H. Emmett	1948 Elmer V. McCollum
1983 George M. Whitesides	1965 James R. Arnold	1947 Samuel C. Lind
1982 Harden McConnell	1964 Paul D. Bartlett	1946 Roger Adams

Wednesday, May 31, 2000

Johns Hopkins University
Homewood Campus

The Garrett Room
Milton S. Eisenhower Library

6:00 PM Reception (appetizers and beverages included)

7:00 PM Banquet

Remsen Hall, Room 101

8:00 PM Presentation of Remsen Award to Professor Alexander Pines, Glenn T. Seaborg Professor of Chemistry, University of California at Berkeley and Faculty Senior Scientist at the Lawrence Berkeley National Laboratory.

Remsen Award Address, "Some Magnetic Moments or "Lighting Up" NMR and MRI.

Meeting Registration

The dinner includes Italian chopped salad with sherry shallot vinaigrette, fettucine with cream sauce, chicken and bell peppers, carved London broil, garlic mashed potatoes, grilled vegetables, assorted rolls and butter, chocolate ganache cheesecake and beverages. The banquet price is \$24.00 per person (including the reception in honor of Professor Pines); \$21.00 for spouses and retired members and \$12.00 for students. Reservations must be made by 12:00 noon on Friday, May 26, 2000 by calling the Section reservation line 410-532-5712 leaving your name (with spelling), affiliation and telephone number. Cancellations must be received by Monday, May 29, 2000. Mail checks payable to the Maryland Section of the ACS to Dr. Shirish Shah, Department of Chemistry, College of Notre Dame of Maryland, 4701 N. Charles Street, Baltimore, Maryland, 21210. Payment at the door will also be accepted. Late reservations will be accepted on a space available basis. You may attend Professor Pines' address without attending the banquet.

Directions to Johns Hopkins University

Campus improvements are ongoing at the university. Please contact Jean Goodwin at 410-516-7791 a few days prior to the meeting for updated parking information.

From the North. From I-695 (Baltimore Beltway) proceed to exit 25 (Charles Street). Follow Charles Street south for eight miles to University Parkway. Turn right on University Parkway and stay in the left-hand lane. Travel 500 feet and you will see a brick entrance to The Johns Hopkins University (Goodnow Road). Proceed to the visitor parking meters.

From the South. Drive north on I-95. Do not take the Harbor Tunnel or Beltway exits! Follow the signs to downtown Baltimore ("Inner Harbor/Memorial Stadium - Use 395 North" and "395 North, Right Lanes"). The city skyline will be to the left. Take the exits marked "395 North Downtown" and "395 Downtown/Inner Harbor". Turn right on Conway Street (first traffic light). Proceed two blocks to Charles Street and turn left. Follow Charles Street north (about 2.5 miles) to University Parkway. Turn left onto University Parkway and stay in the left-hand lane. Travel 500 feet and you will see a brick entrance to The Johns Hopkins University (Goodnow Road). Proceed to the visitor parking meters.

THE 55th REMSEN LECTURER

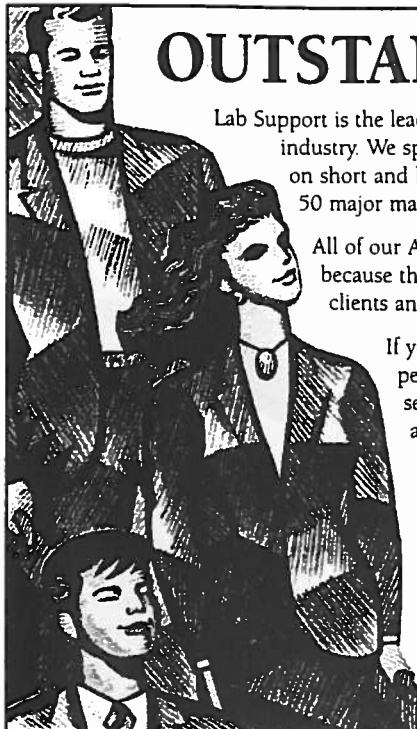
Dr. Alexander Pines
Glenn T. Seaborg Professor of Chemistry
University of California at Berkeley
Faculty Senior Scientist
Lawrence Berkeley National Laboratory

Dr. Pines' research has been mainly in nuclear magnetic resonance theory and experiment; his techniques are widely used in chemistry and materials science. Together with J. S. Waugh he introduced high resolution NMR of dilute spins such as carbon-13 in solids using cross polarization and demonstrated time-reversal of many-body spin couplings. In recent years he has developed the area of multiple-quantum spectroscopy in which groups of spins flip coherently while absorbing or emitting groups of quanta. His techniques of zero-field NMR using both field cycling and superconducting (SQUID) detectors are being applied to the study of molecular structure and dynamics in condensed phases. His development of double rotation and dynamic-angle spinning, based on icosahedral symmetry, extended high-resolution NMR to quadrupolar nuclei such as oxygen-17 and aluminum-27 in solids. His recent interests also include the geometric (Berry) phase and gauge kinematics, drawing on the analogy between the evolution of quantum spin systems and cats falling from trees. His combination of laser-polarized xenon and cross-polarization has led to selective "lighting up" of NMR and MRI in solutions and on surfaces. Most recently he has developed injection-based delivery of laser-polarized xenon for the study of organisms. Two of his patents have been recognized by R&D-100 Awards.

In 1991 Pines was awarded the Wolf Prize in Chemistry (together with R. R. Ernst). In 1995 an Ampere Advanced Institute in NMR was held at Villa Monastera, Varenna, Italy in honor of Pines' fiftieth birthday. His other awards and honors include the ACS Baekeland Award in Pure Chemistry, the ACS Nobel Signature Award for Graduate Education, the ACS Harrison Howe Award of the Rochester Section, the DOE Ernest O. Lawrence Award, the Pittsburgh Spectroscopy Award, the Bourke Medal of the Royal Society of Chemistry, the ACS Langmuir Award, the Distinguished Teaching Award of the University of California, and the Robert Foster Cherry Great Teacher Award of Baylor University. He is a member of the National Academy of Sciences and past President of the International Society of Magnetic Resonance.

Some Magnetic Moments or "Lighting Up" NMR and MRI

The nuclei of some atoms are endowed with a property called "spin" that gives rise to a magnetic moment. So each nucleus with spin can be thought of as a minuscule quantum magnet that has, in the simplest case, two states—spin "up" and spin "down." In the presence of a magnetic field there is a very slight excess of the lower energy spins up, an excess that produces a macroscopic nuclear magnetic moment. Now, imagine that the nuclear spins are subjected to pulses of radio waves at the frequencies corresponding to the up versus down energy differences. Such pulses can place the spins in states of quantum "superposition," that is they are neither up nor down but in a superposition, a peculiarly quantum combination of the two basic states. The so-called expectation value or macroscopic expression of the superposition is equivalent to classical magnetic moments that can be observed to precess or oscillate around the magnetic field at the natural resonance frequencies. It's somewhat akin to the behavior of compass needles that are pulled away from the direction of the earth's field. So the combined genius of nature and the founding physicists gives us nuclear magnetism at natural resonance frequencies—hence the name nuclear magnetic resonance (NMR.) At one level, NMR continues to present a physical playground, a system of interacting spins that display marvelous quantum effects of coherence, non-local entanglement, spin echoes and time reversal. The study of such phenomena is essential to an understanding of the concepts of decoherence and irreversibility and to modern efforts in



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quantum teleportation and quantum computing. At another level, NMR is chemically useful because the NMR frequencies depend on the molecular surroundings of atoms in molecules—nuclei at different positions in molecules resonate or "sing" at different frequencies—the differences are called "chemical shifts." So the NMR spectrum is in effect a "fingerprint" for the molecule and is therefore enormously useful in studies of structure, dynamics and function of molecules and materials in chemistry and biology. A second modality, magnetic resonance imaging (MRI) an offspring of NMR, uses the resonance frequencies of the spins not as indicators of where they are in the molecule but rather as indicators of where they are in the macroscopic object, for example the brain. This is accomplished by imposing on the sample magnetic field gradients, thereby spatially encoding the magnetic fields and the corresponding NMR frequencies. In this way images can be produced using radio waves instead of the x-rays of traditional imaging techniques. We ourselves remain captivated by the fundamental physics, the quantum dynamics and thermodynamics of interacting nuclear spins. But we are also interested in the development of new techniques in NMR and MRI, among them cross polarization, multiple-quantum spectroscopy, zero-field magnetic resonance, and optical pumping, deriving from these phenomena, that can be used to study systems relevant to chemistry, biology and medicine.

LUNCHEON FOR 50-YEAR MEMBERS

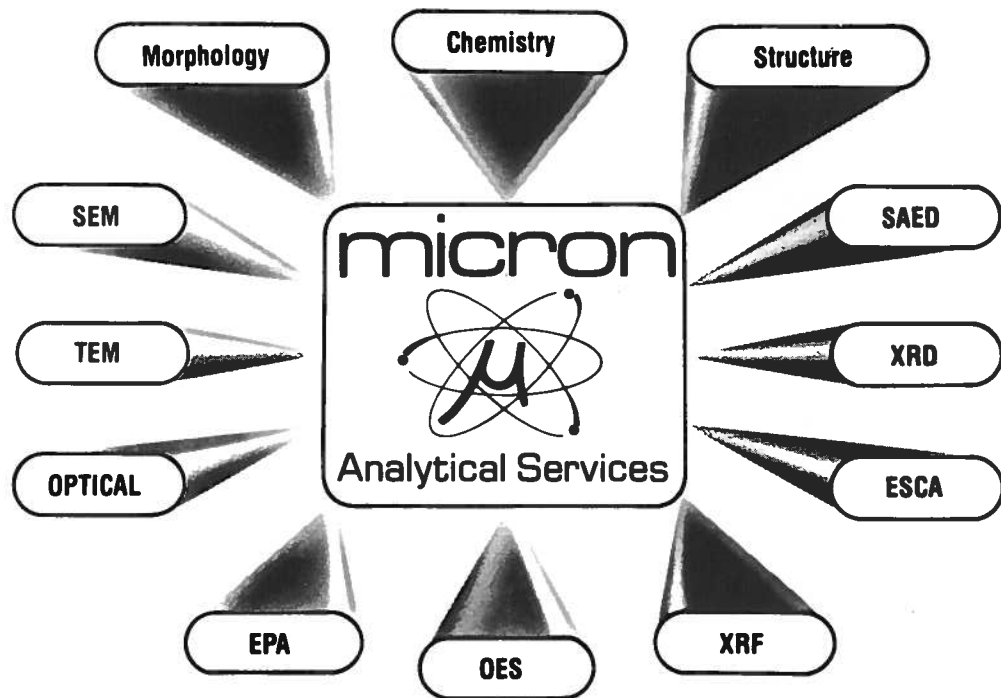
The Maryland Section has arranged a celebratory luncheon to honor its new 50-year members of the ACS. The luncheon will be held on May 26 at noon at Belmont, the ACS retreat in Elkridge, Howard County. Space is limited but reservations, on a first come basis, are available by contacting Dr. Shirish Shah at 410-532-5712 or e-mail shah@juno.com. The cost is \$22.00 but spouses and significant others of the honorees may attend for \$11.00; Previously honored 50-year members may also attend for \$11.00.

Dr. Charles Rowell will preside, assisted by Dr. Ernest Silversmith. Directions to Belmont and an agenda are available from Dr. Shah.

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MARYLAND CHEMIST AWARD NOMINATIONS - Nominations are in order for the year
2000 Maryland Chemist Award. Nominations may be sent to Committee Chair
Shekar Munavalli or Shekar may be contacted for more information. Shekar's
address and phone numbers are listed on page 3.