



# THE CHESAPEAKE CHEMIST

MARYLAND SECTION  
AMERICAN CHEMICAL SOCIETY

VOL. LI

APRIL, 1995

NUMBER 4

AMERICAN CHEMICAL SOCIETY

For

Outstanding Achievement in Chemistry



## MARYLAND SECTION STUDENT AWARDS

Chairman Carl E. Minnier of the Students Awards Committee has announced the nominees for the ACS Maryland Section Student Awards for 1995. Winners were selected by their respective institutions.

The nominees will be guests of the Section at the April 19 dinner meeting at Western Maryland College. In addition to being recognized at the meeting and receiving an ACS certificate, each will receive a one-year subscription to the *Journal of Chemical Education*.

The awardees are:

Dominique Foulkes, Morgan State University  
David W. Clark, Goucher College  
Edward Durant, Baltimore City Community College  
John B. Stetson, Anne Arundel Community College  
Shannon Renee Zientek, Catonsville Community College  
Karen R. Watsic, Harford Community College  
Catherine Santai, College of Notre Dame of Maryland  
Lee Friedman, The Johns Hopkins University  
Karin A. Ezbiansky, Loyola College in Maryland  
Adam Freeman, University of Maryland, Baltimore County  
Charles Davis & Chuong C. Phan, Essex Community College  
Lisa Taneyhill & Emily Snyder, Western Maryland College  
Steven A. Shabek, Towson State University  
Brett M. Showalter, Washington College  
Melissa Wilson, Hood College  
Heather Huerter, United States Naval Academy  
Brenda J. Luther, Villa Julie College

## ACS SCIENCE POLICY FELLOWSHIP

The Fellowship provides an opportunity for a scientist to join the ACS staff and

- Complete one or more selected science policy projects that contribute to the Society's discussions and recommendations, in areas of importance to the science community;
- Assist in the development of official ACS policy statements and testimony for Congress; and
- Meet with Capitol Hill staff and federal agency officials.

Applications are due May 1, 1995 and consist of a letter of intent, a resume, and two letters of reference.

Arrangements should be made to send the letters of reference directly to ACS. Candidates should contact ACS prior to submitting an application to determine the type of information needed in the letter of intent.

For more information contact: Office of Science Policy Analysis, Department of Government Relations and Science Policy, American Chemical Society, 1155 Sixteenth Street, N.W., Washington, DC 20036; (202) 452-2127.

## GETTYSBURG BATTLEFIELD TOUR

A guided tour of the Gettysburg Battlefield with a discussion of chemistry in the Civil War is planned for Sunday, May 21. Guides will be Elwin Penski and Jan Kolakowski. Further details will be published in *The Chesapeake Chemist* for May.



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Maryland Service Award...Mike Zapf

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## LAWRENCE M. PRINCIPE

Dr. Lawrence M. Principe, Senior Lecturer, Department of Chemistry, Johns Hopkins University, is more of a history buff, in particular the history of chemistry and more particularly the life and legacy of Sir Robert Boyle. He earned his B.S. degree in Chemistry (summa cum laude) from the University of Delaware. The same year he also earned his B.A. degree in Liberal Studies (summa cum laude) from the University of Delaware. Then he moved West-wards to Indiana University (Bloomington) from which he received, in June of 1988, his Master's degree in History of Science and again in September of the same year his Ph.D. degree in Organic Chemistry with a minor in History and Philosophy of Science. From 1987 to 1988 he worked as a Laboratory Instructor, Indiana University. In 1989, he migrated to Maryland as an Instructor of Chemistry, School of Continuing Education, Johns Hopkins University and then to the Department of Chemistry as a Lecturer of Chemistry and Laboratory Instructor. He was promoted to Senior Lectureship in 1994. Dr. Principe loves alchemy and is thrilled to talk about alchemists, both ancient and modern! His love of alchemy has led him to work with alembics (a form of still).

His attempt during his undergraduate days to understand the equation  $PxV = \text{constant}$  (where  $P$ =pressure and  $V$ =volume), the so-called Boyle's Law, led him directly to Robert Boyle. The more he read of Robert Boyle, the fonder and more fascinated he became of the 17th Century's alchemist(?) and the deeper he dug into his work, both published and unpublished! His quest for additional information on Robert Boyle helped Dr. Principe to unearth Boyle's earliest manuscript of 1648, which the British Library had miscatalogued. He was also able to dig up some 12,000 words of Boyle's manuscripts listed by the British Library as missing.

Dr. Principe's acquaintance and preoccupation with Robert Boyle and his romantic escapades have resulted in nine papers on Boyle. Dr. Principe was recognized in 1994 with the Johns Hopkins University's Distinguished Faculty Award. He is also the recipient of the Johns Hopkins University's George Owen Fellowship of Humanities in 1988-1989. He is a member of several honor societies. His proficiency in Latin, German, Italian, French, Arabic and Greek permits him to converse with the alchemists of the by-gone days in their native languages.

### ALCHEMY IN EARLY MODERN SCIENCE: THE ALCHEMICAL ROBERT BOYLE

For most of the past two centuries alchemy has been viewed quite negatively. Dismissed as a foolish fancy, outright fraud, or at best a pseudo-science, alchemy has not, in general, been seen as having scientific content or to have had positive influence in the development of modern chemistry. Nonetheless, careful consideration of alchemical means of communication (alien to us) reveals the chemical practice behind alchemy's often bizarre images. Newly discovered manuscripts uncover that the daily work of a prominent alchemist showed a preoccupation with experimental design and theory testing. The positive influence of alchemy on modern chemistry can be followed by documenting Robert Boyle's debt to and belief in alchemy; for example, his life-long search for the Philosophers' Stone.

### EXECUTIVE COMMITTEE

The next meeting of the Maryland Section's Executive Committee will be held on Wednesday evening, April 26, in the second floor reading room (library) of the Knott Science Center at the College of Notre Dame. Section members are invited to attend Executive Committee meetings.

## APRIL MEETING

### DATE:

Wednesday, April 19, 1995

### PLACE:

Decker Auditorium  
Lewis Hall  
Western Maryland College  
Westminster, Maryland

Dinner reservations should be made by mailing checks, payable to Maryland Section of ACS, to

Dr. Shirish Shah  
College of Notre Dame  
4701 North Charles St.  
Baltimore, MD 21210

by April 12. Late reservations may be made by calling

(410) 532-5712

April 14. An answering machine is available at this number.



CLARENCE A. BROOMFIELD



LAWRENCE M. PRINCIPE

### SCHEDULE:

- 5:00 Clarence A. Broomfield  
"Rational Design of a New Enzyme Based on the Cholinesterases"
- 6:00 Social Hour
- 7:00 Dinner - Dining Porch  
Engler Dining Hall
- 8:00 Student Awards Ceremony
- 8:30 Lawrence M. Principe  
"Alchemy in Early Modern Science: the Alchemical Robert Boyle"

Dinner price is \$16.00 per person, but spouses and retired chemists may attend for \$14.00; Students may attend for \$8.00.

It is not necessary to be a member of the American Chemical Society to attend. You may attend the meeting without attending the dinner.

The REMSEN AWARD will be presented for the fiftieth time at next month's meeting, May 17, at the Johns Hopkins University.

## CLARENCE A. BROOMFIELD

Clarence A. Broomfield, Ph.D., former Chief of Protein Chemistry Branch, U.S. Army Medical Research Institute of Chemical Defense, Aberdeen Proving Ground, Maryland, received his B.S. degree from the University of Michigan. He earned his Ph.D. degree from the Michigan State University in Chemistry with a concentration in Biochemistry. He was awarded the Regents-Alumni Scholarship and the NSF Fellowship for his undergraduate and graduate studies respectively. His post-doctoral work with Professor Harold Scheraga, Cornell University was supported by a NIH Fellowship and involved intramolecular interactions of bovine ribonuclease. He was instrumental in developing a novel electrochemical method of scanning paper electrophoretograms. Since 1962, he has been working at Aberdeen Proving Ground. He was recognized for his work on the isolation of neurotoxins from cobra venoms. He was made the Chief of Protein Chemistry Branch in 1967. For the past several years he has been working on acetyl cholinesterase, organophosphorus agent hydrolyzing enzymes and development of vaccines against nerve agents. Over the years, Dr. Broomfield has been a pioneer in the study of enzyme structure by spin labeling, receptors by ligand binding and isolation of enzymes by affinity chromatography. He has been associated with over 100 abstracts and papers.

### RATIONAL DESIGN OF A NEW ENZYME BASED ON THE CHOLINESTERASES

The Cholinesterases are a family of very important enzymes found almost ubiquitously in nature. Their only well demonstrated role is the destruction of the neurotransmitter, acetylcholine, at nerve synapses in the process of nerve transmission. They are particularly sensitive to inhibition by organophosphorus acid anhydrides (OPs) and it is this property that makes the nerve agents (and many insecticides) so toxic. It is also the property that we hope to exploit for protection against OPs. Our goal is to design, express and characterize mutants of cholinesterases that resist or hydrolyze the OP nerve agents, especially soman. Our initial studies have been concentrated on human serum butyrylcholinesterase (BuChE; EC3.1.1.8) because of its relatively open active site region. By computer-aided molecular modeling based upon the crystal structure of acetylcholinesterase, several residues were selected for site-specific replacement with histidine. We reasoned that introducing an appropriately positioned imidazole group could promote general base catalysis to hydrolyze the phosphorylated active site serine. One of the histidine mutants, G117H, was found to retain nearly normal activity with normal substrates. However, the rates of inhibition of G117H by the nerve agents were much slower than with the unmutated enzyme. We conclude that G117H is an active cholinesterase with unusual resistance to nerve agent inhibition and with a limited ability to catalyze the hydrolysis of OPs.

### GALBRAITH LABORATORIES GAS CHROMATOGRAPHY SERVICES

Galbraith Laboratories, Inc., a microanalytical laboratory with over 9,000 clients worldwide, has announced its addition of gas chromatography services.

Special expertise available from Galbraith's new business area includes determination of organic contaminants according to EPA methodology, priority pollutant determinations in waters and soils and standard analyses following RCRA, FIFRA, and TSCA guidelines. Method development services are also available. The laboratory's gas chromatography department is headed by Carol B. Morrison, who has over 15 years of experience in GC techniques. Galbraith plans to gradually expand these new capabilities to support additional EPA methodologies and client needs.

## AN URGENT APPEAL TO MEMBERS OF THE MARYLAND SECTION

Dear Section Members:

During the month of December 1994, we conducted a Survey of the Section. The results of this survey are in and we have read and re-read your comments. We appreciate your taking time out of your busy schedule to complete the survey to tell us what is on your mind. We have already taken steps to implement your suggestions. This fact is reflected in the minutes of the Executive Committee Meeting held on February 1, 1995.

The following lists some of the activities we have initiated:

1. Hospitality
2. Long Range Planning
3. Cultural Activities
4. Extended Science Fair(s)
5. Training Workshops
6. National Chemistry Week
7. Maryland Section's T-shirt with its own LOGO
8. Adopt-a-high school project to help the area high school teachers
9. Historic Gettysburg Guided Tour
10. Active Member Assistance via Video-tapes
11. Two-speaker arrangement to cater to diverse audience

We need your urgent support. As you know, our financial resources depend primarily on your contribution to the Section, namely the \$5.00 item you include in your annual ACS membership dues. It is this contribution that enables us to carry out the Section's activities. The costs associated with the preparation, publishing and mailing of *The Chesapeake Chemist*, our newsletter, and the High School-Related activities consume a lion's share of our available financial resources. These costs are always going up and up.

Although we have, as of October 1, 1994, 1908 ACS members from the Section, hardly one-half of them include the contribution to the Section when they renew their ACS annual membership. Through this letter, we are requesting you to include your contribution to the Section when you renew your ACS membership. If you have already renewed your membership and not included your contribution to the Maryland Section, please send your contribution to our Treasurer, Jan Kolakowski, 2610 Stanley Drive, Baldwin, MD 21013.

We would also like to encourage you to send donations to the Section to the Treasurer. Your donations to the ACS Maryland Section are tax deductible. If you would like to sponsor any of the Section's activities, please let us know and we can sit together to work out the details. Your contributions and donations would be properly acknowledged. We urgently need your help and support.

With best regards,

Shekar Munavalli  
Chairman

Jan Kolakowski  
Treasurer

### COMMITTEES

The Executive Committee announces the establishment of three new *Ad Hoc* committees and their chairpersons:

Long Range Planning and Public Relations, Alice Zeiger (410) 684-3777

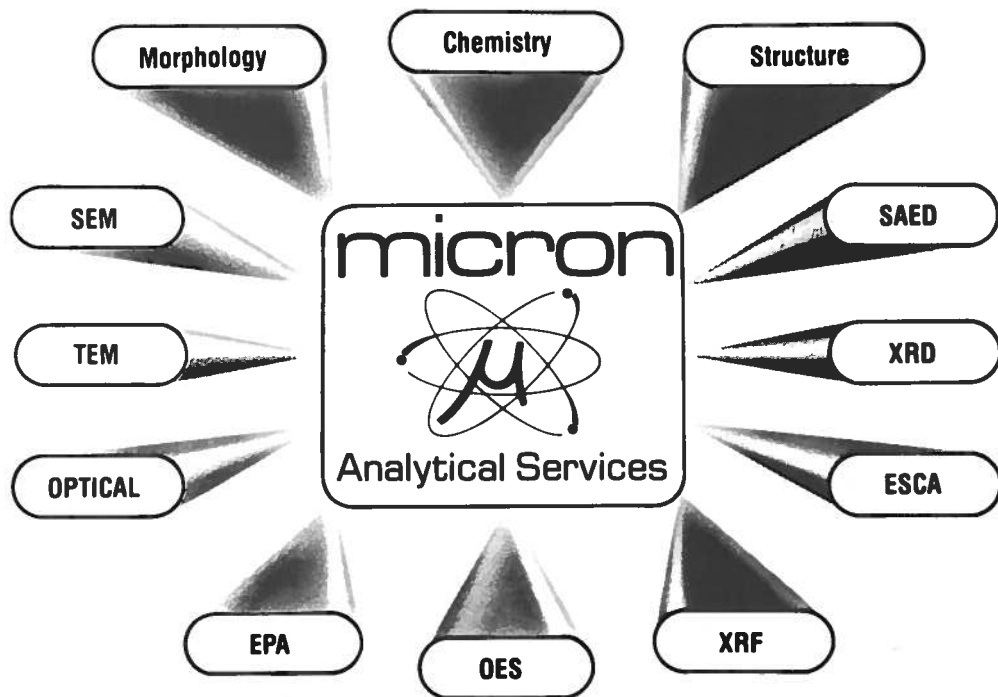
Hospitality, Robert von Tersch (410) 671-1956/1309

Professional Liaison, Yhong Guo (410) 531-4588

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