

SEAC communications

President's Message

Is the Glass Half-full or Half-empty? Electroanalytical chemistry is certainly not one of the heavyweights of scientific subdisciplines. We constitute a relatively small community, albeit one with an unusual number of tie-lines to other areas. Our members run the gamut from A to Z in terms of scientific interests, employment and geographical distribution. A scan of our membership list shows that SEAC has been quite successful in attracting members from our scientific community. We have almost 400 active members representing everyone from seasoned veterans to the young and restless.

So, what's the point? Should we be pleased with our success or are we missing some real opportunities? When one thinks of the vast number of folks who are involved in science and technology that has some relationship in electroanalytical

membership profile is the relatively small number of students who have joined the Society. More aggressive recruiting is needed in this area. In fact, sizable growth could be realized if each present member made an attempt to enroll one new electroanalytical chemist on the Society's roster.

Of course, raising these concerns in our newsletter is very much like "preaching to the choir" because nonmembers are unlikely to read these words. Part of my purpose in this President's Message is to elicit some response from the members. What do you personally derive from SEAC membership? What can we do to make our Society more attractive to nonmembers? Are there activities and projects that we could inaugurate to meet an existing need in the community?

So, from where I stand the glass appears to be half-empty.

Dennis H. Evans

Editorial

This is our **pre-PITTCON'94** issue of the newsletter and, as such, contains the information provided (he says with tongue planted firmly in cheek) to me by our members who take a **very** active role in the meeting. Of course, our major contribution to **PITTCON** is the annual Reilley Award Symposium which this year honors Barry Miller as recipient of the Reilley Award and Adrian Michael as the Young Investigator Award winner. Other noteworthy symposia will honor the memory of Professor I.M. Kolthoff and Prdessor **Willi Simon**. The Kolthoff symposium was arranged by Johannes (**Johan**) Coetzee and includes papers by many SEAC members. I don't know who organized the Simon symposium, but the information was sent to me by Steve Weber.

I am very pleased that several of our members have supplied **me** with interesting news items for this issue. Perhaps my pleas for such information are not in vain.

Once again, a couple of **SEACers** have garnered awards for their outstanding work. Jed Harrison was awarded the **McBryde Medal** for significant achievement in pure or applied analytical chemistry, and Dennis Johnson received the **1993 Palmer Award** from the Minnesota Chromatography Forum for his development of the pulsed **amperometric** detector.

Bubble, bubble, toil and more trouble. Bockris does it again. While still recovering from the cold fusion notoriety, electrochemistry received another setback with the publication in *Science* (26 November 1993) of the article "Alchemy Altercation at Texas A&M." While not using electrochemistry in these experiments, **Bockris'** reputation as an electrochemist reflects on our field nonetheless. While I am not familiar with the details of this research, the article puts a very negative spin on it based on the action (i.e., calling for his resignation from the Chemistry Department) by about a quarter of the full professors in the department. From the information provided, the chemical transmutation of silver into gold and carbon into iron does seem to fly in the face of reason. I welcome any comments on this research from SEAC members who may be more familiar with the details of this work. Who knows, maybe in the future universities will have Departments of Alchemy!

This news came on the heels of an article that Pete Kiisinger sent in on an electric battery that runs on urine. See elsewhere in this **issue** for the article with Pete's pithy (no pun intended and I don't lisp) annotations. In this case, one **of** our members, Bob **Osteryoung**, is quoted as saying that he wouldn't part with a nickel for the device. All I can say **is** that there's never a dull moment when it comes to electrochemistry.

I hope to see everyone at the Reilley Award Symposium in Chicago.

Dick Durst

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Sensors

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Awards

W.A.E. McBryde Medal

The W.A.E. **McBryde** Medal, sponsored by Dow Chemical Canada Incorporated, is awarded in recognition of a significant achievement in pure or applied analytical chemistry.

Jed Harrison, MCIC

University of Alberta
Microelectronics, Polymers and Chemical Sensors:
Probing Their Problems and Advantages in Sensor Development

Jed Harrison is a native of Vancouver, BC. He obtained his **BSc** in Chemical Physics from Simon Fraser University in 1980, and received the Gordon Shrum Gold Medal upon graduation. He was the recipient of an NSERC Post-Graduate Fellowship while undertaking graduate studies at MIT with Mark **Wrighton** and received a Ph.D. in 1984. He then joined the Chemistry Department of the University of Alberta, where he is now an Associate Professor.

Harrison is the author of over 60 scientific publications. His research interests are generally in electrochemistry, specifically in the development of membranes for chemical sensors and the use of microelectronic fabrication techniques for sensors and sensor systems. This program encompasses the development of new ion-selective electrode membrane matrices suited for use with integrated circuit technology, and the study of transport of ions, neutral molecules and solvents within polymer membrane matrices. Recently, his group has begun developing electrophoresis systems on glass "chips." Harrison is Associate **Editor** of a new journal, *Analytical Methods and Instrumentation*. He serves on the Program Committees of the biennial IEEE-sponsored Sensor and Actuator Workshop, Transducers: International Conferences on Solid-state Sensors and Actuators, and the International Meetings on Chemical Sensors. He is also a member of the Electrochemical Society Sensor Group Executive Committee.

Johnson Receives Palmer Award

Dennis C. Johnson, professor of chemistry at Iowa State University and a member of ANALYTICAL CHEMISTRY's Advisory Board, was awarded the 1993 Palmer Award by the Minnesota Chromatography Forum in May. The award, established in 1960, is named for L.S. Palmer, a **former** professor at the University of Minnesota and author of an **early** chromatographic publication on carotenoids and related pigments.

Johnson was recognized for his development of the pulsed **amperometric** detector, one of the most significant developments in electrochemistry, and for his educational activities for the forum. He received his B.S. degree in 1963 from Bethel College (MN) and his Ph.D. in 1967 from the University of Minnesota. Johnson joined the faculty at Iowa State University in 1968 and was promoted to professor in 1979.

Young Investigator Awardee — Adrian C. Michael

Adrian C. Michael has been an Assistant Professor of Chemistry at the University of Pittsburgh since 1990. He obtained a B.S. in Chemistry at Emory University in 1981 and a Ph.D. in Chemistry also at Emory University in 1987. His dissertation research, which was directed by Joseph B. Justice, Jr., concerned the use of in vivo voltammetry for the detection of the neurotransmitter dopamine, in the extracellular fluid of brain tissue. As a postdoc in Mark Wightman's group at Indiana University (1987-1989) he studied voltammetry in supercritical carbon dioxide and also contributed to the development of digital simulations of **voltammetry** at microelectrodes. As a postdoc in Adam **Heller's** group at the University of Texas at Austin (1989-1990) he constructed enzyme-modified **amperometric** microsensors for glucose. His group at the University of Pittsburgh continues to focus on electroanalytical chemistry with emphasis on the development of enzyme-modified microelectrodes for the detection (hopefully in vivo) of choline and **acetylcholine** and **electrocarboxylation** reactions in CC&based media.

[See the August 1993 issue of SEAC Communications for Barry Miller's biographical sketch. — Editor]

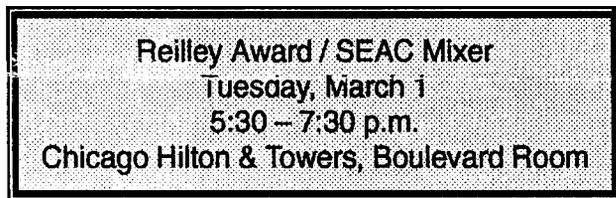
C.N. Reilley Award Nominations Solicited

Nominations for the 1995 C.N. Reilley Award are hereby solicited. Nominations should include a letter of nomination describing the individual's significant contributions to electroanalytical chemistry, at least two seconding letters of support, and a curriculum vitae for the individual. All nomination materials will be retained by SEAC.

Once nominated, any individual will be considered for the Reilley Award for three years without being renominated. The submission of any supporting information or a renomination is welcome at any time, but the decision on the 1995 Award shall be based upon the material which is available to the Award Committee on March 15, 1994. All nomination materials should be sent to: Professor Royce C. Engstrom, SEAC-Reilley Award Committee, Department of Chemistry, University of South Dakota, Vermillion, SD 57069.

Previous Reilley Awardees

1984 Allen J. Bard University of Texas	1996 Jean-Michel Saveant Universite de Paris VII
1985 Ralph N. Adams University of Kansas	1991 Stanley Bruckenstein SUNY Buffalo
1986 Fred C. Anson California Institute of Technology	1992 Stephen Feldberg Brookhaven National Laboratory
1987 Robert A. Osteryoung SUNY Buffalo	1993 Dennis Evans University of Delaware
1988 Royce W. Murray University of North Carolina	1994 Barry Miller Case Western Reserve University
1989 Theodore Kuwana University of Kansas	



SEAC Young Investigator Award Nominations Solicited

Nominations are solicited for the 1995 Young Investigator Award. Potential recipients must be within 7 years of obtaining their Ph.D. or other terminal degree, and under 35 years of age at the time of nomination. Candidates can be nominated by any member of SEAC. Nominations will be selected by the SEAC Awards Committee, and must be received by March 15, 1994. The nominations packet must include a letter describing the significant contributions made by the candidate, an updated curriculum vitae, and at least one supporting letter. Once nominated, candidates will be considered for a period of three years without renomination, although additional supporting materials will be welcome at any time during this period. Nomination files carried over from year to year will automatically be removed from consideration once the candidate reaches the age of 35. Send all nomination materials to: Professor Royce C. Engstrom, SEAC Awards Committee, Department of Chemistry, University of South Dakota, Vermillion, SD 57069.

Previous Young Investigator Awardees

PITTCON '94

Bioanalytical Mini Conference

CHEMICAL SENSORS: A TRIBUTE TO WILHELM SIMON

"FROM SELECTIVE INTERACTIONS TO SELECTIVE SENSORS" Professor Erno Pretsch, ETH-Zurich Switzerland

"ION SENSORS IN CLINICAL CHEMISTRY: THE LEGACY OF PROFESSOR WILHELM SIMON" Dr. Paul D'Orazio, Ciba-Corning Diagnostics

"BIOMEDICAL APPLICATIONS OF FLEXIBLE MICROFABRICATED ARRAY ELECTRODES" Professor R.P. Buck, University of North Carolina at Chapel Hill

"SPATIAL IMAGING AND EQUILIBRIUM MEASUREMENTS OF THE PROC-

I.M. Kolthoff Memorial Symposium

Professor I.M. Kolthoff of the **University** of Minnesota, who is often referred to as "the father of modern analytical chemistry," died on March 4, 1993, 21 days after his 99th birthday. His contributions to analytical chemistry were monumental. He published some one thousand research papers as well as numerous text and reference books that had a seminal influence on analytical chemistry. His scientific progeny with doctoral degrees now number approximately twelve hundred.

PITTCOON'94 will honor the memory of Professor Kolthoff in a full-day symposium on Tuesday, March 1, arranged by **Johannes (Johan) Coetzee** of the University of Pittsburgh who is a first-generation student of Kolthoff. A panel of nine outstanding, internationally recognized scientists has been assembled; all (except one) are first-, second- or third-generation scientific descendants of Kolthoff.

The research of Kolthoff covered an exceptionally broad front and was concerned above all with the understanding of areas of lasting importance, so that it is not surprising that many of his scientific progeny are active in related areas, but taking advantage of recent advances in instrumentation, materials, computation, etc.

The symposium is intended to illustrate the seminal influence of Kolthoff on analytical chemistry in general and his scientific descendants in particular. It includes presentations on important properties of polyelectrolytes and polymers, the properties of nonaqueous solutions and their influence on chromatographic processes, voltammetry in biological cells, electrogenerated luminescence and the spectroscopy of electrode surfaces.

Speakers and titles of their presentations are as follows:
Studies of Electroactive Polymers with the Quartz Microbalance

S. BRUCKENSTEIN, State University of New York at Buffalo

Electron Transfer to Redox-Active Counterions in Soluble Polyelectrolyte-Metal Complexes

F.C. ANSON, California Institute of Technology

Sensitive and Selective Analytical Methods Based on Electrogenerated Chemiluminescence

A.J. BARD, University of Texas at Austin

Surface Vibrational Spectroscopy of Electrodes

A.T. HUBBARD, University of Cincinnati

Can Chemical Probes Determine Generally Valid Properties of Solvent Mixtures?

Y. MARCUS, Hebrew University of Jerusalem

Ambient Temperature Ionic Liquids: Real Nonaqueous Solvents

R.A. OSTERYOUNG, North Carolina State University

Studies of the Hydrophobic Effect and Its Implications for the Retention Mechanism in Reversed-Phase Liquid Chromatography

P.W. CARR, University of Minnesota

Immobilized Metalloporphyrins as Versatile Stationary Phases in Liquid Chromatography

M.E. MEYERHOFF, University of Michigan

Voltammetry: Kolthoff's Creation and Its Use to Sample Microenvironments

R.M. WIGHTMAN, University of North Carolina at Chapel Hill

Gordon Conference On Bioanalytical Sensors

JULY 17-22, 1994, COLBY SAWYER COLLEGE, NEW LONDON, NEW HAMPSHIRE

Sunday p.m. TUTORIAL SESSIONS

Spectroscopy for electrochemists, Richard Thompson*

Electrochemistry for spectroscopists, Dick Durst'

Building sensors in silicon, Martin Peckerar

Genetic engineering for engineering, Matt **Mauro***

Monday a.m. MEDICAL DIAGNOSTICS

Needs and requirements for clinically useful sensors, Barry H. Ginsberg (Chair)

Protein-Nucleic Acid recognition, Michael **Egholm***

DNA binding molecules, Catherine Murphy'

Direct detection of viruses, Bob Carr'

Monday p.m. BIOMOLECULAR INTERACTIONS

Molecular self-organization at surfaces, Helmut Ringsdorf (Chair)

Multianalyte sensing, Sharon Neal'

Induced electrostatic potentials on antigen-antibody complexes for bioanalysis, Cheng Lee*

Kinetics and inhibitors, John **Albery***

Tuesday a.m. ENVIRONMENTAL MONITORING

Needs, limitations, and opportunities, Jeannette Von **Eron** (Chair)

Ionophores and metal ions, R.K.R. **Easwaran***

Portable SPR & environmental detection of bacteria, David **Squirrel***

Long term, remote sensing, Ken Johnson'

Tuesday p.m. SIGNAL DISCRIMINATION

Nonspecific adsorption, Tom Horbett (Chair)

Single molecule analysis, Mike Barnes*

Near IR dyes, **Gabor Patonay***

Fluorescent binding proteins, Tony **Cass***

Wednesday a.m. and p.m. TECHNOLOGY DRIVERS

Potential for small devices, Leroy Hood (Chair)

Beyond Sensors: Micromachining sensors and chemical separations on chips, Jed Harrison*

Monitoring insulin at single cells and islets with high time resolution, Robert Kennedy*

Micromachined neural interfaces, Greg **Kovacs***

Micromachined optical devices, Lloyd Burgess'

Templating, Klaus Mosbach

Chemometrics, Karl Booksh'

Thursday a.m. IN VIVO MEASUREMENTS

State of the art, Peter Lonroth (Chair)

Extracting new information with microdialysis probes, Jay Justice'

IR fluorescence for noninvasive IR sensing, Robert Lodder'

Submicron optical fiber sensors, Raoul Kopelman'

Thursday p.m. WORKSHOPS

Detection of peroxide

Problems in calibration

Random vs. rational synthesis of binding and catalytic sites

Where are the membrane sensors for anions?

Rational design of macromolecules and supramolecular systems

In vivo sensors

How not to make a biosensor!

Statistics and chemometrics

Friday a.m. MOLECULAR ELECTRONICS

Electronics of biomolecules, Watt Webb (Chair)'

Chemistry of molecular electronics, Jim Tour*

Molecular electronics for sensors, Howard **Weetall***

Those marked with asterisks have confirmed their willingness to participate.

Louis Meites — in Memoriam

It was sad news that Louis **Meites** is no longer with us. Lou (to his friends) had a brilliant academic career: Graduate of Middlebury College; he received his Ph.D. from Harvard University; taught at Princeton University, Yale University and Polytechnic Institute of Brooklyn, where in 1967 he became the Chief of the Division of Analytical Chemistry.

From 1968 until 1981 he was the chairman of the Department of Chemistry and the then **Clarkson** College of Technology which became **Clarkson** University. He was the best chairman in living memory and always managed to find consensus in the department of a dozen plus strong personalities. When R. Plane, at that time the president of Clarkson, introduced limited terms for department chairmen, Lou unwillingly stepped down and left in 1984 to become the chairman of the chemistry department at the George Mason University in suburban Fairfax, Virginia. His successful drive to build up the graduate program in chemistry there was interfered with by cardiovascular problems. The attempt to rectify his condition by open-heart surgery was **unfortunately unsuccessful!**

From his marriage with Thelma, his student at Yale, he had three children. With his second wife, Ruth, he shared the love of opera.

Lou was a very conscientious teacher, who as chairman, always stressed the importance of good teaching to his faculty. His great management

of time enabled him to successfully blend teaching with research. He wrote a good textbook serving as an introduction to chemical equilibria and kinetics for freshmen chemistry majors. His great ability to formulate ideas very precisely and clearly, assisted by his mastery of English was demonstrated in *Advanced Analytical Chemistry* (with H.C. Thomas, **1958**), a predecessor of Laitinen's book and others, extending the marriage of analytical and physical chemistry.

His research interests were originally oriented to the use of electrochemistry in the studies of oxidation-reduction processes of inorganic compounds. This led to studies of controlled-potential **electrolyses** of both inorganic and organic compounds. His experience in mechanistic studies was most valuable in evaluation of electrochemical data collected in the CRC Handbook Series in Organic and Inorganic Electrochemistry, edited with the undersigned, which remains the largest collection of electrochemical data. The long hours spent in the development of forms, of critical evaluation procedures, but particularly in discussions of mechanisms of individual systems are gladly **remembered**. Two **editions** of his *Polarographic Techniques* assisted several generations of graduate students in introduction to this complex but rewarding area of electroanalytical chemistry.

Lou recognized early the importance of the use of computers in chemistry and was one of the first pioneers in the area now called chemometrics. He applied

nonlinear regression analysis and deviation pattern analysis to the treatment of titration curves and was involved in the development of automated procedures for the interpretation of chemical data and the design of chemical experiments. He was also interested in formation of intermetallic compounds in mixed amalgams, thermochemistry and development of techniques for studying chemical reactions in solutions which resulted in over 200 publications.

Last, but not least, Lou was a warm, friendly human being. He had a great ability to deal kindly with **people** and had a somewhat unusual, somewhat surrealistic sense of humor based on puns. Those who appreciated it, like the undersigned, enjoyed his company tremendously. Being in an adjoining office, good laughs were part of everyday life. His analytical and logical way of thinking was reflected outside chemistry — he was an excellent bridge player, who knew how he would play a given hand the moment he received it.

Unfortunately, when moving to a new position he found it necessary to burn bridges with he past. He did that with Yale, with Brooklyn Poly, and finally with **Clarkson**. So **lost** him for the second time. I miss him.

P. Zuman

Announcement of Retirement

After just over thirty years of service, it is with regret and sadness that we wish to announce the retirement and impending passing of an old, valued, and trusted friend. As it must to everyone, the old must make way for the new. This old friend, however, has sustained us in sickness and health, in richness and poverty, and in good times and bad. This friend has been an unnamed author on **a good** many, and perhaps even many good, papers that have emanated from our laboratories over the past years.

Our first encounter with this long trusted, dedicated soul started in California, at the then North American Aviation (now Rockwell International) Science Center, in about 1962. Our relationship improved as we moved to Colorado State University, ripened and matured as we moved to State University of New York at Buffalo, and now, finally, has resulted in retirement here at North Carolina State University.

Therefore, it is with great pain and sadness that we, joined by Dr. John

O'Dea, announce the retirement of all of the Digital Equipment PDP-8 computers from our laboratory.

Donations to the **SJDrybox** Fund in honor of the last of the PDP-8's will be accepted. Please make checks payable to the SJDrybox Fund.

Janet G. **Osteryoung**, Professor and Head
Robert A. **Osteryoung**, Research Professor
Department of Chemistry
North Carolina State University
Raleigh, NC 27695-8204

Letters

Dear Dick,

In your editorial in the August 1993 edition of SEAC Communications you solicited comments from those who have read "Bad Science: The Short Life and Weird Times of Cold Fusion," by Gary Taubes. I have read it, and here are my comments.

I found the book to be well-researched, well-documented, and well-written. In addition to using published material, the author interviewed 257 people (not including those requesting anonymity). The author is clearly not a "believer" in cold fusion, but in my opinion his coverage of events is accurate and his conclusions are supported by the facts. It is not a useful distinction to label the book as complimentary or not complimentary. The actions of electrochemists in this drama speak for themselves.

I recommend the book to anyone who is interested in the history of cold fusion and who wants to gain insight into the personalities of the principal players. Moreover, the book inspires constructive thought concerning the purpose of science and the motivations of scientists. I would like to see it become required reading for first year graduate students.

Carey Scortichini
Central Research and Development
The Dow Chemical Company
Midland, MI 48674

Dear Dick:

I am looking for examples of experiments (projects) for teaching laboratories which involve electrochemistry and integrate information from other instrumentation. For example, I would like to find experiments in which a substance is characterized by IR, MS, NMR, or UV-Vis (or whatever, including LC or GC) and this data is integrated with voltammetry information to arrive at a conclusion (structural, mechanistic, thermodynamic, whatever). Examples are especially sought from organic, bioorganic, inorganic, bioinorganic, and physical chemistry (let's not forget materials science). This information is sought for a model undergraduate course (sophomore year) in molecular characterization which would tie together various techniques around a common software base for graphics, statistics, report generation, literature searches, molecular structure, etc.

I would appreciate hearing from anyone who may have defined such an open-ended experiment as part of the undergraduate curriculum.

Peter T. Kissinger
Department of Chemistry
Purdue University
West Lafayette, IN 47907

Dear Dick:

Just read the latest SEAC Comm. Always enjoy it. Great job. But... in case anyone asks, on first line after first equation of Electrolysis with No Current: insert ...of the Hg electrode. The second reversible wave results from the stepwise reduction of the HgSe formed.

I'm sure any competent electrochemist will figure it out anyway.

Best regards,
Gary Christian

Dear Dick:

This was in our local paper. Since it featured the 1987 Reilly Awardee, you might be able to use it in your editorial... apparently it was quite widely published. We were beat down on cold fusion -- so now "we" electrochemists generate power from urine. We need some better PR soon!

Pete Kissinger

INVENTORS PUSH BATTERY THAT RUNS ON URINE (cheaper than acetone)

PASADENA, Cal. (by the Associated Press) — Three men who say they invented an electric battery that runs on urine are seeking investors with \$5 million. At least one doubting scientist said he wouldn't give 5 cents for the thing.

And other scientists said they were highly skeptical of the inventors' claims, in particular without knowing what other materials were used and the chemical reactions purported to produce the power.

That's a secret, say the inventors, Nelson Camus, Edgar Aguayo and Ismael Valle, partners in a company they named Nel Nithium Electronics and run out of a home in Hacienda Heights, a Los Angeles suburb.

But "without more information, it would be impossible to determine if there is anything here or not," said Robert Osteryoung, an electrochemist at North Carolina State University in Raleigh, N.C. He's the one who wouldn't part with a nickel for the device. [Bob is in the public eye again! Is urine a molten salt?]

Camus, a 45-year-old electronics engineer from Chile, discovered the compound that makes the battery work, Aguayo said. They call it Nelson's lithium — or nithium for short.

They need investors to refine the device, which they say could run anything from a watch to a home power plant. In

the meantime, a prototype will be displayed at the Invention Convention showcase running through Labor Day at the Pasadena Convention Center.

Chemist Gary Henriksen, in charge of advanced battery development at Argonne National Laboratory in Illinois, called the idea "off the wall." (No joke!)

New Members:

James Klancke
Lilly Research Laboratories 3/12/93

Eve F. Sullenberger
University of Pittsburgh 3/15/93

Mark T. Stauffer
University of Pittsburgh 3/29/93

Brigitte Ramos
University of Cincinnati 3/19/93

Robert L Turner
University of Illinois 4/1/93

Peter Vandeberg
Iowa State University 4/8/93

Susan Morris
Andcare, Inc. 6/28/93

Tai-Sung Hsi
National Sun Yat-Sen University
8/20/93

David J. Weiss
University of Kansas 10/13/93

Michael V. Mirkin
Queens College - CUNY 11/11/93

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