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President's Message

The Reviewer's Dilemma

I am willing to bet that you have had more than a few reviews that would have been funny had the paper/proposal not been yours. I am also sure that you have never written a bad review. So where do these clever editors come up with these reviewers? I certainly don't know, but a recent review that I received, which contained abundant evidence of the writer's poor training, has prompted some thinking about the review process. (What has this to do with electrochemistry? See the bottom of this column for one comment that prompted this column.)

Let's do the numbers … Start with the facts. You should expect to review 2-3 times as many papers as you submit and 5-6 times as many proposals as you submit. There is no way around it.

Managing reviews … A few years ago I thought that I was being abused. I reviewed 3 proposals and 8 papers in a period of a couple of months, and I had a proposal deadline looming. I asked a secretary to send a simple two-line letter asking for a 3-month cease fire to all of the editors and program directors who had been providing me with free entertainment over the previous couple of months. It worked! Each and every letter recipient respected my wishes, and several phoned me after 4 or 5 months asking if I was ready to begin reviewing again. Clearly the editorial offices are well-organized and have a way to keep track of your availability.

Managing reviews, Part B … I oscillate between two modes: "Do it now" and "pile 'em up to take on the next trip." I gotta tell ya—the first one is the best one, for papers anyway. You really ought to be able to review a paper in a very brief time. Here's how you do it. Put it on your calendar, like an appointment. This is not the same as putting it on your list, mind you. If you create a place for it in your week, it will happen. By the way, this works well for any project—put a defined piece of work on your calendar just like an appointment. The other mode—the travel mode—could be OK if you travel frequently enough. Do let your editor know if you plan to review the paper on your schedule, not the editor's.

A little help … Did you ever get a review that was more about spelling and punctuation and experimental details than anything else? It's a 50-50 bet that a graduate student wrote that review. I like to have students review papers (never proposals of others; however, I do give them mine at many stages) but they tend to avoid the big picture questions and focus on the minutiae. If you ask students to review papers, work with them.

When you submit … What can you do to improve your odds at getting a fair and rapid review? The most important thing is to write the introduction in a way that focuses the reader's attention on the single issue that you addressed in the research. Paraphrase that in the cover letter to the editor. Finally, give the editor half a dozen, not two, names of potential reviewers. Give addresses, at least for industrial or government scientists who are not listed conveniently in the ACS Graduate Directory or on the web.

So what has this to do with the Editor's stable of less-than-helpful reviewers? I think many reviews come from good people, but the reviews are less than adequate because the reviewers are not managing their reviewing chores well, or they are only tangentially interested in the work that they are reviewing.

Solutions … Control your reviewing chores. Make a conscious decision to avoid reviewing for some period of time, and tell program directors and editors about this decision via a letter, phone call, or email. Then, when you are in the reviewing mode, you will be mentally prepared for it. When you get a paper—put it on your schedule as an appointment. When you get a proposal put it on your schedule as a half-day for reading and pondering, and an hour for writing and editing the review. If you direct reviews to students, work with them.

When writing papers … Be clear about your hypothesis and experimental tests of it. That way the editor and the reviewers know what you are up to, and will be compelled to comment on substantive and relevant issues, rather than commenting on inconsequential or tangential issues, or worse, requesting that you do a bunch of additional experiments.

So, ultimately, if we all do our jobs well, quantitatively and qualitatively, then editors will not have to stretch to seek out reviewers

for our papers. The result will be a better system for all of us.

Now, the reviewer's comment that prompted this thinking: We had used ferrocene in an acetonitrile-based electrolyte and ferrocene carboxylic acid in an aqueous/organic electrolyte to calibrate an electrochemical system (n = 1). "Ferrocene and ferrocene carboxylic acid are not very stable. Are they very reliable standards for calibration of hydrodynamic voltammetry and HPLC detection?"

Steve Weber

Editorial

It has been a busy Spring (so busy that I am a member of Steve's category of reviewers who now lives in danger of death by collapsing piles of papers and proposals that are long-past needing a review … and remember, Steve: we in industry and government aren't writing proposals that y'all in academia need review … that means the many proposals we review in a given year are our gift to you, yours, and the system ...

Some of you have been keeping track of why it has been such of a busy Spring for me.

For those of you have not (and give a hoot), feel free to check out my guest editorial in the 13 March 2000 issue of *C&EN* in which I discuss why it may be time to withhold Federal dollars from (in other words, apply Title IX to) universities that cannot create a departmental environment that women chemists are willing to call home. Be sure to check out the three letters in response to my editorial, which were published in the 8 May issue of *C&EN*, including two from SEAC stalwarts: **Pete Kissinger** (Purdue) and **Alex Scheeline** (University of Illinois). And if you are pathologically interested, the slides that I used in my talk on 3 May at the National Academy of Sciences (as part of a Chemical Sciences Roundtable Workshop on Women in the Chemical Workforce, 3-4 May 2000) can be read by a direct link (Why Title IX) on **Dick Crooks**' website:

www.chem.tamu.edu/rgroup/crooks

or one can go directly to:

http://www.chem.tamu.edu/rgroup/crooks/links/Title_9/Title9.html

Tusen takk to Dick!

One of the pleasant pieces of fallout from my wee editorial Molotov cocktail is the article published in this issue, which was sent in, post-editorial, by **Anna Farrenkopf** of the Oregon Graduate Institute. Anna, our electrochemist of diagenesis fame [*SEAC Communications* **1997**, *13* (3)] describes her electroanalytical work using microelectrodes in a challenging electrochemical environment (Columbia River sediment!) as well as her equally important work to interest young girls in science through OGI's AWSEM program (Advocates for Women in Science, Engineering, and Mathematics)—love that acronym, Anna!!

In this issue we also have a review by **David Blauch** of web-available software that simulates voltammetric data, including reaction mechanisms, plus a new cartoon from **Daren Caruana**, SEAC's cartoonist of all things electrochemical.

And most importantly, this issue touts SEAC's latest award winners: **Dick Buck**—the 2001 Charles N. Reilley Awardee—and **Eric Bakker**—SEAC's Young Investigator! Their research biographies follow immediately. My personal and our Society's warmest electronic (and ionic!) congratulations to them both.

May your summer be productive!

Debra Rolison

All Hail Dick Buck—the 2001 Charles N. Reilley Awardee—and Eric Bakker—SEAC's Young Investigator!

Congratulations to Professor **RICHARD P. BUCK**, recipient of SEAC's 2001 Reilley Award. He will receive the award at PITTCON® 2001 in New Orleans next March. Buck recently retired from the faculty at the University of North Carolina, Chapel Hill, after an illustrious industrial and academic career that spanned nearly 50 years. A native of Los Angeles, Dick Buck stayed close to home to receive his B.S. and M.S. degrees in Chemistry from the California Institute of Technology in 1950 and 1951, respectively. He then traveled east and earned his Ph.D. in 1954 from the Massachusetts Institute of Technology, where he worked with **David N. Hume**.

Following his graduate work, Buck carried out fundamental research on fuel cells and other electrochemical systems at the California Research Corporation. He later moved to Bell & Howell, and then Beckmann Instruments. His experiences at Beckmann in the early days of electrochemical sensors and membrane electrodes helped pave the way for him to become the preeminent academic researcher in this field once he joined the faculty at Chapel Hill in 1967.

Buck made enormous contributions to the fields of electroanalytical chemistry and fundamental electrochemistry during his many years as an active researcher. Indeed he is the author/coauthor on more than 240 original research papers, dating back to his earliest work on the first constant-current dual intermediate titrimetric scheme that was published in *Analytical Chemistry* in1952. In the '60s and '70s he focused his efforts on the theory of interfacial potential development and selectivity of solid-state and glass membrane electrodes, including very tedious calculations of the potential profiles that exist at electrode/membrane interfaces (using numerical solutions of the Nernst-Planck-Poisson equation). He was one of the very first to apply impedance methods to delineate the charge-transfer kinetics at the interfaces and within the bulk of membrane electrodes, including the development of improved instrumentation to carry out such impedance measurements.

As newer organic liquid- and polymer-membrane-based ion-selective electrodes began to emerge in the 1970s, Buck turned his attention to understanding the ion permselectivity of such membranes, including an in-depth effort to define the role of endogenous and exogenous lipophilic counterion sites in preventing interfacial Donnan failure at higher concentrations of analyte ions. He later went on to pioneer the development of novel microfabricated ion and biosensor arrays based on flexible Kapton substrates, and further demonstrated that such devices can be implanted within living heart muscle to provide the first real time measurements of key ions (H^+, K^+, etc.) and metabolites (e.g., lactate) in such tissue.

Dick Buck's research contributions go beyond the classical electrochemistry boundaries. Indeed, several of his early academic papers dealt with spark sources for mass spectrometry, spectral deconvolution methods, Raman spectroscopy of adsorbates on electrode surfaces, etc. As one nominating letter writer put it, "these (other) contributions clearly illustrate the great breadth of his knowledge and interests … and the high scholarly quality of his work (electroanalytical and other) over an extended time period makes him especially worthy of receiving SEAC's highest honor."

Congratulations to Dick Buck on this very well deserved award—we look forward to celebrating with him next March in New Orleans!

Eric Bakker, Auburn University, is the 2001 Young Investigator of SEAC. Eric, a native of The Netherlands, attended university at ETH in Zurich, Switzerland, and received his Dipl. Chem. in 1989 and Dr. Sc. Nat. in 1993, working with the late **Wilhelm Simon**. He then joined the research group of Professor **Mark Meyerhoff**, as a postdoctoral fellow, at the University of Michigan from 1993 to 1995, where he developed models for anion sensors that have exerted a major influence on current research in this area. He developed a model/mechanism that thoroughly explains the response of certain polymeric membranes to macromolecular polyanionic species. A major contribution was his development of a more practical and self-consistent model for mathematically expressing, the selectivity of ion-selective polymeric membrane electrodes. While at Michigan, he broadened his horizons by working with Professor **Raoul Kopleman** in ultramicro-optical sensors, and introducing fluorescent bulk optodes.

Bakker joined the faculty at Auburn University as Assistant Professor in 1995 and was promoted after just three years to Associate Professor. He has made numerous seminal contributions to our understanding and development of chemical sensors. One nominator states: "He has single handedly changed the way we think of, design, and use ion-selective electrodes in two important areas: assessment of the true selectivity of an electrode, and the design and measurement technique to lower the limits of detection by orders of magnitude over what was possible before." He has over fifty publications in the last 6 years. Among more than 20 papers on the theory of ionophore-based ion-selective electrochemical/optical sensors, perhaps his most innovative work relates to the determination of unbiased selectivity coefficients for such devices. Indeed, he has shown the long-used empirical Nicoslky-Eisenman relationship to be incorrect in certain cases and replaced it by an exact equation, and he showed that conventional methods for determining selectivity coefficients are biased by the presence of primary analyte ion within the polymeric membrane phase of the sensor. At the same time, his discovery that primary and counterion diffusion through the membrane from the internal filling solution actually controls the detection limit led to a host of reports, in collaboration with **Erno Pretsch** and coworkers at ETH-Zurich, for methods to greatly lower the limit of detection for such sensors merely by creating a gradient of primary ion-ionophore complexes through the membrane. This latter work is truly revolutionary.

His more recent work has included various other important contributions in the field of sensors, such as reversible heparin sensors, improved biocompatibility of ion-selective electrodes, new kinds of reference electrodes, sensor membranes with acid release, and pioneering work in the new field of voltammetric transduction of ion sensing with polymeric membranes.

Eric Bakker has gained the recognition and respect of leaders in the field. One says: "I believe he is currently the preeminent person in the world working on the fundamentals of ion sensor response characteristics and mechanisms." Another says: "He is the bright spot among the youngest group of the electrochemical sensor people specializing in membrane and polymer electrolyte chemistry." One states: "With his broad fundamental knowledge, he has become, within a very short time, one of the leading scientists in the field of chemical sensors, and his quiet and friendly character and complete integrity have always been appreciated by his colleagues." And another says: "In my view, Eric Bakker is one of the up-and-coming young analytical chemists in the U.S., and one of the top researchers and leaders in the world in the area of sensors…"

—Remember—We are back at Party-Central—New Orleans—for PITTCON® 2001 (5-8 March 2001)—Be There! (Note: we had to run Dick's photo in B&W because he is so colorful!!) For more on Dick, check out: http://www.chem.unc.edu/faculty/rpb/cfrpb01.html***; for Eric:*** http://www.auburn.edu/~bakkeer ***…***

Submission of Award Nominations

SEAC established and administers the Charles N. Reilley Memorial Award and the SEAC Young Investigator Award. Sponsored by Bioanalytical Systems, Inc., the Reilley Award recognizes an active researcher who has made a major contribution to the theory, instrumentation, or applications of electroanalysis. The Young Investigator Award recognizes accomplishments by a researcher who is within the first seven years of their career. This award is sponsored by Ensman Instrumentation. In conjunction with the presentation of these awards, SEAC arranges an Award Symposium and an informal reception in honor of the Awardees at the Pittsburgh Conference. In this way, SEAC serves as the focal point for analytical chemists who wish to exchange ideas about electroanalytical chemistry at the conference.

Charles N. Reilley Award

Nominations for the Reilley Award 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 three years, but submission of any additional supporting information or a renomination is welcome. The decision for the 2002 Reilley Award will be based upon the material that is available to the Award Committee by 1 March 2001.

Young Investigator Award

Nominees for the SEAC Young Investigator Award, sponsored by Cypress Systems, must be within seven years of obtaining their Ph.D. or other terminal degree at the time of nomination. Candidates may be nominated by any member of SEAC. Nominations should include a letter describing the individual's promise in the area of electroanalytical chemistry, at least one seconding letter 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 this award for three years, but the submission of any additional supporting information or a renomination is welcome. The decision for the 2002 Award will be based upon the material that is available to the Award Committee on the 1st of March 2001.

Graduate Student Travel Award

The SEAC Graduate Student Travel Grant, sponsored by PerkinElmer Instruments, is awarded to promising graduate students to offset the cost of travel to the Pittsburgh Conference to deliver an oral presentation in a Conference symposium. The presentation should be on a topic related to their Dissertation or Thesis, and in some area or application of electroanalytical chemistry.

Because the costs in various venues of the Conference may vary, the amount of the award will be determined by SEAC and will be between $250 and $500. The value of all of the awards in any one year will be equivalent, but it may vary from year to year. The award will not exceed the reasonable cost of advance-purchase economy airfare and reasonable expenses for lodging, nor the awardee's actual expenses. In order to spread the travel money as equitably as possible, not more than two awardees will be selected from any one research group and no more than three awards will be made to students from any one educational institution.

Nominations for travel grants are due to the SEAC awards committee chair by the same date as the deadline for submission of PITTCON abstracts—for the 2001 meeting this is in August. The nomination shall consist of the student's current graduate transcript, a copy of the abstract submitted to the Pittsburgh Conference, a complete resume including publication list, and a letter of recommendation from the student's research advisor. The advisor's letter should include a statement of approximate graduation date and a short description of the student's speaking ability. A candidate shall be considered for an award for travel to PITTCON meetings occurring up to one year after the student's Ph.D. defense. Previous awardees will not be eligible for further consideration.

Requests for further information or submissions of nominations should be directed to:

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Texas A&M University
College Station TX 77842-3012

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Email: crooks@tamu.edu

REILLEY AWARDEES

1984 **Allen J. Bard**
University of Texas

1985 **Ralph N. Adams**
University of Kansas

1986 **Fred C. Anson**
California Institute of Technology

1987 **Robert A. Osteryoung**
North Carolina State University

1988 **Royce W. Murray**
University of North Carolina

1989 **Theodore Kuwana**
University of Kansas

1990 **Jean-Michel Savéant**
Université de Paris VII

1991 **Stanley Bruckenstein**
SUNY—Buffalo

1992 **Stephen Feldberg**
Brookhaven National Laboratory

1993 **Dennis H. Evans**
University of Delaware

1994 **Barry Miller**
Case Western Reserve University

1995 **William Heineman**
University of Cincinnati

1996 **R. Mark Wightman**
University of North Carolina

1997 **Dennis C. Johnson**
Iowa State University

1998 **Larry Faulkner**
University of Illinois

1999 **Janet Osteryoung**
North Carolina State University

2000 **Henry White**
University of Utah

2001 **Richard P. Buck**
University of North Carolina

YOUNG INVESTIGATOR AWARDEES

1993 **Leonidas Bachas** and **Werner Kuhr**
University of Kentucky *University of California, Riverside*

1994 **Adrian C. Michael**
University of Pittsburgh

1995 **Mark Anderson**
Virginia Polytechnic Institute

1996 **Louis A. Coury**
Duke University

1997 **Ingrid Fritsch**
University of Arkansas

1998 **Greg Swain**
Utah State University

1999 **Daniel Feldheim**
North Carolina State University

2000 **Merlin Bruening**
Michigan State University

2001 **Eric Bakker**
Auburn University

And you thought Dick Buck was just SEAC's 2001 Reilley Awardee?!!!

Where does **Richard P. Buck** *really* lurk??

Here! RICHARD P. BUCK
N 32 23.351' / W 064 40.885'

The *Richard P. Buck* was wrecked in 1889 near the shore off the East End of Bermuda. The ship was carrying a general cargo including whisky and kerosene. [Editors' note: of course it was! … the man drinks Manhattans!!]

Today the remains of this ship lie on a sand bottom only a few yards off Tobacco Bay in St. George's. There is very little left of the ship, except for scattered timbers, brass spikes and fasternes and other miscellaneous wreckage. This site can be dived from shore, but as there is very little to see and its proximity to shore decreases visibility, it is not recommended.

This would be classified as a beginner-to-novice dive.

—Check it out!

http://www.makinwaves.bm/Pages/dive25.htm

… but of course the real place to view R P. Buck is at PITTCON® 2001, 5-8 March 2001, in New Orleans!—

Kudos to SEAC Ex-El Prez Rick McCreery!!

Richard L. McCreery, Dow Professor of Chemistry at Ohio State University and distinguished former President of SEAC, is the recipient for 2000 of the ACS Award in Electrochemistry.

Rick is internationally renowned for his research on the nature of carbon electrodes and the development of electronic and vibrational spectral probes, particularly those based on Raman spectroscopy, to characterize the structure of the electrode surface and the adjacent solution layer, as well as the study of electron-transfer dynamics therein. This award will be presented by the Analytical Chemistry Division of the American Chemical Society during the National ACS Meeting in Washington, 20-24 August 1999.

—Congratulate Rick at: mccreery.2@osu.edu

Kudos to SEAC Ex-Secretary, Andy Ewing!!

Andrew G. Ewing, J. Lloyd Huck Professor of Natural Sciences and Professor of Chemistry at the Pennsylvania State University (and soon-to-be-former Secretary of SEAC), is the recipient of the American Microchemical Society Benedetti-Pichler Award for 2000. Andy is an internationally recognized chemist at the interface of neuroscience, electrochemistry, and separation science. A symposium in his honor, organized by (Ex-El Prez) **Mark Wightman**, will be held on Thursday, 2 November 2000 as part of the Eastern Analytical Symposium & Exposition in Atlantic City, NJ from 29 October – 3 November 2000.

Here is Professor Ewing water skiing over the wreck of the *Richard P. Buck.*

—Send Andy some non-microscopic congratulations: age@psu.edu

—Tools of the Trade: A Review—

As Editor, I am occasionally sent requests to alert SEAC to electrochemically related products. Rather than just tell you about the item, I prefer to accompany the information with a review. This issue explores a software package, Polar 4 from **Dr Huang Pty Ltd**, Sydney, Australia, which can be used to simulate voltammetric information.

Polar 4.1 was put through its paces by Professor **David Blauch**, Davidson College.

FYI from the Author

Date: Wed, 8 Dec 1999 15:22:27 +1100
From: "Dr Huang" <showing@bigfoot.com>

Polar 4 for Windows: Electrochemical simulation and data analysis

This program analytically and digitally simulates voltammograms (polarograms) for virtually any mechanism at eight electrode geometries (planar, spherical, semi-spherical, cylindrical, semi-cylindrical, microdisc, thin film, and rotating electrodes) and for over five techniques: linear sweep and cyclic voltammetry, and DC, normal pulse, differential-pulse, and square-wave voltammetry. It outputs current, resistance, conductivity and surface concentration. It also simulates effects of charge current, resistance, noise, electrolyte, stripping time, stripping potential, etc. The user can type in the mechanism of choice.

The program analyses any ASCII x-y data for detecting peak location, peak value, semi-derivative, derivative, integral, semi-integral, curve fitting, and separating overlapped peaks.

It shows a tip when the user puts the mouse cursor over a label. It can separate overlapped voltammograms into individuals, and extract real peaks from voltammogram with noise and baseline. Users can compare by the theoretical peak values, analytically and digitally simulation, and choose which kinetic parameters to extract. The data can be imported into other programs (e.g., MS Excel).

The program has been successfully applied to fit experimental voltammograms of In(III), Cd(II), Pb(II), Tl(I), Cr(III), Zn(II), and binuclear copper complexes in aqueous and non-aqueous media at mercury, solid metal and non-metal electrodes (specifically the dropping mercury, hanging mercury drop, gold, platinum and glassy carbon electrodes) by various electrochemical techniques (differential pulse, square wave, and pseudo-derivative normal pulse polarography).

The program is available from the author or it can be downloaded from his Web site.

References

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4. J. Mo, P. Cai, W. Huang, F. Yun, Theory and application on multiple semidifferential electrochemical stripping analysis with thin mercury film formed in situ. *Acta Chimica Sinica*, **1984**, *42*(6), 556-561, [CA 101: 162712].

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FYI from the Reviewer

Polar 4.1 for Windows

Electrochemical Simulation and Data Analysis Software

Dr. Weiguang Huang , Dr Huang Pty Ltd
http://www.drmath.com

Reviewed by **David N. Blauch**, *Department of Chemistry, Davidson College, Davidson, NC*

Polar 4.1 for Windows is a software package that runs under Windows 95/98/NT and simulates voltammograms for user-defined electrochemical systems. My evaluation of

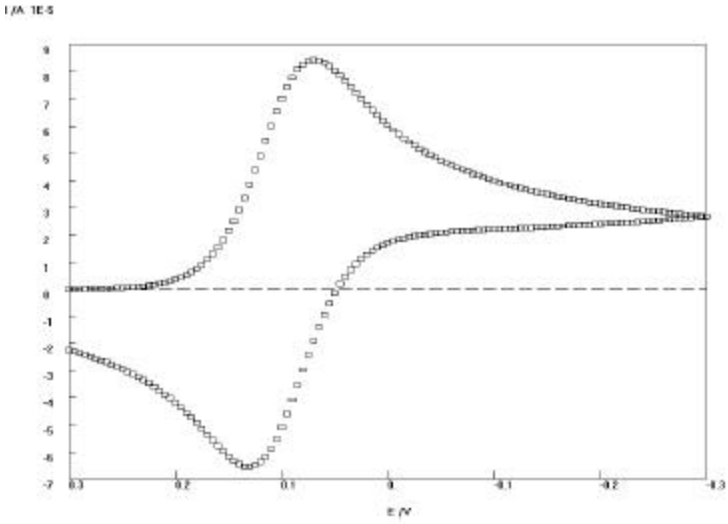
Polar 4.1 was performed on a Dell Optiplex GXa configured with a 330 MHz Intel Pentium III processor and 128 Mb RAM running Windows NT Workstation 4.0 (Service Pack 5). The Polar 4.1 software was obtained from the DrMath.com web site (http://www.drmath.com). There are two different packages for installing the software. Polar41.zip (124 Kb) contains only the Polar 4.1 software itself. Polar 4.1 utilizes the Microsoft Visual Basic 6.0 runtime libraries; if this support is already installed on a machine, the files can be extracted from Polar41.zip and used immediately. If Visual Basic support is not available (as was the case for my system), it is necessary to download the much larger Polar41c.zip (1.6 Mb) file, which contains a setup program that installs both Polar 4.1 and the Visual Basic 6.0 runtime libraries. In my experience, Polar 4.1 is not compatible with the most recent releases of the Visual Basic 6.0 runtime libraries. I found it necessary to allow the setup program to install all of the Visual Basic files, even if this means overwriting existing, more recent files. It would be wise to make backup copies of the affected files, in the event the Visual Basic files installed for Polar 4.1 are not compatible with other software on the system.

The documentation for Polar 4.1 is primitive at best. An HTML version of the documentation (polar.doc.htm) accompanies the program and can also be obtained from the DrMath.com web site; there is also an FAQ for the software. Unfortunately, this documentation merely lists the features of the program without providing a meaningful explanation of how to use the software, and there are no "help" features in the software itself. Users will need to learn how to use the software through intuition and trial-and-error, as there are no explicit instructions for performing common operations. This limitation is probably not a major problem for someone who is both computer-savvy and well-informed about electrochemical experiments, because Polar 4.1 provides a graphical interface and employs menu options that are straightforward and descriptive. The absence of documentation might be a problem for users new to voltammetry, especially students, who lack the fundamental understanding of electrochemistry necessary to interpret the various menu options.

For individuals who possess expertise in voltammetry, Polar 4.1 is very easy to use. Simulation parameters are entered through four options under the "Input" menu. The "Techniques" option allows one to select from linear sweep and cyclic voltammetry, DC voltammetry, normal pulse voltammetry, differential pulse voltammetry, and square-wave voltammetry. The "Mechanism" option provides a box for defining the chemical and electrochemical reactions. "Analytical" simulations are provided for a collection of common, simple mechanisms such as E, EE, EC, and CE. For other mechanisms, "digital" simulations are performed. Templates are provided for heterogeneous electron-transfer and homogeneous first- and second-order reactions—one simply enters symbols for the relevant chemical species. The "Instrument" option provides a dialog for specifying experimental conditions such as starting and final potentials, interfacial capacitance, solution resistance, and noise. The user may select from planar, (micro)spherical, (micro)hemispherical, microdisc, (micro)cylindrical, (micro)hemi-cylindrical, band, rotating disk, and thin-film electrode geometries. Depending upon the geometry selected, additional boxes appear for the dimensions of the electrode and other parameters. In the version I tested, the rotating disk and thin-film electrode geometries were disabled, and I was consequently unable to unable to test those features. The various chemical and electrochemical parameters (e.g., diffusion coefficients, concentrations, and rate constants) are defined under the "Chemicals" option. Polar 4.1 can also has an option to fit a simulated voltammogram to experimental data, and the "Chemicals" option allows one to specify which parameters are adjusted in the fitting process.

The use of menus of features and templates for the reactions makes configuring a simulation extremely easy and very attractive for students, who often require guidance on the types of information required. On the other hand, the templates create a potentially serious limitation for the reaction mechanism. The templates provide space for only three heterogeneous electron-transfer reactions and seven homogeneous reactions, four of which allow for only one reactant and one product and three of which allow for two reactants and two products. There are no provisions for more complex reaction stoichiometries. It is not difficult to find reaction mechanisms that involve more than three electrode reactions. Polar 4.1 could not, for example, be used to model the

electrochemical properties of buckminsterfullerene.



Once the simulation has been defined, one simply chooses the "Simulation" option under the "Run" menu to perform the calculations; the results are displayed in a window in the program. Output options include current, conductivity, resistance, and surface concentration, but it is not possible to examine the concentration profiles. There is an option to copy the voltammogram to the clipboard, which permits pasting the voltammogram in a document, as has been done with the cyclic voltammogram shown at the right. The user may manually scale the plot and control the point and line styles. It is also possible to overlay voltammograms. The results of a simulation may be exported as a text file.

A variety of analysis features are available, including integration, semi-integration, differentiation, and semi-differential, in addition to a standard peak finding feature. An import option is provided for analyzing experimental data, but I found that most of the display and analysis options were nonfunctional or unreliable in analyzing experimental data.

I tested the fitting feature of Polar 4.1 using an experimental cyclic voltammogram for the reduction of $Ru^{III}(NH_3)_6^{3+}$ to $Ru^{II}(NH_3)_6^{2+}$ in aqueous solution at a glassy carbon disk electrode. The import feature of Polar 4.1 reads only text files, which means other experimental parameters must be specified manually. It would be more convenient if Polar 4.1 supported common binary file types (*e.g.*, BAS or EG&G PAR) and extracted experimental conditions from the header information. Polar 4.1 does not permit diffusion coefficients to be optimized in the fitting procedure, so I attempted to fit the experimental data by optimizing only the standard potential. Although I supplied accurate values for all parameters, including the initial value for the standard potential, the fitting operation ended in an overflow error and instructions to try fitting the data again using different initial values. I repeated this process with various choices of initial values but always encountered the same error. At no point were values for the parameters or calculated voltammograms displayed, so I was unable to evaluate the progress of the fitting process and identify possible problems.

A notable limitation of Polar 4.1 is the inability to control the numerical parameters (*e.g.*, grid size, scaling, convergence criteria) for the implicit finite difference algorithm employed in the program. The failure of my attempts to fit an experimental voltammogram serve as an example of the need for some control over the numerical method, not only to avoid a complete failure of the algorithm but also to improve the performance of the algorithm and to examine the convergence properties of the algorithm. Like most programs written in recent years, the graphical interface for entering information is inextricably tied to the computational engine in Polar 4.1, making it impossible to automate simulations by running the program from the command line with an input file containing the necessary simulation parameters. This limitation is problematic for those researchers who wish to thoroughly explore and characterize the behavior of relatively complicated systems, where hundreds or thousands of simulations may be required.

Polar 4.1 is licensed at four levels. The program as downloaded from the web will run without an access code, but its features are extremely limited (no fitting, import, or export features and only one heterogeneous and one homogeneous reaction, first-order kinetics only, may be defined). More advanced features are available under the Student (US $99), Standard (US $499), and Full (US $799) versions. The documentation, available at the DrMath.com

web site, lists the features available under each license.

Summary. Polar 4.1 is a very basic, easy to use program for simulating a variety of voltammetric responses. The program appears best suited for relatively simple electrochemical systems, such as those used in teaching voltammetry at the undergraduate level. Users should not expect detailed and explicit documentation, however. The limited documentation is at most a minor disadvantage for knowledgeable users, but individuals unfamiliar with voltammetric notation and conventions should consult a textbook on voltammetry before using Polar 4.1. Unfortunately, I cannot recommend Polar 4.1 for complex and difficult simulations or for curve-fitting experimental data. In my experience, the numerical methods are not sufficiently robust or configurable for most research problems.

… Thanks, Dave, for walking the interested user through Dr. Huang's program … having waltzed (badly) a time or two with Visual Basic: I salute you!! …

—More web-based electrochemistry—

FYI

LATEST DISCUSSIONS on CHEMWEB

Voltammetry:

http://chemweb.com/forums/Thread.cfm?CFApp=1&Thread_ID=699&mc=2

—Postdoctoral Openings!!—

Dermot Diamond / Dublin City University

The sensors research team at DCU have been successful in attracting significant support from the Irish Government (ca. £9.0M). We are building a new sensors research center at the university, with £4.0M in new equipment which will be finished by the end of 2001. We are beginning a program of recruitment for the first of five postdoctoral positions. If you know of anyone who might be interested in these or in Faculty Research Lectureships (which we hope to introduce this year), please contact Dermot Diamond. General information on the sensor research team can be obtained at the website: http://www.dcu.ie/~ncsr/Frame.htm

Professor Dermot Diamond
Associate Director
National Centre for Sensor Research
Dublin City University
Dublin 9

Phone :+353-1-7045404 Fax :+353-1-7045503
Email: dermot.diamond@DCU.IE

Pat Unwin / University of Warwick

A postdoctoral position is available in the group of Professor Pat Unwin at the University of Warwick, UK. The position, available for up to two years, will involve the development and application of combined scanning electrochemical microscopy–Langmuir trough techniques to investigate chemical processes in molecular monolayers at liquid/liquid interfaces. Full details of the position and an on-line application form is available at:

http://www.jobs.ac.uk/jobfiles/AC726.html

Prospective applicants are also welcome to contact Pat Unwin at: p.r.unwin@warwick.ac.uk

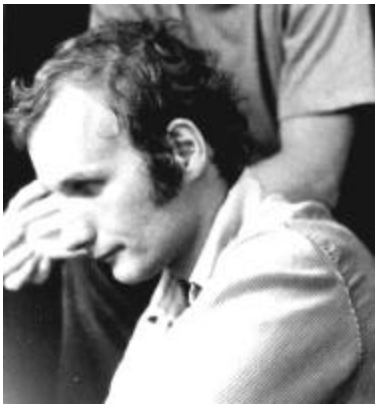
Details of research in the Unwin group can be found at:

http://www.warwick.ac.uk/electrochemistry

Professor Pat Unwin
Department of Chemistry
University of Warwick
Coventry CV4 7AL
UNITED KINGDOM

Phone: +44 (0)24 7652 3264
Fax: +44 (0)24 7652 4112
Email: P.R.Unwin@warwick.ac.uk

OO**OUR CONTINUING AND HIGHLY POPULAR SEAC FEATURE**OO — ***Name That Electrochemical Nerd * !!***



Pictured above is last issue's entrant in **"Name that Electrochemical Nerd**". The mystery man is none other than **Robert Nowak**, Program Manager Extraordinaire, at the Defense Advanced Research Projects Agency (DARPA).

And who is the winner of the coveted Nowackian Power Point presentation? 'tis a quandary. The first e-response was from **Royce Murray** (Fri, 25 Feb 2000 09:08:21 -0500), who wrote: "That nerd looks like a former postdoc who now gives away taxpayer $."

And then **Henry White** chimed in (Fri, 25 Feb 2000 09:54 –0700) with: "easy, nowak", followed by **Dick Crooks** (Fri, 25 Feb 2000 13:10:23 -0600): "Bob Nowak!" And bringing up the rear (Sat, 4 Mar 2000 11:45:24 -0500) was **Tito Abruña**, "D—The most recent "loser-echem" is clearly none other than Bob "The-Man" Nowak."

Who won?

Date: Fri, 25 Feb 2000 09:08:21 -0500
From: Debra Rolison <rolison@nrl.navy.mil>
To: RMC <crooks@tamu.edu>
Subject: Re: Nerd

Dick— … actually ... Henry pointed out that Royce should be disqualified because he was Bob's postdoctoral advisor [even more conflictive-of-interest, the photo was taken during a poker game in Royce's downstairs' family room by **Harry Finklea**] ... and I pointed out to Henry that he should be disqualified— because Robert rescued Lynard the Rat (Henry's pet, who, until Robert stepped in, was fated to be toast, as HSW prepared to flee Chapel Hill for Austin) ... so you (unless I hear otherwise from Robert) are the WINNER!!!

—Fight it out amongst yourselves, gentlemen … —

—Pictured below is this issue's entrant in "Name that Electrochemical Nerd". Again, the first correct guess (**as determined by directly contacting the pictured-herein EN**) will win an autographed copy of the EN's latest reprint.—

—…and please send in your candidates (and mystery photographs) for next issue's entrant in "Name That Electrochemical Nerd"!!—

**** a.k.a. "Loser-Electrochemist!", see*** *SEAC Communications*, **1998,** *14* **(1).**

Plan your attendance accordingly!

Eleventh Australasian Electrochemistry Conference
10-14 December 2000
University of Western Sydney, Parramatta Campus
New South Wales, AUSTRALIA

Theme: Advancing Electrochemistry in the New Millennium

A cordial invitation is extended to all those interested in pure and applied electrochemistry to participate in the 11th Australasian Electrochemistry Conference, which is sponsored by the Electrochemistry Division of the Royal Australian Chemical Institute. In particular, being the division's first conference in the new millennium, it will provide a unique opportunity for discussing recent and future advances in the various areas. It is anticipated that the conference will have a local, national and international flavor and visitors from outside the region are most welcome.

Contributions are welcome on all aspects of electrochemistry: batteries, corrosion and passivation, electroanalysis, electrochemical smelting, electrode kinetics, electrometallurgy, electrolytes, electrosynthesis, chemo-sensors and bio-sensors, mineral processing, nuclear electrochemistry, modified electrodes, inorganic and organic electrochemistry, photoelectrochemistry and polymer electrochemistry. Invited lectures and special sessions are planned on some of these topics. The interaction between fundamental and applied aspects will be highlighted and encouraged.

Scientific Committee

Sam Adeloju / University of Western Sydney
Alan Bond / Monash University
Bob Cattrall / La Trobe University
Stephen Fletcher / CSIRO
Brynn Hibbert / University of New South Wales
Peter Lay / University of Sydney
Ian Ritchie / Murdoch University
Maria Skylas-Kazacos / University of New South Wales
Vicky Vicente-Beckett / University of Central Queensland
Gordon Wallace / University of Wollongong

Call for Papers—Abstracts: Oral presentations (20 min) and/or posters are invited in any field of electrochemistry. Abstracts (300-500 words) are required by **31 July 2000**. Please print the abstract on one A4 page only, (camera-ready copy) with 25-mm margins all around. There is no standard format required for abstracts, but they should give the full title, authors name and address and be suitable for direct photocopying. **Send all abstracts to**:

Professor Sam Adeloju
11AEC Chairman
CERAT, School of Civic Engineering & Environment, Building P
University of Western Sydney
PO Box 10
Kingswood, NSW 2747
AUSTRALIA

Phone: 61 2 4736 0811 Fax: 61 2 4736 0457
E-mail: cerat@uws.edu.au.

—For further information and to register, check out: http://www.nepean.uws.edu.au/cerat/11aec/

Title IX Editorial—One Woman's Response

Anna Farrenkopf (afarren@ccalmr.ogi.edu)
Oregon Graduate Institute, Beaverton OR

Dear colleagues—After passing out copies of Debra's guest-editorial (*C&EN* 13 March 2000, p. 5), a postdoc brought his photocopy into my lab. He said, "Anna, this is for you!" To which I replied, "Actually, it's for *you*, from me—I put the copy in your mailbox."

Everywhere I go I'm told that working as a women in science is "my" issue. It isn't one to be shared by all of my colleagues—it is mine all alone. And yes, being a loud-mouth feminist certainly pegs me readily identifiable as an advocate for women science within the social context of the laboratory. Funny, the same folks that dismiss the women-in-science "issue" as pertaining exclusively to *me* are the folks that send me their grad students, postdocs, and staff to mediate or consult with when perceived or imagined issues of gender or gender-equity get raised. I definitely know that I am not alone—for quite often my work-day consists of supporting and networking contemporaries and younger women and men.

The skills honed in methods development and analytical trouble-shooting easily apply to the climate of the laboratory. Yet, the skill set so coveted in analytical chemistry, applied to the workplace is consistently undervalued and pushed into the category of "not-relevant" to my research plan and objectives.

Whether it was growing up the oldest of five children or my experience in the environmental analytical lab during the "just in time" management craze of the 80's, I don't think that women are the only ones to benefit from a teamed approach. The image of the "isolated crazy scientist alone in the lab" does not jive with the reality and necessities of contemporary academic research or industrial laboratories. Perhaps my perspective is skewed because I've always done interdisciplinary research and analyses, but it definitely seems to me that a "new" model in contrast to the prevailing hierarchy is necessary to continue to keep the brains from draining out of academia. Disproportionately we see women leave (graduate school and postdoctoral assignments). Men and women are both bailing out of schools and into dotcoms and other industries more conducive to the lifestyles they wish to live, with a tax bracket that is more amenable to leisure-time.

To improve the work place for future women in science, I work with two programs here in Oregon that are trying to change the "image" of scientists. Both programs are affiliated with Oregon Graduate Institute of Science and Technology's Saturday Academy. Saturday Academy, since 1983, has created educational opportunities for students and teachers by enlisting community professionals to share their expertise and equipment in hands-on classes, workshops, and mentorships. Special emphasis is placed on the sciences, mathematics, technology and role modeling of careers in these fields.

I work with the co-educational program ASE, "Apprenticeships in Science and Engineering" (http://www.ogi.edu/satacad/ase). ASE targets high school students for summer internships. I help to recruit mentors and participate in the yearly summer conference. I am more heavily involved (time-wise) coordinating site visits with the Advocates for Women in Science, Engineering, and Mathematics (AWSEM) program (http://www.awsem.org) which targets young girls. We host after school science clubs in our labs about six times a year. In part due to my departmental affiliation (Department of Environmental Science and Engineering), most of the labs the girls do are chemistry labs, although this year we had a really strong Computer Science component. Visit the web pages the girls made at (http://www.ese.ogi.edu/~awsem).

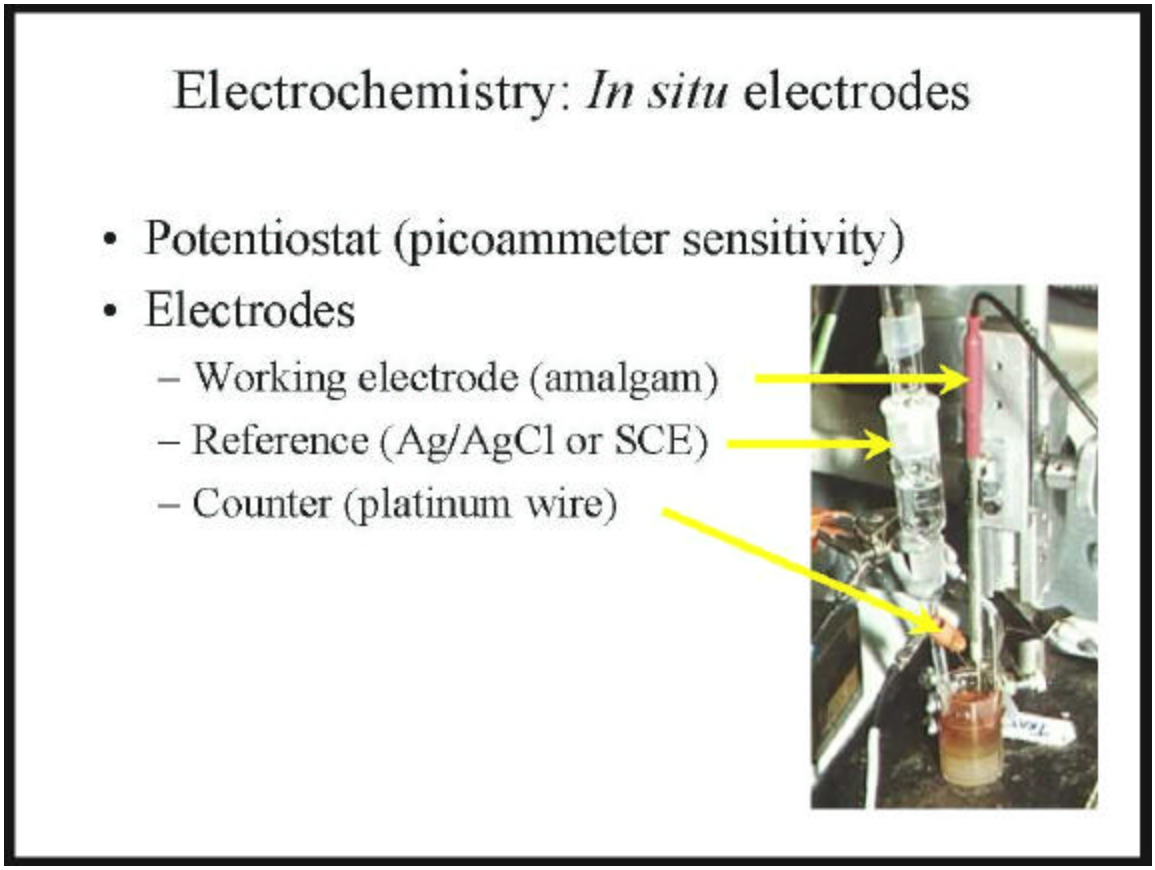
Why target girl-only audiences? is the question I most often hear from my colleagues. If female enrollment in degree programs has increased (in some instances up to 50% of the student pool) why do we need "girl-only" programs in middle and high school? As it turns out, most of the Saturday Academy staff are women, the director of

Saturday Academy, Dr. Gail Whitney, is a woman. Yet, despite the administration of the program being fairly inclusive of women, many of the classes offered in science and technology (targeting ages 9-16) were enrolled exclusively by boys. Even when the classes were offered for "free"—no girls were taking advantage of the classes offered. So in 1993/4 Dr. Whitney wrote a grant application to the National Science Foundation to start up a handful of after-school science clubs to try and increase the participation of girls in the extracurricular science classes. From that pilot project AWSEM was created. AWSEM started out with 7 NSF-sponsored clubs and within 5 years, 67 independently funded clubs existed. Pilot programs are underway in three other states. A welcome "side effect" of the coordination of the AWSEM project and participation in the program as a mentor is the opportunity to interact with dozens of other women scientists from around the Portland Area and as well as the network opportunities with Women in Technology International (WITI).

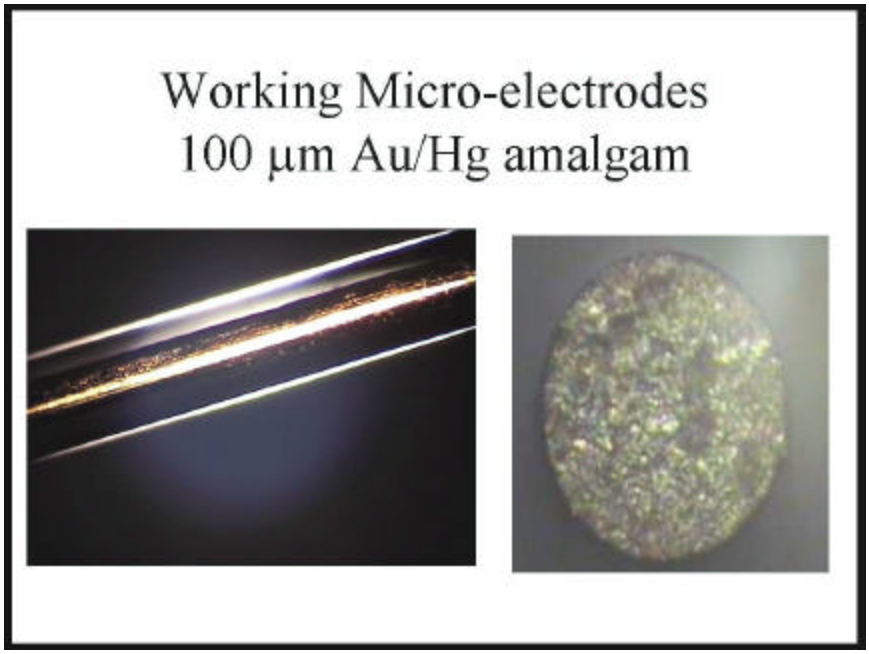
With my male colleagues—who still don't understand about the accessibility issues faced by women in science in academia—I try for the more "tangible" observation, I tell them to look around the cafeteria next time they eat lunch. What you will see are solitary faculty reviewing a manuscript, a group of guys (read: males), or occasionally a group of guys dining with the one woman from their research group. What you don't see at lunch, but for a few times a year, is a table full of women faculty, staff, and research associates. When you do have the odd circumstance to be more than two women (senior staff) together in the hall–a very wide berth around you is duly noted as the "faculty" literally run past. The "issue" of women is science is not a women-only issue; it is a work-place "issue".

So where is the electrochemistry? Electrochemistry is why we read *SEAC Communications*. Well, here is where the electrochemistry bit comes in … when I am engaged in my research goals (exclusive of the "quality of life" issues) here are some of the projects I work on with electrochemical tools.

The flume and AWSEM students. Here are the AWSEM girls exploring the chamber in which most of my electrochemistry is conducted. The monstrosity they are so curious about is a rotating annular flume. You can't see the microelectrodes (unfortunately) for all the suspended solids in the river water overlying the Columbia River sediment bed. We are using the microelectrodes to track chemical changes (fate and transport) across the sediment-water interface subsequent to resuspension of the sediment. (photo taken by Middle School Science teacher, Laurie Denio).



Microelectrode in bacterial agar. You can see the microelectrodes, they are positioned in a bacterial culture agar in order to explore the microgradients of Fe(II) and oxygen across the interfaces of each density layer. (photo by Anna Farrenkopf)



Side-long and end-on view of a microelectrode; 450 X ocular magnification.

(Video capture by Anna Farrenkopf). All the microelectrodes are constructed on-site at the Oregon Graduate Institute.

Starting Early!

—Grow your own electrochemist!—

Ingrid Fritsch (University of Arkansas) holds a proposed entrant in the SEAC 2025 membership base: **Connor Wilkens Fritsch**, who was born on 26 January 2000, at 6 lbs 12 oz and 19.25 inches long. Blond of hair, blue of eye, and healthy.

Ingrid writes: "A perfect baby ... but I think that I am biased. He will start learning the elements on the periodic chart after he learns his colors!"

—send your congratulations to Professors Fritsch and Wilkins (a.k.a.: Ingrid and Charlie) at:

ifritsch@comp.uark.edu

SEAC on the Move!

Another Victim of the Creeping Epidemic of Electrochemists Morphing into Chairs!!!

—**David Williams**, has also succumbed to the pandemic and is now head of the Department of Chemistry at University College, London—however, he did escape administrative clutches long enough to attend the 197th Meeting of the Electrochemical Society in Toronto, 14-18 May 2000, where he was spotted checking out the Canadian beer at the Monday night poster session/mixer.

—send your condolences (and beer) to:

d.e.williams@ucl.ac.uk

—**Eiichi Shoji** has recently joined **Michael Freund**'s group at Caltech as a postdoctoral associate. Contact Eiichi at:

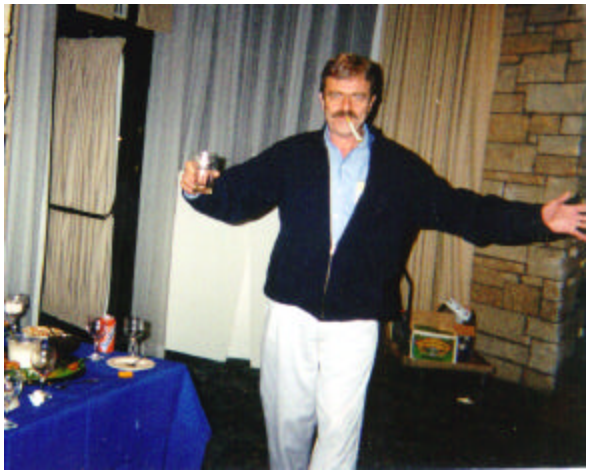
shoji@caltech.edu

—**David Atherton** writes that effective Friday, 31 March 2000 at 6:00 PM, his email address will change to:

David.Atherton@Moltech.Com

From the (E-)Mailbag

—Ex-El-Prez R. Mark Wightman's Pre-Seminar Ritual—



Self-stimulation of neurotransmitter release (as submitted by an anonymous SEAC stringer).

—The members rattle their electrons—

In message Fri, 25 Feb 2000 10:52:28, **Jim Anderson** writes:

Debra—Thanks for the announcement. Just out of curiosity, couldn't you arrange to send copies of *SEAC Communications* as attachments to your e-mail announcement? If you count the aggregate number of hours needed for all SEAC members to go to the website and download the newsletter, a direct mailing would be a lot faster, though it might have an impact on your mail server. Is there a technical reason why this is not feasible? Just a thought.

See you in New Orleans.

Jim
anderson@sunchem.chem.uga.edu

—Hi, Jim: I'm afraid that the only realistic answer to your proposition, for the reason you suggest, is: arggggggghhhhh!!!! NFW!! My e-notification goes out to ca. 800 electrochemists. Best.—

In message Wed, 1 Mar 2000 15:48:09 -0500, **Robert Rodgers** writes:

Debra—I enjoyed the WETS expose, sorry I missed it!

As far as the two-column discussion goes, I'm converting my website to two columns as I go along. Although you have to scroll up and down, it's easier on fossilized eye muscles to scan half a line! I could sit further from the screen with the same effect, if I could read the characters at that distance!

In case you need filler for the next *Communications*, I have just added a page to one of my websites which asks the piercing question: "If you made a movie about electrochemists, who would play **Martin Fleischmann**?" That page also touches on the question: "Why ask?" The URL is:

http://members.home.net/rsrodgers/echemmovies.htm

or look at the Treasure Map at:

http://drive.to/delorean-motorcar

As I said, if you are ** desperate ** for filler....

See you in the Big Easy!

Bob
bob.rodgers@ConsultRSR.com

—moi?? desperate?—

Reminders to SEAC Members

—and now a message from Jim Cox, Chair of the Nominations Committee—

(yes, there is a committee, not just Jim!)

As stated in the Society's By-laws, suggestions for candidates can be made by SEAC members to the Nominations Committee at any time during the year—we welcome your input. The names of potential candidates can be forwarded to: coxja@miavx1.muohio.edu. The preparation of the next ballot will begin in late September 2000.

Special Exclusive!

Daren Caruana (d.j.caruana@ucl.ac.uk)—Cartoonist and Electrochemist (and Lecturer at the University College, London)—returns with further adventures (speaking of **Martin Fleischmann**) in the realm of electrochemical reality: