

SEAC *communications*

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PRESIDENT'S MESSAGE

Dear Members of SEAC and any and all interested parties:

I consider it both a pleasure and an honor to be asked to serve a term as the President of SEAC. In this, my first President's Message, I mainly wish to say 'thank you' and 'congratulations' to the Society's members, officers, award winners, and sponsors who have kept our micro band of electroanalytical chemists so vibrant and successful over so many years. My first thank you goes out to Johna Leddy, our immediate-former President, for her stewardship of the Society over the past two years: Johna kept us on track and moving forward with great skill. I must also thank the officers and committee members for their various roles in our organization, which would simply stop to function without the valued input from so many dedicated individuals. And congratulations go to our past, current, and future award winners who are, in many respects, are our raison d'être. The 2014 Reilley and Young Investigator Awards will be presented to Joe Hupp and Steven Maldonado, so congratulations to both of them. The 2014 Student Travel Awards are still up for grabs, so faculty and students reading this should be planning accordingly.

Our sponsors are crucial participants in our enterprise. Our sponsors come in two forms, individuals who have made so many valued and deeply appreciated donations and our corporate sponsors: the latter are listed on the Society's web site so we all know who they are (I also want to mention here our former Sponsor Ensmann Instruments, who back in the day sponsored the Young Investigator Award, including when it was presented to your's truly). It's humbling, frankly, that our sponsors see the merit in the Society's efforts to promote electroanalytical chemistry as a vital field of study and electroanalytical chemists at all career stages.

Regards to you all,
Adrian Michael

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How Easy it is to Become a SEAC Member

NOMINATIONS FOR SEAC BOARD AND OFFICERS

Nominations are now open for President-Elect, Secretary, and Treasurer of the Society, as well as for three positions on the Board of Directors.

All members in good standing are eligible for nomination for the three Officer positions or for the Board, with the exception of the following members who have recently stepped down:

- Board members who stepped down in July 2012, not eligible for election to Board until Fall 2014: Robin McCarley, Keith Stevenson, Cindy Zoski.
- Board members who stepped down in July 2013, not eligible for election to Board until Fall 2015: Katherine Ayers, Daniel Feldheim, Jean-Michel Kauffmann.

As specified in the bylaws, the list of nominees shall include the name of each candidate suggested by more than ten members and all other candidates deemed appropriate by the Nominating Committee. Nominations should be forwarded to Jill Venton, jventon@virginia.edu, the Chair of the Nominations Committee, by November 1 for consideration, and election materials will be sent to all members in good standing on December 1. Ballots will be due to the Secretary by January 15.

Members of the Nominations Committee: Jill Venton (Chair), David Cliffel

SEAC AWARDS 2014

The Reilley Awardee 2014 is Joe Hupp of Northwestern University, and the SEAC Young Investigator Awardee is Stephen Maldonado of the University of Michigan. The symposium honoring the two awardees at Pittcon 2014 is being organized by Mark Ratner from Northwestern University. Stephen's bio was included in the last newsletter.

Joe Hupp is a native of rural western New York state. He was introduced to chemical research as an undergraduate student at Houghton College in New York, evaluating candidate electrode materials for heart pacers. He completed a B.S. degree in 1979. Subsequently he was a student of the late Mike Weaver at Michigan State University and Purdue University, completing a Ph.D. degree in 1983. He was a postdoc with T. J. Meyer at the University of North Carolina. He moved to Northwestern University in 1986 where he is currently a Morrison Professor of Chemistry. He also holds an appointment as a Senior Science Fellow at Argonne National Laboratory in the Division of Materials Science and in the Division of Chemical Sciences & Engineering. Additionally he serves as an Associate Editor for the *Journal of the American Chemical Society*. His research centers on energy-relevant materials chemistry, including materials for light-to-electrical energy conversion, catalytic water oxidation, chemical separations, chemical and electrochemical catalysis, carbon capture, and high-capacity storage and release of molecular hydrogen. His research accomplishments have been recognized with awards from the Sloan Foundation, the Dreyfus Foundation, the American Chemical Society, the Electrochemical Society, the Defense Threat Reduction Agency, the Inter-American Photochemical Society, the Japan Society for Coordination Chemistry, and others. He has mentored ca. 50 students to Ph.D. completion. Roughly two dozen of his former graduate and postdoctoral advisees hold faculty positions at research universities. His research group's findings are described in about 380 peer-reviewed articles and in a dozen patents, provisional patents, and active invention disclosures. The group's work has attracted roughly 22,000 citations. More detailed research descriptions can be found at: <http://chemgroups.northwestern.edu/hupp/>



STUDENT TRAVEL AWARD WINNERS

And a round of applause for the students chosen to receive travel awards to present their work at Pittcon this year. The SEAC Graduate Student Travel Grants, sponsored by CH Instruments (Peixin He), Pine Instruments (Frank Dalton), Metrohm Autolab B.V. (Maarten Van Brussels), Gamry Instruments (Chris Beasley) and Ametek-AMT Scientific Instruments (Ari Tampasis) are awarded to promising graduate students to offset the cost of travel to the Pittsburgh Conference to deliver an oral presentation in a Conference symposium. Recipients of SEAC travel awards for Pittcon 2013 were:

Gabriel LaBlanc (mentor: David Cliffler, Vanderbilt University)
Dulan Gunasekara (Sue Lunte, The University of Kansas)
Lisa Mellander (mentor: Andrew Ewing, Göteborg University)
Chris Jacobs (mentor: Jill Venton, University of Virginia)
Mohammed Marei (mentor: Richard Baldwin, University of Louisville)

Congratulations to all of them!

Lisa Mellander (Mentor: Andrew G. Ewing, University of Gothenburg, Sweden). At Pittcon 2013, in Philadelphia, Lisa discussed her current research in a presentation entitled “Exploring the dynamics of membrane fusion using PC12 cell blebs”. Lisa’s research focuses on the use of electrochemical methods to study the process of exocytosis, the primary mechanism for neuronal communication. Exocytosis involves the extracellular release of small molecules that are packaged in secretory vesicles. The approach discussed in this work is the use of amperometric detection at an artificial cell model to study the membrane dynamics of the release process. Plasma membranes from PC12 cells have been “blebbed” to create an artificial cell membrane and lipid nanotubes that can be inflated to release neurotransmitter-containing solution similarly to exocytosis. An electrode placed outside the point of release from the bleb is used to quantitatively detect release. This allows the study of a membrane with similar lipid and protein composition as the intact cell plasma membrane, bringing the artificial cell one step closer to the situation in a living cell.



Mohamed Marei (Mentor: Richard P. Baldwin, University of Louisville). At Pittcon 2013 in Philadelphia, Mohamed presented a talk entitled “Calibration-Free Micro-Fabricated Electrochemical Sensor for Heavy Metal Determination”. Mohamed’s research focuses on the practical obstacles for unattended, long-term, field deployable instrumentation. These include the issues of in-field calibration, sample pre-treatment, cost, and energy efficiency. His work investigates the practicality of coulometric analysis, based on Faraday’s law of electrolysis, for calibration-less measurements of electroactive analytes with a focus on heavy metals. For copper and mercury, his most recent work demonstrated accurate calibration-free absolute measurements (within 5-10%) of picomole amounts in μL volume samples by double potential step stripping coulometry (DPSC). This method has the added advantage of eliminating the need for a blank electrolyte solution to perform background subtraction. The use of microfabrication techniques in that work also affords promising cost and efficiency attributes. His present work is focused on lowering the concentration detection limits of the DPSC technique and widening its applicability to other heavy metals such as arsenic, lead and cadmium. He has also been investigating microfabricated sample pre-treatment approaches for unattended operation in the field.



Gabriel LeBlanc (Mentor: David E. Cliffel, Vanderbilt University, Nashville, TN). At Pittcon 2013 in Philadelphia, Gabriel presented his research in a talk entitled: “*Electrochemical Analysis of a Semiconductor/Protein Interface*”. Gabriel’s research focuses on converting solar energy into electrical energy or hydrogen using photosynthetic proteins from plants. In particular, he is interested in Photosystem I due to its extraordinary efficiency. In order to take full advantage of this bio-material, Gabriel is investigating how films of this protein can be interfaced with semi-conducting materials. He recently discovered how doped silicon could be used in order to help direct the electron flow through the protein film. Furthermore, the photocurrent generated by this system could be enhanced by simply changing the formal potential of the electrochemical mediator as well as the concentration of this mediator. By tuning the properties of the electrode material and the mediator, Gabriel hopes to generate a system that can take full advantage of the incredible nano-materials that nature has generated for solar energy conversion.



Dulan B. Gunasekara (Mentor: Susan M. Lunte, University of Kansas, Lawrence, KS). Dulan is developing novel analytical methodologies to detect reactive nitrogen and oxygen species produced in immune cells using microchip electrophoresis (ME) with electrochemical detection. Reactive nitrogen species (RNS) such as nitric oxide (NO) and peroxynitrite (ONOO⁻) participate in oxidative and nitrosative stress, which can cause some cardiovascular and neurodegenerative diseases. The short half-life of NO and ONOO⁻ at physiological pH makes their quantification difficult. Also, common amperometric and fluorescence methods used for RNS detection often suffer due to interferences in cells. Therefore, Dulan is employing a fast electrophoretic separation in a simple “T” microfluidic device prior to detection. This allows for separation of RNS from interferences and their detection prior to significant degradation. This method was then used to detect and identify RNS in stimulated macrophage cells. To identify molecules using voltammetric characteristics, rather than just amperometry, Dulan has integrated a dual electrode detection system into his separation device. Using this system a current ratio can be generated by applying different working electrode potentials to the two electrodes. This current ratio is distinct for analytes with different half-wave potentials. Dulan has presented findings of these studies under the title of “Detection and Identification of Reactive Nitrogen Species Using Microchip Electrophoresis with Electrochemical Detection” at Pittcon 2013. The ultimate goal of his project is to identify heterogeneity of RNS production in single cells using ME coupled to electrochemical methods.



Christopher Jacobs (Mentor: B. Jill Venton, University of Virginia) Chris’ research focuses on developing new strategies and technologies to improve neurotransmitter detection through the integration of carbon nanostructures into microelectrodes. At Pittcon 2013, in Philadelphia, Chris introduced the use of a carbon nanotube yarn as a new, commercially available microelectrode material for fast-scan cyclic voltammetry in a presentation entitled “Exploiting Carbon Nanotubes for Real-Time Detection of Neurotransmitters.” The primary advantage of using carbon nanotube yarn microelectrodes (CNTYMEs) was revealed to be the capability of making dopamine measurements at frequencies up to 2 orders of magnitude faster than at carbon fiber microelectrodes (CFMEs). The CNTYMEs also exhibited improved electron transfer kinetics and an enhanced limit of detection for dopamine, and thus the high frequency measurements can be made with no loss in electrode sensitivity. Further investigation has determined that the improvement to temporal resolution is explained by distinct adsorption/desorption kinetic properties between CFMEs and CNTYMEs. Chris’ most recent work has been in collaboration with the Center for Nanophase Materials Science at Oakridge National Laboratories to develop other novel carbon nanostructured microelectrode surfaces that will further enhance neurotransmitter measurement.



MEETINGS TO COME

Meetings of interest to our SEAC members abound during the coming year, with symposia being organized by some among us.

Meeting	When	Where	Link for More Information
224th ECS Fall meeting	2013, Oct. 27–Nov. 1	San Francisco, CA, USA	http://www.electrochem.org/meetings/biannual/fut_mtgs.htm
Southeastern Regional Meeting of the ACS, “NanoElectrochemistry in Biomedical Research and Energy Technology” sessions	2013, Nov. 12–16	Atlanta GA, USA	http://www.sermacs2013.org
Gordon Research Conference: Electrochemistry	2014, Jan. 5–10	Ventura CA, USA	http://www.grc.org/programs.aspx?year=2014&program=elecchem
Pittcon 2014	2014, March 2–6	Chicago, IL, USA	http://www.pittcon.org/
American Chemical Society Spring Meeting	2014, March 16–20	Texas TX, USA	http://portal.acs.org/
14 th ISE Topical Meeting	2014, March 28–31	Nanjing, China	http://www.ise-online.org/annmeet/next_meetings.php
15 th ISE Topical Meeting	2014, April 27–30	Niagara Falls, Canada	http://www.ise-online.org/annmeet/next_meetings.php
Gordon Research Conf.: Electronic Processes in Organic Materials	2014, May 4–9	Lucca, Italy	http://www.grc.org/programs.aspx?year=2014&program=elecproc
225th ECS Spring meeting	2014, May. 11–16	Orlando FL, USA	http://www.electrochem.org/meetings/biannual/fut_mtgs.htm
15 th International Conference on Electroanalysis ESEAC	2014, June 11–15	Malmö, Sweden	http://eseac2014.com
2014 Matrafured International Conference on Electrochemical Sensors	2014, June 15–20	Near Budapest, Hungary	http://www.matrafured-conference.bme.hu
Gordon Research Conference: Bioanalytical Sensors	2014, June 22–27	Newport RI, USA	http://www.grc.org/programs.aspx?year=2014&program=biosens
Gordon Research Conference: Bioelectrochemistry	2014, July 6–11	Biddeford ME, USA	http://www.grc.org/programs.aspx?year=2014&program=bioelec
Gordon Research Conference: Electrodeposition	2014, July 27–August 1	Biddeford ME, USA	http://www.grc.org/programs.aspx?year=2014&program=elecdep
American Chemical Society Fall Meeting	2014, Aug. 10–14	San Francisco CA, USA	http://portal.acs.org/
65 th Annual ISE Meeting	2014, August 31–September 5	Lausanne, Switzerland	http://www.ise-online.org/annmeet/next_meetings.php
226th ECS Fall meeting	2014, October 5–11	Cancun, Mexico	http://www.electrochem.org/meetings/biannual/fut_mtgs.htm
Pittcon 2015	2015, March 8–14	New Orleans, LA, USA	http://www.pittcon.org/
66 th Annual ISE Meeting	2015, October 4–9	Taipeh, Taiwan	http://www.ise-online.org/annmeet/next_meetings.php

"NanoElectrochemistry in Biomedical Research and Energy Technology" at SERMACS 2013

The Southeastern Regional Meeting of the American Chemical Society (SERMACS) will be held at the Loews Hotel in Midtown, Atlanta, November 12–16, 2013. Gangli Wang from Georgia State University, Larry Bottomley from GaTech and John Stickney from UGA are organizing three half-day sessions with the main theme of "NanoElectrochemistry in Biomedical Research and Energy Technology", to be presented in the ANYL division. <http://sermacs2013.org>

2014 Matrafured International Conference on Electrochemical Sensors

The aim of the forthcoming Matrafured conference is to bring together scientists working in the fields of potentiometric and other electrochemical sensors with special emphasis on interfacial phenomena, molecular recognition, bioanalysis, miniaturization, the introduction of new concepts, and pushing the limits of applicability. The conference takes place at the Thermal Hotel Visegrád in Visegrád, Hungary, about 40 km north from Budapest. Transportation will be organized from Budapest to Visegrád on Sunday afternoon June 15, 2014 and back to Budapest on Friday morning, June 20. Note that this conference is following closely the 15th International



Conference on Electroanalysis ESEAC in Malmö (<http://eseac2014.com>), which ends on June 15. <http://www.matrafured-conference.bme.hu>

"Electrolyte Systems and Interfacial Processes in Energy Storage and Conversion" at 247th ACS Spring 2014 Meeting

De-en Jiang (ORNL) and Gangli Wang (GSU) are organizing symposia in the division of Energy and Fuels symposium on "Electrolyte Systems and Interfacial Processes in Energy Storage and Conversion", in the upcoming 247th ACS National Meeting on March 16-20, 2014 in Dallas, Texas. This symposium is aimed at bringing together researchers working on various aspects of the electrolytes and the electrolyte/electrode interfaces to exchange recent progresses and discuss future directions. Topics include, but are not limited to:



- Synthesis, property, and functional studies of electrolytes
- Novel liquid solvents and salts for batteries and capacitors
- Polymer, solid, and composite electrolytes
- Novel additives for Li-ion batteries
- Electrolytes for beyond-Li-ion batteries
- Interaction of electrolytes with electrodes
- Ion transport in electrolytes and electrolyte/electrode interfaces

Electrochemical Conference on Energy & the Environment, ECEE 2014

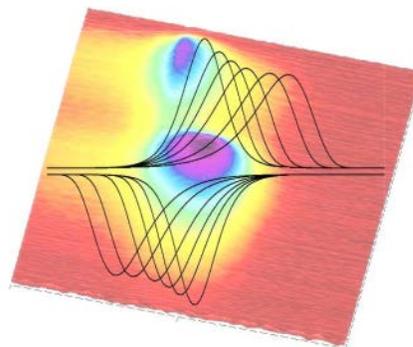
The first Electrochemical Conference on Energy & the Environment is a major international conference that covers a unique blend of topics pertaining to energy and the environment.

Meeting Sponsors: Electrochemical Society (ECS) and the Chinese Society of Electrochemistry (CSE)
Meeting Co-chairs: Professor Paul Kohl (Georgia Tech) and Professor Shigang Sun (Xiamen University)
www.ecee2014.com

ISE Satellite Student Regional Symposium on Electrochemistry “The Future of Australian and New Zealand Electrochemistry” & 19th Australian and New Zealand Electrochemistry Symposium (19ANZES)

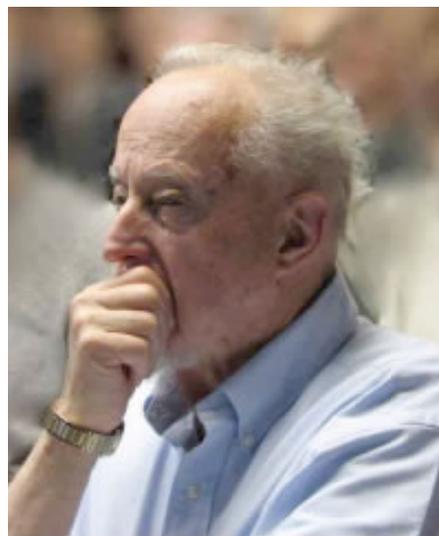
These meetings will be held at CSIRO, Clayton, Melbourne, Victoria on Monday 25th November 2013 and Tuesday 26th November 2013, respectively. They will provide forums for the presentation and discussion of research on all aspects of electrochemistry Prof. David E. Williams (University of Auckland, New Zealand) and Prof. Julie V. Macpherson (University of Warwick, UK).

www.edaq.com/EDRACL/meetings



Special Symposium Dedicated to Memory of Prof. Richard P. Buck at 2014 ECS Spring Meeting in Orlando (2014, May 11–16)

This symposium is being organized to honor the memory of Professor Richard Pierson Buck (1929-2011), who made important contributions to many areas of physical and analytical electrochemistry, ranging from fundamental theoretical considerations to development of sensors in applied biomedical fields. Papers are solicited in topics spanning the areas to which Prof. Buck contributed, including membrane electrochemistry, charge transport kinetics and thermodynamics, electrified interfaces, methods of electroanalysis, impedance studies, ion-selective electrodes and sensors. Contributions are welcome from past pupils, collaborators and associates as well from new researchers blazing the paths once explored by Prof. Buck. Abstracts should be submitted electronically to ECS headquarters by November 15, 2013. Questions, inquiries and suggestions should be sent to the symposium organizers: Petr Vanýsek, Northern Illinois University, DeKalb, IL, USA, e-mail: pvanysek@gmail.com and Andrzej Lewenstam, Åbo Akademi University, Turku, Finland, andrzej.lewenstam@abo.fi.



JOB OPENINGS

Tenure-track BIOCHEMISTRY Professor Creighton University. Creighton University invites applications for a tenure-track assistant professor beginning fall 2014. A Ph.D. in biochemistry, bioanalytical chemistry, bioorganic chemistry or closely-related discipline is required. We seek individuals committed to being outstanding teacher-scholars within a primarily undergraduate institution. The successful applicant is expected to teach biochemistry, an advanced elective in their specialty of choice, and perhaps lower-division chemistry courses while developing an independent research program involving undergraduates. Applicants must submit application materials online at <https://careers.creighton.edu>. The complete application must include a (1) letter of intent, curriculum vitae, (2) statement of teaching philosophy, (3) research proposal, and (4) all undergraduate and graduate transcripts. In addition, **three letters of recommendation** should be addressed to: Dr. Juliane Soukup, Search Committee Chair, Chemistry Department, Creighton University, 2500 California Plaza, Omaha, NE 68178. **Review of completed applications will begin September 20, 2013 and continue until the position is filled.** Consistently ranked as the #1 comprehensive university in the Midwest Region by *U.S. News & World Report*, Creighton University is a Jesuit, Catholic, AA/EEO institution that encourages applications from qualified individuals of all backgrounds who believe they can contribute to the distinctive educational tradition of the University. Women and minorities are particularly encouraged to apply. For further information, visit <http://chemistry.creighton.edu>.

Staff Scientist/Engineer (Sensor Development). Sano, a digital health startup located in San Francisco, is seeking a skilled and highly motivated staff scientist/engineer (sensor development) to join a team dedicated to transforming healthcare. Sano is developing a new wearable chemical sensing platform for consumer health and biomedical applications. The ideal candidate is a creative individual with the ability to work in a fast-paced, entrepreneurial environment.



Responsibilities:

- Formulate electroactive film layers for the electrochemical detection and quantification of important chemical and biochemical species
- Establish processes for applying coatings to suitable substrates and creating prototypes for *in vitro* and *in vivo* testing
- Develop and apply electrochemical, spectroscopic, and mechanical tests to assess sensor performance and optimize material layers
- Work with R&D team to plan, execute, and interpret benchtop and clinical studies to assess system performance and improve design

Qualifications:

- Creative, inquisitive, and passionate individual with excellent communication skills
- PhD in chemical engineering, materials science, chemistry or related field
- 1-5 years experience in hands-on R&D
- Experience in one or more of the following areas: electrochemistry, ion-selective electrodes, enzymatic sensors, electrodeposition, electropolymerization, thin film deposition, MEMS/microfabrication

Email us at info@sano.co if you're interested.

RESEARCH ON GRAPHENE BY PABLO FERNANDEZ AND NEW CENTER FOR GRAPHENE TO OPEN IN 2014

A contribution by Regional Editor Francisco J. Ibañez

Pablo Fernandez is a Postdoctoral Research Associate at the **Sanning Probe Microscopy and Surface Physical Chemistry Group**, in *La Plata, Buenos Aires*. He is currently working on the synthesis of graphene obtained by the chemical vapor deposition (CVD) method. He's work focuses in the study of graphene as a platform for further decorating it with metal nanoparticles (NPs) of controlled size and shape. The aim of this work is to obtain novel catalysts with good stability and relatively high quantities of metal/carbon that can be applied in different fields of nanoscience. He is interested in using the heterojunction (graphene and Pt NPs) in an electrochemical environment to study the electro-oxidation of small alcohol molecules and other reactions involved in fuel cell technology. Some of those promising results were shown at HYFUSEN 2013 (**Hydrogen and other Sustainable Sources of Energy Conference**) which took place from the 10 to the 14 of June in Córdoba, Argentina. Pablo presented a poster about the synthesis and characterization of monolayer grown graphene on a Cu foil and its decoration with Pt NPs. One of the issues of CVD grown graphene is that the polymer (PMMA) remains as an impurity during the transferring procedure therefore preventing some reactions that occur at the interface. Pablo decorated graphene without transferring graphene onto a new substrate. He just simply immersed the Cu foil/graphene film into the Pt salt for galvanic exchange reaction between both metals. With the aim of controlling the NPs size and shape, some quantities of polyacrilate (PA) are added to the Pt salt containing solution. PA is chosen as it is easily moved away from the NPs surface.



In line with the above, it should be mentioned that Brazil is a year away from opening its first research lab **devoted to graphene** as **Eunezio Antonio Thoroh de Souza**, project's coordinator mentioned. The Center for Advanced Graphene, Nanomaterials and Nanotechnology Center of Universidad Presbiteriana Mackenzie, is expected to open in the first half of 2014 in **Sao Paulo**. The research center will focus on developing methods for producing graphene, known as the raw material of the 21st century, the scientist said. The Sao Paulo State Research Support Foundation, or *Fapesp*, is providing start-up funding for the center, which will be equipped with cutting-edge equipment. Some \$15 million is being invested to launch the center. Graphene, considered the world's toughest material, is composed of carbon atoms with a hexagonal structure.

HIRE EDUCATION

WHICH CAME FIRST? THE UNIVERSITY OR THE ECONOMY?

A contribution by Peter T. Kissinger, Purdue University

It is common these days to debate a higher education bubble. Tuition, fees and living costs are high; graduates are left underemployed and student loan defaults accelerate. We hear that the expansion over five decades is unsustainable. We claim a “knowledge based economy” and that the essence of job creation is academic innovation with a formal embrace of entrepreneurship. STEM education in K-12 is promoted with enthusiasm, although without salary incentives for teachers or even minimal supplies to make experiential learning a reality. Others see merit in green cards for all science and engineering Ph.Ds. Trade publications then argue there is a glut of Ph.Ds. trapped in perpetual motion between low wage postdoc and adjunct teaching positions. Once there were the Ivy League, a few prestigious independent universities and a network of private colleges. Most originated with religious sects in the 18th and 19th centuries. These were focused on philosophy, religion, history, classics and law. Greek and Latin were favored. A few provided military skills such as ballistics and surveying. Science and engineering only accelerated as a topic for higher education after the Morrill Act of 1862, although such institutions were disparaged well into the 1970s as “cow colleges.” Training for the ministry or law defined early American education. Private colleges and universities were for a few good men and even fewer good women. Everyone else got calluses. No mammalian species could afford to take more than a few of its offspring, at the height of their fecundity and physical prowess, and isolate them to study Greek. The popular terminal degree into the early twentieth century was an 8th grade diploma. Families needed pairs of hands and strong backs. Colleges and Universities expanded as the result of industrialization and mechanized agriculture. The likes of Thomas Edison, the Wright brothers, Henry Ford, Bill Gates, Richard Branson and Steve Jobs changed the world, but were far from credentialed scholars. The innovation economy is driven as much by enthusiastic, stubborn and impatient dropouts as by the credentialed.



So what’s the problem? Globalization has tightened economies and margins have flattened, yet the cost of degreed entitlements has accelerated. The numbers of youth impounded from productive work has put higher education at a tipping point in the USA. Campuses now compete based on food quality, recreation facilities, single rooms with private baths, research excellence, athletic facilities with skyboxes, and ratings from specious magazines. Where we undershoot workforce requirements is with technical skills, where supply is short. Some call this the “skills gap.” Consider that a commercial truck driving certificate will pay more per year than degrees in art history or elementary education. That’s OK. That’s fair. There are many such middle-skill positions that make an economy go, just as the sergeants make an army go.

We are at the end of a season of commencement. Near the conclusion of these ceremonies comes the familiar refrain “I hereby confer upon each of you the XYZ degree, with all the rights, privileges, and responsibilities thereunto appertaining.” The tassel on the mortarboard hat is then moved from right to left, a symbol that the graduates have been exposed to ideas that cause most to vote against their own economic interests.

In conclusion, affordable higher education follows innovating economies and doesn’t create them. If we continue to stifle innovation by regulatory frictions and confiscatory taxes, we will not soon recover from the bubble of rising costs and reduced opportunities. The acceleration of college costs must stop. Just remember and please respect the most productive who dropped out and created value for those of us who stayed. Thank them for making your education possible.

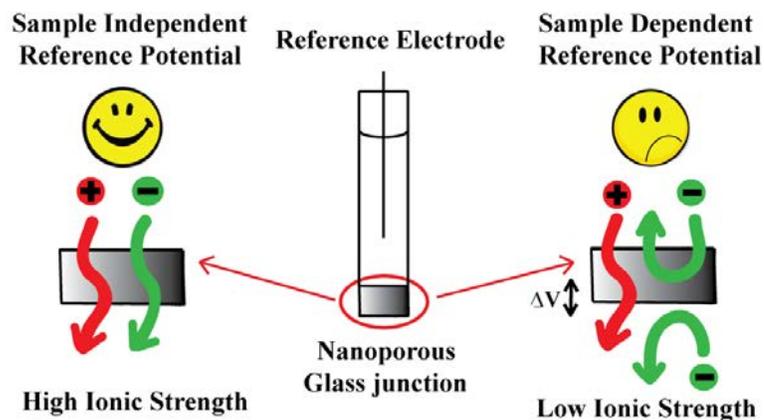
VYCOR NOT SO INNOCENT?

Reference Electrodes with Salt Bridges Contained in Nanoporous Glass: An Underappreciated Source of Error

Many of you are using reference electrodes on a routine basis. Chances are pretty high that you have been using commercial reference electrodes with Vycor glass plugs (made of nanoporous glass) to form the contact between sample and salt bridge. These nanoporous glass plugs are extremely popular and are a standard in commercial products from multiple companies (e.g. BASi, CHI), but limitations of their use have been ignored in the academic literature. We have just published in *Analytical Chemistry* (editor's highlight) a manuscript that shows that vycor glass plugs are not suitable for electrochemical experiments in low ionic strength solutions and show an undesired response to pH and various cations. These issues are particularly problematic in organic solutions. I apologize for advertising so blatantly a paper of ours, but I believe that there must be a fair number of data misinterpretations in the literature, and I hope that this message will help prevent such errors in your lab.

In the brief period from January 2012 to May 2013 alone, more than 70 publications explicitly reported using reference electrodes equipped with nanoporous glass plugs (better known under the brandnames Vycor or CoralPor). We assume that thousands of publications describing work with reference electrodes with Vycor glass plugs have been published over the years.

We discovered by serendipity that reference electrodes with nanoporous glass plugs perform much poorer than anticipated, given their wide use. Surprisingly, studies systematically assessing the limitations of reference electrodes with nanoporous glass plugs have not been published in the past. We show in *Analytical Chemistry* that the phase boundary potential at the interface between sample and a salt bridge with a nanoporous glass plug exhibits a surprisingly large dependence on the sample composition. Users of reference electrodes with nanoporous glass plugs need to be aware of these limitations to avoid substantial measurement errors.

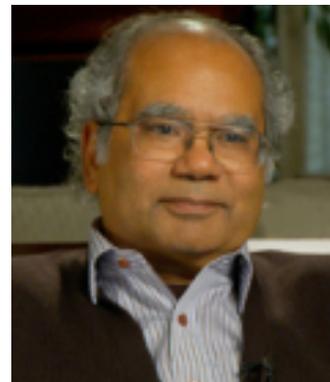


Reference Electrodes with Salt Bridges Contained in Nanoporous Glass: An Underappreciated Source of Error, Mousavi, M. P. S.; Bühlmann, P., *Anal. Chem.* DOI: 10.1021/ac402170u (publication date (web) 09/04/2013).

NEWS FROM MEMBERS

Obituary Joseph Grover Gordon II

Research chemist and research manager Joseph Grover Gordon II, was born on December 25, 1945 in Nashville, Tennessee to Joseph Grover, Sr. Juanita Elizabeth (Tarlton) Gordon. He was one of four children. After briefly attending Atkins High School in North Carolina, Gordon went on to graduate from the prestigious Phillips Exeter Academy in 1963. Gordon earned his A.B. degree in chemistry and physics from Harvard College in 1966. He received his Ph.D. in inorganic chemistry from Prof. Richard Holm at the Massachusetts Institute of Technology in 1970.



Gordon was an assistant professor in the Chemistry Department at the California Institute of Technology from 1970 -1974. During this period he discovered a new class of 1-D organometallic conductors based on metal isocyanides. In January 1975, he began working as a research staff member at IBM's San Jose Research Center (later the Almaden Research Center). During a fruitful IBM Research Division career spanning 33 years he held increasingly more responsible advisory and technical management positions including assignments to local and divisional Research Director technical staff.

In research Gordon pioneered in important areas of interfacial electrochemistry (1975-1994). He made the first use of surface plasmons as probes of Langmuir films on metal surfaces with Jerry Swalen and went on to develop the method to study metal electrode-aqueous electrolyte interfaces. Other key projects included the application of quartz microbalance technology to electrochemistry with Kay Kanazawa, *in situ* surface EXAFS and *in situ* interfacial X-ray diffraction measurements with Owen Melroy and Michael Toney. During this period Gordon and the interfacial electrochemistry group contributed to understanding the mechanism of electroless copper plating (for printed wiring boards) and the corrosion of magnetic alloys (recording heads) in wide use within IBM.

Joseph Gordon was a successful technology manager. In areas of support and technology he headed IBM departments for Materials Science and Analysis, Batteries and Displays, New Directions in Science and Technology and was the Research Relationship Manager for Health Care. Prior to retirement (2009) Gordon was Senior Manager of Materials for Advanced Technology with the responsibility of developing an exploratory battery materials research program and evaluating new battery technology for ThinkPad strategic planning in Raleigh, North Carolina and development in Japan. After retirement Gordon was hired as a senior director for the advanced technology group at Applied Materials, Inc.

Throughout his career, Gordon showed a continuous commitment to scientific research and technology. Gordon published numerous research papers in the leading scientific journals and was credited with twelve United States Patents. Within IBM he was recognized many times for his scientific and technical work. Gordon was a member of several professional organizations, including the American Chemical Society, Society for Analytical Chemistry, Electrochemical Society, American Physical Society (Fellow 2000) and the National Research Council. In 1990, he was awarded the Black Engineer for Outstanding Technical Achievement, and in 1993 the National Organization of Black Chemists and Chemical Engineers awarded Gordon the Percy L. Julian Award. Gordon resided with his wife, Ruth M., in San Jose, California. He passed away on September 13, 2013.

Professor Xueji Zhang of University of Science & Technology Beijing has been elected as a foreign member of the Russian Academy of Engineering. Dr. Xueji Zhang obtained his B.Sc. and Ph.D. from Wuhan University in 1989 and 1994 respectively. He was a postdoc at the National Institute of Chemistry, Slovenia; the Swiss Federal Institute of Technology (ETH), Zurich, Switzerland and at New Mexico State University from 1995 to 1999. He has over 20 years experience in sensors and biomedical research and

commercialization. He joined World Precision Instruments Inc. (WPI) in 1999 as research scientist and was promoted to Vice President of Science in 2003 and Sr. Vice President of Science in 2004. In 2009, he was recruited by the Chinese Government through the “Global Talent recruitment program” and was appointed as National Professor (the highest honor) at the University of Science & Technology Beijing. Currently, he is dean at the School of Chemistry & Biological Engineering, University of Science & Technology Beijing. He has authored over 150 papers, 5 books and 15 patents. His research was cited over 3000 times and his H-index is 33. He has developed numerous biomedical sensors, instruments and devices for commercialization. He also serves as the editor-in-chief of American Journal of Biomedical Sciences and has been a member of the advisory editor board of 14 other international journals. He has received numerous awards and honors including member of Russian Academy of Engineering and W. Simon Fellow of ICSC-World lab, United Nations.

Dr. Subbiah Alwarappan was a research scientist at USF, Tampa, when I joined SEAC. He was in the US from October 2006 till February 2013. In March 2013, he moved to the Central Electrochemical Research Institute CSIR in Karaikudi (Tamilnadu, India) where he is now as a staff scientist.

Cynthia A. Schroll, Ph.D. a recent graduate from Bill Heineman's group at the University of Cincinnati has joined BASi as the EC Product Manager. Her dissertation work was performed at Pacific Northwest National Lab under Samuel Bryan on Spectroelectrochemical detection of lathanides and actinides in molten salts under pyroprocessing conditions and detection of hazardous compounds in on a micro-volume level (C-3 cell stand customization). Her previous work at TestAmerica Inc. involved sample prep and GC-MS. She has extensive experience working with BASi's electroanalytical instrumentation including EC Epsilon, reference electrodes, working electrodes and customization of cell stands for spectroelectrochemical applications. She has contributed to numerous publications and a patent application. Having worked with two ACS Fellows has prepared her well for her new position at BASi. Cynthia is looking forward to assisting and advising clients with their inquiries. For questions about how your lab or business can use BASi's instrumentation, you can contact Cynthia at cschroll@BASinc.com



The 2013 Geochemistry division Medal was awarded to **Dr. George W. Luther III**, Professor of Oceanography, University of Delaware, for his wide-ranging fundamental contributions to aqueous geochemistry. These contributions include application of physical inorganic chemistry to understanding electron transfer in natural waters; development of chemical sensors and the application of voltammetry to quantifying trace element speciation in natural waters; and elucidation of chemical and microbial processes in metal and sulfur cycling. After the presentation of the award, Dr. Luther's contributions were celebrated with a series of invited lectures highlighting critical issues in aqueous biogeochemistry. The Geochemistry Division of the ACS awarded me their Geochemistry Medal for 2013. Information can be found at <http://geochemistrydivision.sites.acs.org/geochemistrymedal.htm>



Dr. Joseph Wang, University of California San Diego was awarded in July 2013 in Durham UK the Spiers UK Medal Award for his pioneering contributions to the fields of electroanalytical chemistry and nanobiotechnology.

<http://www.rsc.org/ScienceAndTechnology/Awards/SpiersMemorialAward/2013-Winner.asp>



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