

## Spotlight on the IE&EE Division

The Industrial Electrochemistry and Electrochemical Engineering (IE&EE) Division successfully completed its seventh volunteer Outreach Program during the recent ECS meeting in Vienna, Austria. Gerardine Botte and graduate student Rebecca King, Ohio University; Venkat Subramanian and graduate student Venkat Ramadesigan, Washington University in St. Louis;

Vijay Ramani and graduate student Satheesh Sambandam, Illinois Institute of Technology (IIT); and Dennie Mah, DuPont Company, participated in the program. The event took place at the Gymnasium und Realgymnasium des Instituts Neulandschule, a local Vienna private K-12 school, under the guidance of Christiana Kuttenberg, Eric Schliegel, and Berthold Wanderer. Our thanks

go to Ludwig Martin, Headmaster, and Peter Weinberger and Juergen Flieg, both of the Vienna University of Technology, for their assistance in locating a venue for our program. Thirty-five students participated in a fuel cell car competition designed to introduce the youth to new electrochemical technology and its potential future impact on our everyday life by employing active learning techniques. Six fuel cell car kits were donated to the school and were sponsored by Vijay Ramani's NSF Career Award.

The IE&EE Division is pleased to announce that Brandon Bartling (Case Western Reserve University, Cleveland, OH) was selected to receive the 2010 H. H. Dow Memorial Student Achievement Award and that Satheesh Sambandam (Illinois Institute of Technology, Chicago, IL) was selected to receive the 2010 Student Achievement Award at the upcoming 2010 Spring Vancouver ECS meeting.

The IE&EE Division will be chairing or co-chairing several symposia at the Vancouver ECS meeting featuring, "Electrochemical Engineering for the 21<sup>st</sup> Century with Dedication to R. C. Alkire," "Fuel Cell Membranes, Electrode Binders, and MEA Performance," "Electrochemistry in Mineral and Metal Processing (EMMP 8)," "Electrochemical Technology Tutorial - Design (including design of experiments, electrochemical cells, etc.)," and "Characterization of Porous Materials 3," among other topics.

The IE&EE Division will announce a Call for Nominations for 2011 New Electrochemical Technology (NET) Award in this issue and the spring issue of *Interface*. All sponsoring organizations of commercial, new electrochemical technology are invited to submit their nominations for the 2011 NET Award. Please contact Dennie T. Mah, [doctor\\_electro@msn.com](mailto:doctor_electro@msn.com) for further information. ■



*Gymnasium und Realgymnasium des Instituts Neulandschule student participants and ECS facilitators at the IE&EE Outreach program in Vienna. Pictured on the right-hand side of the photo are the IE&EE leaders. From right to left are: **SATHEESH SAMBANDAM**, Illinois Institute of Technology; **VENKAT SUBRAMANIAN**, Washington University in St. Louis; **DENNIE MAH**, DuPont Company; **VENKATASAILANATHAN RAMADESIGAN**, Washington University in St. Louis; **REBECCA KING**, Ohio University; **VIJAY RAMANI**, Illinois Institute of Technology; and **GERARDINE BOTTE**, Ohio University.*



*Gymnasium und Realgymnasium des Instituts Neulandschule student winning team (from left to right): **ANDREA ARABADJIEVA**, **NICOLE POLACEK**, **MARIA ZEHETMAYER**, **MARIE-CHRISTINE BAUER**, **CONSTANTIN HAIDER**, and **FABIAN KOINER**.*

## ECS Cosponsored Conferences for 2010

*In addition to the regular ECS biannual meetings, ECS, its Divisions, and Sections cosponsor meetings and symposia of interest to the technical audience ECS serves. The following is a list of the cosponsored meetings for 2010. Please visit the ECS website for a list of all co-sponsored meetings.*

- **61<sup>st</sup> Annual Meeting of the International Society of Electrochemistry**; September 26-October 1, 2010; Nice, France; [event10.ise-online.org/](http://event10.ise-online.org/)
- **IMLB 2010: 15<sup>th</sup> International Meeting on Lithium Batteries**; June 27-July 2, 2010; Montreal, Canada; [www.imlb.org](http://www.imlb.org)
- **International Conference on Electrified Interfaces**; June 20-15, 2010; Geneva, New York, USA; [icei2010.com/](http://icei2010.com/)
- **8<sup>th</sup> Spring Meeting of the International Society of Electrochemistry**; May 3-6, 2010; Columbus, Ohio, USA; [spring10.ise-online.org/](http://spring10.ise-online.org/)
- **Florida Solar Energy Center (FSEC) 5<sup>th</sup> Annual Fuel Cell Workshop**; February 7-11, 2010; Cocoa, Florida, USA; [www.fsec.ucf.edu/en/education/cont\\_ed/fuelcell/index.php](http://www.fsec.ucf.edu/en/education/cont_ed/fuelcell/index.php)

*To learn more about what an ECS co-sponsorship could do for your conference, including information on publishing proceeding volumes for co-sponsored meetings, or to request an ECS co-sponsorship of your technical event, please contact [ecs@electrochem.org](mailto:ecs@electrochem.org).*

# 2010

## Endowment Established for the Norman Hackerman Young Author Award

ECS recently announced that it has received a matching gift of \$50,000 from Jerry M. Woodall. The gift completes the challenge campaign he engaged in with ECS to establish an endowment in honor of his mentor and friend, the late Norman Hackerman. ECS successfully secured \$50,000 in charitable gifts from its membership, and from the family and friends of Dr. Hackerman. Thanks to the generosity of Dr. Woodall, ECS can now increase the awards given for the two best papers published in the *Journal of The Electrochemical Society* (JES) by a young author or co-author. One prize is in the field of electrochemical science and technology and the other in the field of solid-state science and technology. The award amounts have been increased to \$1,500 per paper to be divided among the eligible authors. In addition, a \$1,000 travel grant per paper will be given in order that the winners may attend the ECS meeting where the award will be presented.

This outstanding gift is one of the largest ever made to ECS. It is an investment in the future of electrochemical and solid-state science and technology and will sustain an opportunity for a student or students to aspire to be the best they can be. ECS extends its sincerest gratitude to Dr. Woodall for his foresight to establish this challenge campaign with ECS. His philanthropic spirit and generosity will have an impact on students and their advancement of science for years to come. He serves as an inspiration to philanthropists and other supporters who choose to make an impact and support the mission of ECS.

The Norman Hackerman Award is the Society's oldest award and has recognized many great scientists early in their careers. Established in 1928, as simply the Young Authors Award, it was created to recognize authors under the age of 27 who published their work in the *Transactions of The Electrochemical*

*Society*. It has changed a number of times and now recognizes authors under the age of 31 for their contributions to electrochemical and solid-state science in both JES and *Electrochemical and Solid-State Letters*. It was renamed in 1990 to recognize Norman Hackerman, who held the position of JES Editor for four decades. (See *Interface*, fall 2007, p. 25 for the notice on the death of this legendary man.) Many accomplished scientists and ECS leaders have received this award early in their careers, including: Henry Leidheiser (1947), Mike Pryor (1954, Past President), Paul Milner (1960, Past president), John Newman (1961 and 1966), Stan Whittingham (1971), Larry Faulkner (1975, Past President), Barry MacDougall (1976, Past President), Jennifer Bardwell (1988), and Hubert Gasteiger (1994).

For additional information on how your charitable gift can make a difference, contact [ecs@electrochem.org](mailto:ecs@electrochem.org) or call +1 609.737.1902. ■

*The following is an appreciation by Dr. Woodall, which speaks to his great respect and admiration for Dr. Hackerman, the inspiration for his very generous gift.*

### Norman Hackerman: My Mentor, My Friend

by Jerry M. Woodall



I don't know about the rest of you but when I reflect on my life, I spend the first few moments thinking about what good, if any, I did for my loved ones and for my profession. Then, reminiscing about those events and folks that

were game changers in my life quickly follows. This takes a lot more time, even though I can count the game changers on 10 fingers. After accounting for the family and domestic life events and those who changed that part of my life, I am left with four folks who provided and enabled critical mid-course corrections to my professional life. These were my undergraduate thesis advisor, my mentor at IBM, a professor at Cornell University, and last but not least, Norman Hackerman.

Let's not get confused about what constitutes the exalted position of game changer. Think lighthouse before GPS came along. For a sea captain approaching a rocky shore at night, a lighthouse can mean the difference

between life and death. We are not talking here about good friends, buddies, neighbors, and close acquaintances, all of whom are important and have had a very positive impact on the quality of my life.

So, let's get back to Norman. As most of those in the Society know, I have had more than my share of good luck and fortune when it comes to the impact of my career. The "luck" part is due to the fact that I met, got to know, and paid attention to the advice of these "mentors." In Norman's case, and for reasons known only to him, he made a bet that in spite of the fact I had not yet developed a national or international trail of accomplishment, did not have an advanced degree, and at the time had just begun participating in ECS activities, he appointed me as an editor for solid-state side of JES. And that was just the beginning. Later, when he was a member of the National Science Board, he told me (without my asking him) that if I wanted to be a White House Fellow, he would endorse my application and use his position to fast track it! Wow! Is that a mentor or what?

There are many more mentoring events that I could ramble on about, but let me close with this conversation

I had with Norman while he was both President of Rice University and Editor of JES and I was still an associate editor.

I remember that I had received and was handling a fairly controversial manuscript submission that was beyond my expertise. I had received two very animated reviews of the manuscript; one very strongly supporting publication, and one highly critical of the both the lead author and the manuscript. I decided to get some advice from Norman about what he thought I should do next with the paper.

So, I called Norman, at his Rice phone number. President Hackerman, not an administrative assistant, answered the phone. He was relaxed and very friendly. I then proceeded to describe the editorial issue I was facing and asked his advice. Without missing a beat he said, "Say, Jerry, can I call you later about this. I have to deliver the President's address at the Rice graduation ceremony in about 5 minutes."

What else is there to say about Norman—a great man, a great scientist, and a great teacher. Therefore, it is a great honor and with great pleasure and great humility, that I make my contribution to the Norman Hackerman Award. ■



## websites of note

by Zoltan Nagy

### Electrochemistry Lecture Notes

As part of a "Lecture Notes for First-Year Chemistry," it is a good elementary introduction to electrochemistry. However, it's heavily thermodynamics oriented and short on modern areas like kinetics and surface electrochemistry.

- Michael Mombourquette, Queen's University
- <http://www.chem.queensu.ca/people/faculty/mombourquette/FirstYrChem/electro/index.htm>

### Battery University

The introduction states: "Battery University is an online resource that provides practical battery knowledge for engineers, educators, students, and battery users alike. The papers address battery chemistries, best battery choices, and ways to make your battery last longer." The site indeed contains a very wide range of information on a wide variety of batteries.

- Isidor Buchmann, Cadex Electronics Inc.
- <http://www.batteryuniversity.com/index.htm>

### Collecting the History of Fuel Cells

A good collection of historical notes about fuel cells, from the earliest days to the present, by the Smithsonian. They welcome your input. Contact them if you have any historical material, references, data, pictures, etc: "Through this website we are seeking historical materials relating to fuel cells. We have constructed the site to gather information from people already familiar with the technology—people such as inventors, researchers, manufacturers, electricians, and marketers."

- The Smithsonian Institution
- <http://americanhistory.si.edu/fuelcells/index.htm>

### About the Author

**ZOLTAN NAGY** is a semi-retired electrochemist. After 15 years in a variety of electrochemical industrial research, he spent 30 years at Argonne National Laboratory carrying out research on electrode kinetics and surface electrochemistry. Presently he is at the Chemistry Department of the University of North Carolina at Chapel Hill. He welcomes suggestions for entries; send them to [nagy@email.unc.edu](mailto:nagy@email.unc.edu).

## In the **NEXT** issue of **INTERFACE**

- **ECS SCIENCE AT ITS BEST** continues... The spring 2010 issue will conclude the two-part series (begun in the spring 2009 issue) featuring the most influential papers that have appeared in the *Journal of The Electrochemical Society*. The various Divisions within ECS will provide comments on these hand-picked papers, and perspectives on how they have had an impact on the progress in a given field of solid-state or electrochemical science and technology.
- The issue will contain a Special Meeting Section on the **217<sup>th</sup> ECS MEETING**, April 25-30, 2010, highlighting information on the featured speakers, award winners, and special events. The meeting is taking place in Vancouver, the home of the 2010 Olympic winter games.
- Be sure to check out two regularly-occurring departments: the popular **TECH HIGHLIGHTS**, where each article reviewed (from the *Journal of The Electrochemical Society* and *Electrochemical and Solid-State Letters*) is available free online; and the newest, **WEBSITES OF NOTE**, featuring websites of interest to the ECS community.

## Looking for Student News

Send all correspondence to

65 South Main Street  
Pennington, NJ 08534-2839, USA  
Tel: 609.737.1902  
Fax: 609.737.2743  
E-mail: [interface@electrochem.org](mailto:interface@electrochem.org)

ECS takes an active interest in the affairs of its Student Members, and is always interested in hearing from you about your interests, activities, and accomplishments.

[www.electrochem.org](http://www.electrochem.org)

# Symposium

## Electrochemical Engineering for the 21<sup>st</sup> Century

in honor of Prof. Richard C. Alkire

217<sup>th</sup> ECS Meeting, Vancouver, Canada

### Symposium is open for abstract submission

Future trends in electrochemical engineering will be influenced by the need to control processes at the molecular scale. This symposium focuses on the role of molecularly coupled electrochemical engineering in addressing future technology challenges of the 21<sup>st</sup> Century. It features two prominent keynote speakers in each of three topic areas. Papers are solicited in all three areas.



*Tetsuya Osaka*



*Dieter Kolb*

**Session 1:** Experimental and theoretical methods for understanding and describing behavior in electrochemical systems at the molecular level.



*Richard Alkire*



*Linda Petzold*

**Session 2:** Engineering methods and simulation algorithms that enable coupling to molecular scale processes for the design, control and optimization of entire, realistic systems.



*Mark Verbgrugge*



*Lubomyr Romankiw*

**Session 3:** Use of molecular understanding, design and/or control to address 21<sup>st</sup> Century electrochemical engineering applications.

**Questions and inquiries  
should be sent to the  
symposium organizers:**

- John Harb, Brigham Young University, e-mail: john\_harb@byu.edu
- Lili Deligianni, IBM Research, e-mail: lili@us.ibm.com
- Kurt Hebert, Iowa State University, e-mail: krhebert@iastate.edu
- James Fenton, University of Central Florida, e-mail: jfenton@fsec.ucf.edu
- Richard Varjian, AIC Labs, e-mail: richard.varjian@apicap.com
- Venkat Subramanian, Tennessee Tech University, email: VSubramanian@tntech.edu

# Symposium and Tutorials on: “The Role of Electrochemistry in Medicine and Biomedical Applications”

217<sup>th</sup> ECS Meeting in Vancouver, April 25-30, 2010

The symposium organizers are pleased to announce **four experts**, who will each be giving a one hour long presentation as part of this symposium. The speakers and their abstracts are:



## Advances in Molecular Biology and Analytical Chemistry Lead to a New Class of Sensors

Prof. **HENRY S. WHITE**,  
University of Salt Lake City

Sensors are based on electrochemical and electrical measurements of molecular fluxes and ion conductances in pores of nanometer dimensions. The fabrication of biochemical sensors, based on glass nanopore electrodes and glass nanopore membranes, will be described. Their use in a range of applications including use as solid supports for protein ion channel recordings; resistive pulse counting of particles (10 nm diameter); photon and pH sensors; and use as a structural support for ion-selective electrodes will also be discussed.



## Electrochemical Sensors in Medicine—Meeting Needs for the 21<sup>st</sup> Century

Prof. **MARK MEYERHOFF**,  
University of Michigan

This presentation will review the current status of electrochemical sensor technologies as currently applied for *in vitro* measurements of blood-gases, electrolytes, glucose, lactate, etc. in blood samples, and then report on recent research aimed at developing more biocompatible implantable electrochemical sensors for continuous *in vivo* monitoring these important analytes. Improved biocompatibility is achieved using nitric oxide release/generating polymeric coatings on the surface of the sensing catheters. In addition, completely new sensors to detect S-nitrosothiol species in blood will be reported, along with the potential biomedical applications of such devices.



## Conductive Diamond for Implantable Neurological Devices

Prof. **HEIDI B. MARTIN**,  
Case Western Reserve University

Robust implantable electrodes enable functional electrical stimulation and neurosensing technologies and expand their benefits to applications in human health. Conductive diamond provides the opportunity to integrate sensing and stimulation in the same robust device. Diamond stimulators operate at higher currents while avoiding tissue and electrode damage. Diamond sensors are used to examine new neurochemistries and can detect lower analyte concentrations. The presentation will focus on diamond-film electrode development and application in tissue for (a) stimulation of neural activity, and (b) detection of neurotransmitters, neuromodulators, and electrical activity. Unique fabrication and materials integration approaches to render the electrodes flexible will be presented.



## Scanning Electrochemical Microscopy of Individual Pancreatic Islets

Prof. **DAVID E. CLIFFEL**,  
Vanderbilt University

Scanning electrochemical microscopy (SECM), a non-invasive variant of scanning probe microscopy, can be utilized in conjunction with an insulin sensing ultramicroelectrode (UME) for the direct, real-time electrochemical detection of insulin release by single live pancreatic islets. We are able to stimulate and record insulin production from a single pancreatic islet by modulating the concentration of extracellular glucose between physiological low (2.8 mM) and high (16.7 mM) levels, or other substances such as potassium. This research is a part of an ongoing attempt to increase the scope of application for Bio-SECM, both through the adaptation of specialized biosensors and application of existing techniques for biological analysis of single cells and micro organs, and has potential application as an assay for human islets which are candidates for transplantation.