

2014 ECS and SMEQ Joint International Meeting



226th Meeting of
The Electrochemical Society

XXIX Congreso de la Sociedad
Mexicana de Electroquímica



7th Meeting of the Mexico Section of The Electrochemical Society

CANCUN

 Mexico 

October 5-9, 2014

Moon Palace Resort

Special Meeting Section





CANCUN



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ECS and SMEQ Welcome You to Cancun



Paul Kohl
ECS President

Welcome to Cancun, Mexico! ECS and SMEQ are excited to host the 2014 Joint International Meeting, which combines the 226th Meeting of The Electrochemical Society (ECS) and the XXIX Congreso de la Sociedad Mexicana de Electroquímica (SMEQ). This major international conference is being held at the Moon Palace Resort hotel and will include over 50 topical symposia consisting of 2,300 technical presentations, full-day short courses, professional development workshops, career opportunities, poster sessions, and a dynamic technical exhibit including demo workshops. On Sunday October 5, 2014 please join us for the **Plenary Session**, “Mexico’s National Policy on Science and Technology,” presented by Enrique Cabrero Mendoza followed by the Sunday Evening Get-Together. On Monday, October 6, 2014 the ECS



**Facundo Almeraya
Calderón**
SMEQ President

Charles W. Tobias Young Investigator Award Lecture address will be presented by Adam Weber who will speak on “Understanding Transport Phenomena in Polymer-Electrolyte Fuel Cells.” On Tuesday, October, 7, 2014 the **ECS Edward Goodrich Acheson Award Lecture** address will be presented by Ralph Brodd who will speak on “Maintaining the Momentum in Electrochemical Energy and Power Conversion.”

In addition to the comprehensive technical program the organizing committees have scheduled various social events to complement your technical meeting experience in Cancun. Please join us for the 2nd **Free the Science™ 5K Run** on Wednesday morning, with proceeds benefitting the ECS Publications Endowment in support of Open Access. On Monday evening, students are invited to participate in the Student Mixer. Nontechnical Registrants are invited to enjoy exclusive use of the “Get-together Lounge,” Monday through Thursday 0800-1000h; and a special “Welcome to Cancun” orientation presented Monday at 0900h. It is also worth noting that on Thursday evening we will host the not-to-be-missed Cena Baile dinner and dance party; the Cena Baile is a ticketed event starting at 2000h.

ECS is holding a multi-day workshop during the meeting in Cancun to address critical technology gaps and water, sanitation and hygiene challenges in partnership with the Bill & Melinda Gates Foundation. The workshop is being designed to foster collaborative problem solving among participants and apply the collective brainpower of the joint ECS and SMEQ meeting attendees to complex technical challenges that require integrated thinking and out of the box solutions. **More than \$200,000 in research grants will be distributed by a review panel as seed funding for projects that address critical technical gaps; at least two grants will be distributed at this meeting, each in the range of \$25,000-\$100,000.**

More details on the application process will be available on Monday morning, and selected applicants will be given the opportunity to present their concepts and answer questions on Thursday afternoon.

Please join us to lend your voice and expertise in helping to solve some of the world’s most challenging water and sanitation problems! We begin Monday morning at 0800h in Universal Second Floor Expo.

Please refer to the meeting program for additional information regarding technical and nontechnical events. Feel free to stop by the registration desk located in the Expocenter if you would like further assistance.

There is still time to register.
Go to electrochem.org/cancun.



Featured Speakers and Lecturers



Plenary Session

Be sure to arrive on Sunday in time for this special plenary session.

Mexico's National Policy on Science and Technology

by Enrique Cabrero Mendoza

**Sunday, October 5, 1630h
Universal Ballroom, 2nd Floor
Expocenter**

ENRIQUE CABRERO MENDOZA obtained his Bachelor of Arts in Administration at the Autonomous University of San Luis Potosi. Later on, he obtained a Master's degree in Pedagogical Improvement at the French Centre d'Enseignement Supérieur des Affaires and a Master's in Public Administration at the Center for Economic Research and Teaching (CIDE). In France in 2001, Enrique Cabrero Mendoza received his PhD in Management Sciences at L'École des Hautes Études Commerciales. In January 2013, Dr. Cabrero was appointed General Director of the Consejo Nacional de Ciencia y Tecnología (CONACYT, the National Council of Science and Technology), and since then, he has been in charge of articulating Mexico's national policy on science and technology.

Dr. Cabrero's lecture is structured in three sections. The first includes definitions and concepts of the knowledge economy and the knowledge society, as well as a comparative perspective among Organization for Economic Co-operation and Development (OECD) countries using the most relevant indicators for assessing science and technology.

The second part presents the main programs, policy instruments, and priorities in the Mexican scientific and technological agenda, for instance: strengthening human capital; attracting global talent, building research infrastructure, promoting regional development, and establishing links between public instances and the private sector.

The third part presents some of the main challenges ahead such as: boosting the overall expenditure on research and development activities, designing a long-term policy that strategically boosts regions and specialized science topics, increasing the availability of researchers and highly trained human capital, along with strengthening the national research oriented infrastructure.



ECS Edward Goodrich Acheson Award Lecture

Maintaining the Momentum in Electrochemical Energy and Power Conversion

by Ralph Brodd

**Tuesday, October 7, 1710h
Universal 1, 1st Floor
Expocenter**

Special Reception

**Tuesday, October 7, 1745h
Arena A**

RALPH BRODD is President of Broddarp of Nevada. He has over 40 years' experience in the technology, manufacturing, and market aspects of the electrochemical energy conversion business. His experience spans the major primary and rechargeable battery systems, fuel cells, and electrochemical capacitors. He is a Past President of ECS and was elected an ECS Honorary Member in 1987. With Dr. A. Kozawa, he founded the IBA and arranged for the first joint meetings of the Electrochemical Society of Japan and ECS in Honolulu. He served as Vice-President and National Secretary of the International Society of Electrochemistry; served on technical advisory committees for the National Research Council and the International Electrotechnic Commission; as Secretary for the P1625 and P1725 of the IEEE, and NEMA; as well as on program review committees for the U.S. Department of Energy and NASA.

Dr. Brodd began his studies in 1950 at the University of Texas under Norman Hackerman. His PhD thesis was on the relationship of capacitance and surface area of electrodes. This work continued at the National Bureau of Standards (now NIST) using impedance as a function of frequency to determine the characteristics of battery electrode reactions. His relationship with ECS began in 1952 when he was awarded membership as the result of winning an essay contest sponsored by the ECS Corrosion Division.

Dr. Brodd pushed hard to increase funding for lithium exploration over that for alkaline as a key for the future. He re-engineered the alkaline technology with new MnO₂ materials, a new separator, a new anode current collector, and a new seal to prevent leakage. The new current collector was adopted because it lowered cost and instantly saved over a million dollars annually. The MnO₂ research work continued and eventually resulted in new cathode materials for Li-ion cells.

In many respects electrochemical energy conversion (batteries, fuel cells, flow batteries, capacitors, etc.) has become the hope of the future in maintaining our world as we know it. Battery technology has reached goals that were considered by many as impossible only 15 years ago. The pace of new developments has accelerated along with the entrance of people with exceptional skills who have been drawn into the technology. Dr. Brodd will relate his observations from the period of time when he entered the arena. Society has seen the promise of electric cars fulfilled, and the promise of solar and wind power as replacements for coal-fired power plants as viable possibilities to control global warming. Dr. Brodd's reflections will encourage others to keep up the momentum and the remarkable growth that has led to the use of electrochemical energy and power conversion in our everyday personal life.

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Featured Speakers

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Charles W. Tobias *Young Investigator Award Lecture*

**Understanding Transport Phenomena
in Polymer-Electrolyte Fuel Cells**
by Adam Weber

Monday, October 6, 1730h
Galactic Ballroom 7, 2nd Floor
Sunrise

ADAM Z. WEBER holds BS and MS degrees from Tufts University, the latter under the guidance of Professor Maria Flytzani-Stephanopoulos. Next, he earned his PhD at University of California, Berkeley in chemical engineering under the guidance of John Newman. Dr. Weber's dissertation work focused on the fundamental investigation and mathematical modeling of water management in polymer-electrolyte fuel cells.

Dr. Weber continued his study of water and thermal management in polymer-electrolyte fuel cells at Lawrence Berkeley National Laboratory, where he is now a staff scientist. His current research involves understanding and optimizing fuel-cell performance and

lifetime including component and ionomer structure/function studies using advanced modeling and diagnostics, understanding flow batteries for grid-scale energy storage, and analysis of solar-fuel generators where he is a Team Leader for Modeling and Simulation at the Joint Center for Artificial Photosynthesis (JCAP).

Dr. Weber has authored over 50 peer-reviewed articles and nine book chapters on fuel cells, flow batteries, and related electrochemical devices, developed many widely used models for fuel cells and their components, and has been invited to present his work at various international and national meetings including the Gordon Research Conference on Fuel Cells, the Special Invitation Session at FC Expo 2007, and nine keynote/invited lectures at national society meetings. He has also been the recipient of a number of awards including a Fulbright scholarship to Australia, the 2008 Oronzio and Niccolò De Nora Foundation Prize on Applied Electrochemistry of the International Society of Electrochemistry, the 2012 Supramaniam Srinivasan Young Investigator Award of the Energy Technology Division of The Electrochemical Society, and a 2012 Presidential Early Career Award for Scientists and Engineers (PECASE). Dr. Weber is also on the Editorial Board of the *Journal of Applied Electrochemistry* and is current chair of the Energy Technology Division of The Electrochemical Society.

Dr. Weber will speak about understanding transport phenomena in polymer-electrolyte fuel cells, including current macroscopic modeling approaches for multiphase flow in fuel cells, diagnostics and effective-property measurements for gas-diffusion layers, and the impact and genesis of catalyst-layer ionomer in limiting fuel-cell performance, especially at low catalyst loadings.



AMY MARSCHLOK of Stony Brook University, SUNY, spoke at the Panel of Professionals in Orlando, a new feature of the ECS meetings.

Panel of Professionals

As part of its Career Development Series, ECS is pleased to present our **Panel of Professionals on Monday 1700-1830h**. Attendees will hear from three guest speakers, representing industry, academia, and government, each discussing the unique challenges and opportunities of pursuing a career in their chosen field.

The session will be moderated by Jamie Noël, PhD, of University of Western Ontario. There will be ample time for questions and answers. **Students and early-career professionals are strongly encouraged to attend.**

Four Short Courses will be offered on Sunday, October 5, from 0900 -1630h. The registration fee is \$425 for ECS Members and \$520 for Nonmembers. Students may register for a Short Course at a 50% discount—ECS Student Members: \$212.50, and Nonmember Students: \$260.

The Short Course registration fee includes participation in the course, text materials, breakfast, luncheon, and refreshment breaks. The Short Course registration fee **does not** include or apply to the general Meeting Registration, and it is not applicable to any other activities of the meeting. Pre-registration for Short Courses is required.

SHORT COURSE #1

Basic Impedance Spectroscopy

Mark E. Orazem, Instructor

This course is intended for chemists, physicists, materials scientists, and engineers with an interest in applying electrochemical impedance techniques to study a broad variety of electrochemical processes. The attendee will develop a basic understanding of the technique, the sources of errors in impedance measurements, the manner in which experiments can be optimized to reduce these errors, and the use of graphical methods to interpret measurements in terms of meaningful physical properties.

SHORT COURSE #2

Polymer Electrolyte Fuel Cells

Hubert Gasteiger and Thomas Schmidt, Instructors

This course develops the fundamental thermodynamics and electrocatalytic processes critical to polymer electrolyte fuel cells (PEFCs, including direct methanol and alkaline membrane FCs). In the first part, the instructors will discuss the relevant half-cell reactions, their thermodynamic driving forces, and their mathematical foundations in electrocatalysis theory (e.g., Butler-Volmer equations).

In the second part of the course, the instructors will illuminate the different functional requirements of actual PEFC (incl. DMFC and AMFC) components and present basic in situ diagnostics (Pt surface area, shorting, H₂ crossover, electronic resistance, etc.). This will be used to develop an in-depth understanding of the various voltage loss terms that constitute a polarization curve. Finally, the instructors will apply this learning to describe the principles of fuel cell catalyst activity measurements, the impact of uncontrolled-operation events (e.g., cell reversal), and the various effects of long-term materials degradation.

To benefit most effectively from this course, registrants should have completed at least their first two years of a bachelor's program in physics, chemistry, or engineering; or have several years of experience with PEFCs.

SHORT COURSE #3

Fundamentals of Electrochemistry: Basic Theory and Kinetic Methods

Jamie Noël, Instructor

This course, fully revised to include more practical examples and a more manageable volume of material, covers the basic theory and application of electrochemical science. It is targeted toward people with a physical sciences or engineering background who have not been trained as electrochemists, but who want to add electrochemical methods to their repertoire of research approaches. There are many fields in which researchers originally approach their work from another discipline but then discover that it would be advantageous to understand and use some electrochemical methods to complement the work that they are doing.

SHORT COURSE #4

Operation and Exploitation of Electrochemical Capacitor Technology

John R. Miller, Instructor

Electrochemical capacitors (ECs), often referred to by the product names supercapacitors or ultracapacitors, are receiving increased attention for use in power sources of many applications because they offer extraordinarily high reversibility, provide unexcelled power density, and have exceptional cycle-life.

This tutorial is targeted at technologists interested in understanding and exploiting electrochemical capacitor technology. Basics are first covered that describe the nature and significance of electric double layer charge storage, the general design of such products, and the similarities and differences between these devices and traditional capacitors and batteries. The goal is to provide basic understanding, necessary tools, and sufficient operating information to allow direct and successful advancement and/or exploitation of electrochemical capacitor technology.

Short Course Refund Policy: Written requests for Short Course refunds will be honored only if received at ECS headquarters by September 29, 2014. All refunds are subject to a 10% processing fee and requests for refunds must be made in writing and e-mailed to customerservice@electrochem.org.

Refunds will not be processed until AFTER the meeting. All courses are subject to cancellation pending an appropriate number of advance registrants.

Please visit the ECS website (electrochem.org/cancun) for full course descriptions and instructor biographies.

2014 Class of ECS Fellows



GEORGE BLOMGREN is president and founder of Blomgren Consulting Services, Ltd., where he has provided consulting services worldwide in the field of battery technology and applications for many companies. He holds a BS in chemistry from Northwestern University and a PhD in physical chemistry from the University of Washington and received the Boese Post Doctoral Fellowship from Columbia University.

Blomgren had a 41-year career as a research scientist with Union Carbide Corporation, now known as Eveready Battery Co. finishing as Senior Technology Fellow, the highest Technical position at Eveready. At Eveready, he utilized his background in electrolyte solutions to enable the development of liquid cathode primary batteries (including a fundamental patent on the use of thionyl chloride or sulfuranyl chloride as a liquid cathode), and his interest in electrochemical methods to explain the operation of sulfide cathodes resulted in the development and commercialization of lithium iron disulfide batteries. He subsequently served as Chief Scientist at Imara Corp. (where he was a co-founder) and successfully helped to develop an industry leading battery for high power applications such as power tools. He is Adjunct Professor of Chemical Engineering at Case Western Reserve University.

Dr. Blomgren has served as officer and Chair of the Battery Division of The Electrochemical Society, member of several committees of that organization and served as Associate Editor of the *Journal of The Electrochemical Society*. He has also served on the Board of the International Battery Materials Association (IBA) for many years. He has received the 1998 IBA Research Award, the 1998 Battery Division of The Electrochemical Society Technology Award and the 2010 IBA Yeager Award. He has been a frequent reviewer of battery programs and proposals for the Department of Energy, proposals for the SBIR program of the National Institute of Health, and an external examiner for 5 PhD theses.

Dr. Blomgren has authored 30 book chapters and chapters on batteries for Kirk Othmer Encyclopedia of Chemical Technology, Ullmann's Encyclopedia of Industrial Chemistry, the Encyclopedia of Physics, and the new Springer Encyclopedia of Applied Electrochemistry in addition to holding 20 patents and over 30 journal publications,



GERARDINE (GERRI) BOTTE is the Russ Professor of Chemical and Biomolecular Engineering at Ohio University, the founder and director of Ohio University's Center for Electrochemical Engineering Research, and the founder and director of the National Science Foundation I/UCRC Center for Electrochemical Processes and Technology. Dr. Botte and members of her research group are working on projects in the

areas of electrochemical engineering, electro-synthesis, batteries, electrolyzers, sensors, fuel cells, mathematical modeling, and electro-catalysis. Example projects include: hydrogen production from ammonia, biomass, urea, and coal, synthesis of carbon nanotubes and graphene, water remediation, selective catalytic reduction, ammonia synthesis, and electrochemical conversion of shale gas and CO₂ to high value products.

Professor Botte has 116 publications (peer-reviewed, book chapters, proceedings, and patents) and over 190 presentations in international conferences. She is the inventor of 18 US patents and 29 pending applications. She is the Editor in Chief of the *Journal of Applied Electrochemistry*. In 2010, she was named a Fellow of the World Technology Network for her contributions on the development of sustainable and environmental technologies. In 2012 she was named a Chapter Fellow of the National Academy of Inventors.

Dr. Botte has been active in ECS for over 16 years, including past Chair, Vice-Chair, and Secretary/Treasurer of the IEEE Division, past member of the Honors and Awards Committee, and the Symposium

Planning Subcommittee. She is a founder and leader of the IEEE Division outreach program. This program, which started in the fall of 2006, consists of demonstrations performed to high school students on electrochemical technologies. Since then, the program had served 743 students in the United States and Overseas.

Professor Botte received her BS in Chemical Engineering from Universidad de Carabobo (Venezuela) in 1994. Prior to graduate school, Dr. Botte worked as a process engineer in a petrochemical plant (Petroquímica de Venezuela) where she was involved in the production of fertilizers and polymers. She received her PhD in 2000 (under the direction of Dr. Ralph E. White) and M.E. in 1998, both in Chemical Engineering, from the University of South Carolina. Prior to joining Ohio University as an assistant professor in 2002, Dr. Botte was an assistant professor at the University of Minnesota-Duluth.



RALPH J. BRODD is President of Broddarp of Nevada. He has over 40 years experience in the technology, manufacturing and market aspects of the electrochemical energy conversion business. His experience spans the major primary and rechargeable battery systems, fuel cells and electrochemical capacitors.

He is a Past President of The Electrochemical Society and was elected Honorary Member in 1987. With Dr. A. Kozawa, he founded the IBA and arranged for the first joint meetings of the Electrochemical Society of Japan and the ECS in Honolulu. He served as Vice President and National Secretary of the International Society of Electrochemistry as well as on technical advisory committees for the National Research Council, the International Electrotechnic Commission, Secretary for the P1625 and P1725 of the IEEE, and NEMA as well as on program review committees for the Department of Energy and NASA.



YASUHIRO FUKUNAKA is currently a visiting professor at the Institute for Nanoscience and Nanotechnology in Waseda University. He obtained his Dr. of Eng. in Metallurgy Dept. at Kyoto University, (1975, "Kinetic Analysis of Gas-Solid Reactions in a Fluidized Bed," advisor Prof. Y. Kondo). Afterwards, he held a postdoctoral fellow position at the University of Toronto (Oxidation Kinetics of Ni Sulfide

Droplet Levitated above 2300K, with Prof. J. M. Toguri). In late 1977, he was appointed as a research associate in Kyoto University.

Through his international experiences, Professor Fukunaka learned that nonferrous metallurgy provides a treasure trove of academic seeds for a young materials scientist. Moreover, he came to realize that the electrolyte circulation process with additive supply in copper refinery had been already optimized for over 100 years and that many refinery engineers believed there was no room to improvement except for materials handlings. This situation strongly stimulated his academic interests. In particular, he was inspired by the pioneering approach of C. Wagner and the Berkeley electrochemical engineering school to the role of natural convection in electrochemical processes. After the ISE Meeting in Berkeley, 1984, his interest shifted to the coupling phenomena between the morphological/microstructural variations and the mass transfer rate. The introduction of another degree of freedom like gravitational forces or magnetic gradient fields into electrochemical processing further broadened his research activities.

In 1996, Dr. Fukunaka moved to the field of energy science and technology and started research on space energy and resources as well as on solar-hydrogen energy. He was the first to observe various kinds of unique electrochemical interfacial phenomena in microgravity conditions, including three-phase interfacial phenomena such as the influence of froth layer growth on the surface coverage ratio of H₂ and O₂ gas bubbles on electrodes in alkaline water electrolysis as well as the MHD effect to implement efficient liquid/gas separation. The electrodeposition of Li and Si from ionic liquids was also studied.

Professor Fukunaka retired from Kyoto University and joined Waseda University and Japan Aerospace Exploration Agency (JAXA)

in 2008. His current interests include non-equilibrium electrochemical processing confined in nano-scale volumes as well as the technology of large scale solar-hydrogen energy systems. He has also been interested in the ultra-fast reduction processing of SiO₂ refined from diatomaceous earth resources and in high temperature molten salt electrochemistry for in-situ resources utilization.



JAY W. GRATE has been at the Pacific Northwest National Laboratory (PNNL) since 1992, where he is currently a Laboratory Fellow, a Wiley Research Fellow in association with the Environmental Molecular Sciences Laboratory, and a Battelle Distinguished Inventor. He has been an Affiliated Professor with the Chemistry Department at the University of Washington since 2004. He was a scientist at the Naval

Research Laboratory from 1984 to 1992.

Dr. Grate's research interests are in interfacial chemistry and materials science, including polymer thin films, organic monolayers, monolayer-protected inorganic nanoparticles, and stabilized enzyme nanoparticles and composites. His expertise has been applied to various topics in analytical and bioanalytical chemistry, particularly in chemical sensors. He was a pioneer in the development of polymer-coated vapor sensors, where his signature contribution was to develop a systematic understanding of vapor-polymer interactions as they relate to sensor selectivity, and to determine the basis for selecting sets of sensor coatings to maximize selectivity in an array of acoustic wave sensors. He applied this understanding to the development of new sensing polymers, receiving an R&D100 Award for "BSP3 Polymer" in 2004 and the American Chemical Society Regional Industrial Innovation Award in 2007.

At PNNL, Dr. Grate initiated the development of a new class of chemically-selective sensors for radionuclides in water. These sensors use a preconcentrating mini-column device and have been engineered into systems for field testing at the Hanford nuclear site in Washington State. He has also contributed to the development of microfluidic sensors for biological toxins, and investigated oxygen sensors incorporated into microfluidic structures as habitats for microbial communities.

His work has been featured on the covers of several leading journals including *Analytical Chemistry*, *Chemical Reviews*, *Langmuir*, and *Chemical Communications*, and described in magazines such as *Chemical and Engineering News*. Within the Electrochemical Society, Dr. Grate participated in the founding of the Sensor Division and has been a continuous member of the Executive Committee of the Sensor Division since its inception. He served on the ECS committee to award the Henry B. Linford Award for Distinguished Teaching in 2010 and 2012.



DIRK M. GULDI is one of the world-leading scientists in the field of charge transfer/nanocarbons. In particular, he is well-known for his outstanding contributions to the areas of charge-separation in donor-acceptor materials and construction of nanostructured thin films for solar energy conversion.

His scientific career began at the University of Köln, from where he graduated in Chemistry (1988) and from where he received his PhD (1990). After a postdoctoral stay at the National Institute of Standards and Technology (NIST) in Gaithersburg/USA (1991/1992), he took a position at the Hahn-Meitner-Institute Berlin (1992-1994). Following a brief stay as a Feodor-Lynen Fellow at Syracuse University/USA he joined the faculty of the Notre Dame Radiation Laboratory/USA (1995). Then, after nearly a decade in the USA, the University of Erlangen-Nürnberg succeeded in attracting Dirk M. Guldi back to Germany, despite major efforts by the University of Notre Dame (2004), who offered him a position as Director of the Notre Dame Radiation Laboratory & Full Professor in the Physics Department, and the University of Bowling Green (2005) as Ohio Board of Regents Eminent Scholar in Photochemical Sciences.

Professor Guldi is the recipient of numerous honors and awards—VCI Abschlusstipendium (VCI, 1990), Heisenberg Preis (DFG, 1999), Grammaticakis-Neumann Prize (Swiss Society of Photochemistry,

2000), JSPS Award (Japan Society for the Promotion of Science, 2003), JPP Award (Society of Porphyrins & Phthalocyanines, 2004), and Elhuyar-Goldschmidt Award (Spanish Chemical Society, 2009).

He served as Chair of the Fullerenes, Nanotubes, and Carbon Nanostructures Division of The Electrochemical Society between 2008 and 2012.



BRUCE PARKINSON grew up in Minnesota and in high school showed an early interest in electrochemistry by working on electrochemical science projects that placed first at the regional science fair three years in a row from 1967-1969. After high school he went to Iowa State University where he did undergraduate research on rotating electrodes with Dennis Johnson and received his BS in chemistry in 1972. He then

attended Caltech where he earned his PhD in 1977 under the guidance of Fred Anson working on electrode kinetics and surface phase formation on mercury electrodes.

In 1978, Dr. Parkinson did post-doctoral studies at Bell Laboratories with Adam Heller and Barry Miller where he was introduced to the area of semiconductor photoelectrochemistry that became his primary career interest. His first real job was as a staff scientist at the Ames Laboratory from 1979-1981 after which he moved on to the Solar Energy Research Institute (now known as the National Renewable Energy Laboratory) in Golden, Colorado working on solar energy conversion as a senior scientist in the Photoconversion Branch with Art Nozik. In 1985 he joined the Central Research and Development Department of the DuPont Company in Wilmington, Delaware. In 1991 he became Professor of Chemistry at Colorado State University until his departure in 2008 to join the Department of Chemistry and the School of Energy Resources at the University of Wyoming where he is now the J. E. Warren Professor of Energy and Environment.

Professor Parkinson's current research covers a wide range of areas including electrochemistry, materials chemistry, nanomaterials, photoelectrochemistry on Mars and photoelectrochemical energy conversion. He has more than 210 publications in peer-reviewed journals and holds 5 US patents and is a Fellow of the American Association for the Advancement of Science. Dr. Parkinson is married to Lucinda Baker and has three children Lily, Graham, and Robin Parkinson. His other interests include photography and swimming.



FRED ROOZEBOOM received his MSc in chemistry (cum laude) from Utrecht University in 1976, and his PhD in chemical engineering in 1980 at Twente University (both in The Netherlands) on topics in catalysis. From 1980-1983 he worked on zeolite catalysis with Exxon R&D Labs in Baton Rouge, USA (1980-1982) and with Exxon Chemicals in Rotterdam (1983).

In 1983, Dr. Roozeboom joined Philips Research (since 2006: NXP Research) in Eindhoven, Netherlands, where his earlier work encompassed MOCVD of III-V semiconductors (1983-1988), IC metallization deposition and (rapid thermal) processing (1988-1990), soft-magnetic materials for magnetic recording (1990-1996), and on MBE of ultrathin magnetic and "switchable mirror" hydride multilayers (1996). More recently (1997-2009) he led a team working on silicon-based 3D passives and Li-ion microbatteries, and heterogeneous integration into System-in-Package products in wireless communication, power management and digital signal processing. For part of this work he received the Bronze Award of the 'NXP Invention of the Year 2007' and became an NXP Research Fellow.

Since 2007, Professor Roozeboom is also a part-time professor at the Department of Applied Physics of the Eindhoven University of Technology, Netherlands, in the group Plasma and Material Processing. In 2009, he left NXP and joined TNO, Eindhoven, Netherlands as a senior technical advisor working in a team specializing in spatial atmospheric Atomic Layer Deposition and other high-speed processing. In 2011, the spatial processing team received the 2nd EARTO Innovation Prize Award.

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Dr. Roozeboom has authored or co-authored ~150 journal and conference publications and 5 book chapters. He holds 24 US patents and has ~30 pending patent applications. He has edited or co-edited of 28 conference books on semiconductor processing. His h-index (web of science) is 28.

Dr. Roozeboom serves or has served as a member-at-large of the Electronics and Photonics Division of the Electrochemical Society, as a member of the ENIAC* advisory committee to the European Commission (subcommittee Beyond CMOS). He also served as Meeting Chair of the Materials Research Society (MRS) Fall 2003 Meeting.

Topics of interest: ultrathin-film technology, plasma processing, spatial ALD (incl. roll-to-roll), RTP, reactive ion etching, 3D passive and heterogeneous integration, microsystem technology, Li-ion microbatteries, sensors, displays.



ALVIN SALKIND has been involved in electrochemical technology for most of his career. His graduate education at Polytechnic Institute, now NYU, was part-time while working at battery companies around NYC. His masters thesis involved membranes for silver-zinc batteries and absorbent separators for lead-acid batteries. His rejected membranes were used by H. Mark to directly measure the MW of cellulose.

Dr. Salkind's doctoral training at Polytechnic (Poly) was interdisciplinary, chemical engineering with minors in electrochemistry and x-ray physics. His thesis involved nickel-cadmium batteries. He was the first to build a battery into an x-ray port tracking structure with state of charge. He shared the x-ray machine with Margo Bergmann, (the wife of Peter Bergmann who earlier was Einstein's assistant). With a visiting faculty member, Vladimir Scatturin, Dr. Salkind resolved the structure of AgO using neutron diffraction. At the initial request of Don Othmer, then Chemical Engineering Chair, Dr. Salkind taught a graduate course at Poly in Applied Electrochemistry from 1959-1970. While at Poly, Dr. Salkind shared lab space with Rudy Marcus, who later won the Nobel Prize in Chemistry.

After completing his doctorate, Dr. Salkind became a group leader at ESB Central Lab which had subsidiaries and licensees in 26 countries, and whose divisions included Exide, Rayovac, Willson, and Grant. In 1970, he became President of the ESB Technology Center and Vice-President of the parent company. He also became a member of the Industrial Research Institute.

Also in 1970, Dr. Salkind became a part-time Professor of Surgery/Bioengineering at Rutgers Medical School. By 1980, Dr. Salkind returned to academia full-time, dividing his time between Rutgers, and Case Western as the Executive Director of the Case Center for Electrochemical Sciences (now the Yeager Center). In 1982, Professor Salkind became the Associate Dean of the Rutgers School of Engineering. In 2004, he became Professor Emeritus.

From 2004-2012, Dr. Salkind was a visiting Professor at the University of Miami and at CUNY. He has been a visiting professor in Russia, Japan, China, Austria, India, Serbia, and Croatia.

Professor Salkind is also a Fellow of the American Medical Association, AIMBE, AAAS, and the NJ Academy of Medicine and has received awards from societies in England and Japan.

Dr. Salkind has been the author or editor of 17 books. His first book, *Alkaline Storage Batteries*, with S. Uno Falk, was an ECS monograph. He wrote another title, *Techniques of Electrochemistry* with Ernest Yeager. Dr. Salkind is co-editor of 11 ECS proceedings volumes, and is the author of over 200 articles. He has over 2 dozen patents.

Dr. Salkind has been chair of the ECS Battery Division, the ECS Metropolitan Section, and the chair of many ECS committees and subcommittees, including the New Technology Subcommittee (now Interdisciplinary Science & Technology Subcommittee).

Professor Salkind is grateful to colleagues who helped along the way including Rutgers faculty members Forrest Trumbore, Vladimir Bagotzky, Lisa Klein, Tom Reddy, and Tony Cannone; and students/colleagues Max Schautz (ESA), Sergio Sironi (Sironi battery Milan), and Terry Atwater (Aberdeen).

Dr. Salkind has two children, Susanne and James, and two grandchildren, Abby and Jacob. He also enjoys sailing, skiing, swimming, photography and traveling to revisit friends.



SUDIPTA SEAL joined the Advanced Materials Processing and Analysis Center (AMPAC) and Mechanical Materials Aerospace Engineering at the University of Central Florida in Fall 1997. He is the University Distinguished Professor and UCF Pegasus Professor. He received his BS (BTech-Hons) (1990) from Indian Institute of Technology (KGP) in Metallurgy and Materials Eng, worked for TATA Steel India (90-91), MS

in Metallurgy, University of Sheffield (91-92), UK, and PhD from U Wisconsin (UWM) in Materials Engineering and Minor in Biochemistry and Surface Chemistry (93-96).

During his PhD, he developed various surface techniques to evaluate organic/iorganic interfaces relevant to defects, corrosion and biological radical production. After that, he joined Lawrence Berkeley National Laboratory, University of California, Berkeley and was involved in the development of Scanning transmission X-ray microscopy and spectroscopy and Scanning photoemission spectroscopy. At UCF, he pioneered nanostructured cerium oxide and other metal/oxide platforms (micro to nano) and discovered its antioxidant properties and applied in various biomedical problems and led to various patents in the area of regenerative nanostructures. His group is currently studying the biochemical interfaces of nanostructures and composites using various surface and electrochemical techniques to understand the redox properties responsible for its regenerative properties at nanoscale. He is also involved in plasma based large scale manufacturing of nano-coatings and products for corrosion applications and developing novel nano-energetics materials. His research is funded by DOD, NSF, NIH, SBIR programs, and numerous industries including (Airproducts, Siemens, Lucent, Garmor, Nemours Children Hospital, Florida High Tech Corridor, Sanofi Pastour, and others).

Besides research and teaching, he has served as Nano Initiative Coordinator for the Vice-President of Research & Commercialization. He is currently the Director of Nanoscience Technology Center and Advanced Materials Processing Analysis Center at UCF and Professor of Materials Science and Engineering and holds a secondary joint appointment at UCF College of Medicine. In 2014, he is elected as an Interim Chair of the Materials Science and Engineering Department. He created Professional Science Masters Program in Nanotechnology at UCF.

He is the recipient of the 2002 Office of Naval Research Young Investigator Award (ONR-YIP) in the areas of bulk nanocomposites. He's also been selected for the Japan Society of Promotion of Science Awardee and the Alexander Von Humboldt Fellow, ASM IIM Lecturer award, Royal Soc of Eng - Visiting Professor Distinguished Fellowship at Imperial College of Science, Technology and Medicine, Central Florida Engineers Week award, Academic Trail Blazer Award from DC. He was elected to attend the prestigious Frontiers of Eng Symposium sponsored by National Academy of Engineering.

He is the recipient of Fellow of American Society of Materials (FASM) and Fellow of the American Association of Advancement of Science (FAAAS), Fellow of American Vacuum Society (FAVS), Fellow of Institute of Nanotechnology-UK (FIoN) and recently elected to the Fellow of American Institute of Medical and Biological Engineering (FAIMBE) and Fellow of National Academy of Inventors (FNAI). He has won multiple teaching and research awards from UCF. He was awarded the UCF Dean's Advisory Board: Faculty Award for Excellence from UCF College of Engineering. He has more than 350 journal papers, conference proceedings papers, book chapters, and three books on nanotechnology (including one on Nanoscience and Technology Education). He has 39 issued patents (and many pending), and h index >54 and his technology is responsible for various startups (nSolgel, NanoCe, Nantiox, etc). He graduated 16 PhD, 19 MS, 18 postdoc/researchers and mentored more than 80 undergraduate students in research. He is currently supervising a group of 12-graduate and undergraduate students/postdocs/researchers. His expertise lies in the field of oxides, nanomanufacturing, sensors, nanobio-therapeutics, nano-energetics, green manufacturing and surface engineering. <http://sudipta-seal.ucf.edu>.

He is an active member of ECS DS&T and served on various committees over the years, and organized numerous Chemical Mechanical Planarization symposium/CMP Proceedings and delivered various short courses. He was instrumental in creating the first Electrochemical Society Student chapter at University of Central Florida and many of his students have received various ECS awards for talks and posters.



MICHAEL M. THACKERAY is an Argonne Distinguished Fellow and senior scientist in the Chemical Sciences and Engineering Division at Argonne National Laboratory. He received his PhD from the University of Cape Town, South Africa (1977) and studied as a post-doctoral student at Oxford University, UK. He was manager of the Battery Unit at the Council of Scientific and Industrial Research (CSIR), South

Africa before moving to Argonne in 1994. He was Director of the Department of Energy's (DOE's) Energy Frontier Research Center (EFRC), the Center for Electrical Energy Storage (CEES) from 2009 to 2014, and is currently Deputy Director of the renewed EFRC, the Center for Electrical Energy Science (CEES-II).

Dr. Thackeray has focused his career on unraveling structure-electrochemical relationships in solid electrodes and electrolytes for battery systems and in designing new or improved materials. While at the CSIR, he contributed to the early concepts of high-temperature sodium-metal chloride ('Zebra') batteries, and he pioneered the discovery of several transition-metal-oxide electrodes for lithium batteries, notably the spinel LiMn_2O_4 . While at Argonne, in a CRADA between DOE, 3M, and Hydro-Quebec his identification of a new cathode chemistry led to significant advances in lithium-polymer battery technology; he is also recognized for his contributions to the design of composite electrode structures for lithium-ion batteries.

Dr. Thackeray has published more than 200 research papers and is an inventor on 51 patents, several of which have been licensed on an international scale. Recognition for his contributions to battery science and technology include an honorary doctorate from the University of Cape Town (2014), the International Battery Association Yeager Award for life-long achievements in lithium battery R&D (2011), a DOE R&D Award (2010), an R&D100 Award (2009), The Electrochemical Society Battery Division Research Award (2005) and the University of Chicago Distinguished Performance Medal (2003). In South Africa, he is recognized on the commemorative wall at Africa's first internationally accredited science park for contributions as a South African to world science and technology.

Dr. Thackeray is a Board member of the International Battery Association, serving as its President between 1999 and 2002. He has been a member of the Battery Division of ECS since 1994 and has served on several Committees of the Society.



TOORU TSURU is an Emeritus Professor at Tokyo Institute of Technology (TIT), Japan. He received his Doctor degree in metallurgical engineering from TIT in 1975 and joined the Department of Metallurgical Engineering at TIT as a Research Associate, in 1982 as an Associate Professor, in 1990 as a Professor, in 2010 as a Distinguished Professor, and retired in 2012. He joined Massachusetts Institute of Technology as Post-

Doctoral Research Fellow from 1980 to 1981.

Professor Tsuru combined basic electrochemical measurements with other physical, chemical or mechanical methods, such as resistometry, electrochemical impedance, channel flow electrode, Kelvin probe, acoustic and photo acoustic measurements, and others, to advance corrosion research and developed understanding based on electrochemistry principles. He showed the amount of adsorbed intermediate for anodic dissolution of iron in the Bockris mechanism and diffusion control of oxygen in thin water film as proposed by Tomashov. For electrochemical impedance spectroscopy, He and his group and the French group were pioneers for wide range measurement from 0.001Hz to 20kHz. He applied this for studies of many corrosion problems and proposed a practical application as corrosion monitoring system. He applied Kelvin probe, electrochemical methods and many others to study on atmospheric corrosion that is a most complicated

phenomenon that involve many physical and chemical effects. He proposed a basic tool for design and evaluate a corrosion test in laboratories by the investigations of change in corrosion rate and mechanisms during wet and dry cycles. He and his co-workers have explored with success the electrochemistry of hot corrosion, hydrogen entry of steels, corrosion fatigue, and fuel cells.

Professor Tsuru supervised 37 doctoral dissertations and published more than 175 original papers (include Japanese), more than 161 papers in international meeting proceedings, 19 co-authored books and 9 co-edited international proceeding volumes. He is an active member of Japan Society of Corrosion Engineering (JSCE) and was the president of JSCE (2007-2008) and he has been the member of International Corrosion Council (ICC) since 1998, and was vice president (2002-2007) and president (2008-2010).



HARRY L. TULLER is Professor of Ceramics and Electronic Materials, Department of Materials Science and Engineering and Head of the Crystal Physics and Electroceramics Laboratory at the Massachusetts Institute of Technology, Cambridge, Massachusetts, USA.

He received BS and MS degrees in Electrical Engineering and Eng.Sc.D. in Solid State Science & Engineering from Columbia University, NY; served as Postdoctoral Research Associate, Physics, Technion, Israel 1974-5; following which he joined the faculty at MIT.

Professor Tuller's research focuses on defects, diffusion, and the electrical, electrochemical and optical properties of metal oxides with applications to sensors, fuel cells, photoelectrochemistry, thin film oxides, microphotonics, and MEMS devices. He has published over 420 articles, co-edited 15 books and was awarded 29 patents. He is Editor-in-Chief of the *Journal of Electroceramics* and Series Editor of *Electronic Materials: Science and Technology* and co-founder of Boston MicroSystems, a pioneer in silicon carbide-based MEMS technology and devices.

His honors include: Fellow of the American Ceramic Society-ACERS (1984); recipient of Fulbright (1989-1990), and von Humboldt Awards (Germany) (1997-2002); Docteur Honoris Causa, University Provence, Marseilles (2004); ACERS F.H. Norton Award (2005); elected to World Academy of Ceramics (2006); ACERS Edward Orton Jr. Award (2007); The Joseph Meyerhoff Visiting Professor, Weizmann Institute of Science (2008); Honorable Guest Professor of Shizuoka University, Japan (2009-2014); Technics Doctor Honoris Causa, University of Oulu, Finland (2009); The John F. McMahon Award Lecture, Alfred University (2009); Outstanding Achievement Award - High Temperature Division, The Electrochemical Society (2010); Somiya Award for International Collaboration in Materials Research, International Union Materials Research Societies, Japan (2012); Helmholtz International Fellow Award (Germany) (2013); VP and President-Elect of International Society of Solid State Ionics-ISSI (2013); Fellow of The Electrochemical Society (2014).



JOSE H. ZAGAL is a professor at the University of Santiago de Chile. He received his undergraduate degree in Chemistry from the University of Chile in 1973 and a PhD from Case Western Reserve University, in 1978, under E. Yeager. He was a visiting scientist at Brookhaven National Laboratory in 1982, Brown & Williamson Visiting Scholar, University of Louisville in 1996 and has been visiting scientist at the Ecole

Superieure de Chimie de Paris in several occasions. He was awarded the Presidential Chair in Science in 1996 in Chile by a committee chaired by Nobel Laureate Rudolph Marcus. He was appointed member of the Superior Council of Sciences by the President of Chile for the period 2011-2013. He has recently been elected Fellow of the International Society of Electrochemistry.

Professor Zagal has been a member of ECS since 1977 and helped to create the Chile Section of ECS and became its first Chair in 2011. He has delivered more than 50 papers at ECS meetings. He has authored over 190 publications, 6 book chapters, co-authored two books and created 3 patents.

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He was member of the Editorial Board of the *Journal of Applied Electrochemistry* and is currently an Editorial Board member of several publications including the *Journal of Solid State Electrochemistry*, *Electrocatalysis*, *Electrochemistry Communications*, *International Journal of Electrochemistry* and of the *Journal of the Serbian Chemical Society*.

He has contributed in many areas of electrochemistry including modified electrodes, conductive polymers, sensors and corrosion but he is particularly known for establishing reactivity guidelines for the design of efficient non-precious metal catalysts for the promotion of many electrochemical reactions including the reduction of O₂. He developed the concept of “tuning” the redox properties of MN₄ metal complexes for optimizing their electrocatalytic activity (volcano correlations). He is a contributor to the last edition of the *Electrochemical Dictionary*.

More recently he has become involved in the development of hybrid micro-electrodes using carbon nanotubes and conductive polymers for the detection of molecules of biological interest. Zagal also writes poetry, plays the Scottish bagpipes, and draws cartoons. Some of his caricatures appeared in *Interface* in 2002.



PIOTR ZELENAY received his PhD and DSc (“habilitation”) degrees in chemistry from Warsaw University, Warsaw, Poland. He was a postdoctoral research fellow at Texas A&M University, College Station (1983-1986), a visiting professor at the University of Illinois Urbana-Champaign (1988, 1989, 1990-92), University of Alicante, Spain (1994), and Colorado State University (1996-1997). Dr.

Zelenay was appointed a faculty member in the Department of Chemistry, Warsaw University in 1983 and remained at the University until 1997, when he accepted permanent research position with Los Alamos National Laboratory (LANL). Dr. Zelenay has been associated with Materials Physics and Applications Division (formerly Materials Science and Technology Division) at Los Alamos National Laboratory for the past 15 years. He is currently a Project Leader and Team Leader at LANL focusing primarily on fundamental and applied aspects of polymer electrolyte fuel cell science and technology, electrocatalysis, and electrode kinetics.

Dr. Zelenay has published more than 100 research articles in renowned scientific journals, including *Nature* and *Science*, co-authored nearly 300 presentations, of which approximately 100 have been invited/keynote/plenary lectures. To his credit, Dr. Zelenay has 16 patents and patent applications in the area of polymer electrolyte fuel cells. Since becoming Project Leader for LANL Fuel Cell Program in 2000, Dr. Zelenay has led numerous research projects and received more than 20 awards and recognitions. Among others, in June 2010, he was awarded the DOE Hydrogen Program R&D Award in Recognition of Outstanding Contributions to Fuel Cell Technologies for research on non-precious metal electrocatalysts for oxygen reduction reaction and, presently, The Electrochemical Society Energy Technology Division Research Award. Dr. Zelenay is a member of The Electrochemical Society, International Society of Electrochemistry and Editorial Board of *Electrocatalysis*.

2013 ECS Young Author Awards

The Norman Hackerman Young Author Award was established in 1928 for the two best papers published in the *Journal of The Electrochemical Society*—one for a paper in the field of electrochemical science and technology, and the other for solid state science and technology. To coincide with the change in Publications, beginning with the 2013 awards, the Norman Hackerman Young Author Award is being presented for the best paper published in the *Journal of The Electrochemical Society* for a topic in the field of electrochemical science and technology by a young author or authors. The Bruce Deal & Andy Grove Young Author Award, established in 2013, is being presented for the best paper published in the *ECS Journal of Solid State Science and Technology* for a topic in the field of solid state science and technology by a young author or authors.

Awarded to Rahul Malik and Aziz Abdellahi for “A Critical Review of the Li Insertion Mechanisms in LiFePO₄ Electrodes” (*JES*, Vol. 160, No. 5, p. A3179).



RAHUL MALIK is a research associate at the Massachusetts Institute of Technology (MIT) currently studying and developing materials for next-generation batteries from a combined experimental and first-principles calculations guided approach. After graduating summa cum laude with honors from Cornell University in 2007 with a BS in materials science and engineering, Dr. Malik completed his PhD in

2013 with Gerbrand Ceder at MIT for work on lithium iron phosphate cathodes, characterizing the particle size-dependence of the ionic diffusivity and non-equilibrium solid-solution transformation pathway. Currently, he is working in partnership with the Joint Center for Energy Storage Research (JCESR) developing novel materials for multi-valent intercalation based batteries which offer promise of significantly higher energy density compared to Li-ion batteries. His broader research interests include the thermodynamics and kinetics of materials (for energy), computationally guided materials development, collaboration with both theorists and experimentalists, and energy applications where material properties govern device performance.



AZIZ ABDELLAHI is a PhD student in the Materials Science and Engineering Department at the Massachusetts Institute of Technology (MIT). His thesis work, under the supervision of Gerbrand Ceder, focuses on understanding the single particle lithiation mechanisms in LiFePO₄ using first principles. Prior to joining Prof. Ceder’s group, Mr. Abdellahi completed a bachelor in engineering physics from the Ecole

Polytechnique (Paris, France) and a Masters in Nuclear Engineering from the Ecole Polytechnique de Montreal (Montreal, Canada). In addition to his research, Mr. Abdellahi is a member of the MIT Energy Club. As a co-director of the MIT Energy Club’s Events Committee, he has organized more than thirty energy lectures given by industrial and academic experts. Mr. Abdellahi also holds a black belt in Taekwondo, a Korean martial art which he practices very competitively. In addition to being a six-time Canadian champion, he earned a gold medal at the 2010 International Sports Karate Association World Championships (Orlando, USA), a bronze medal at the 2012 Taekwondo Pan-American Championships (Trois-Rivieres, Canada) and a top 8 finish at the 2013 Taekwondo World Championships (Benidorm, Spain).

Bruce Deal & Andy Grove Young Author Award

Awarded to Konstantinos Spyrou for “Hydrogen Storage in Graphene-Based Materials: Efforts Towards Enhanced Hydrogen Absorption” (*JSS*, Vol. 2, No 10, p. M3160).



KONSTANTINOS SPYROU received his BS in Materials Science and Engineering (2007) from University of Ioannina, Greece and his PhD in the group of surfaces and thin films (Zernike Institute for Advanced Materials) from University of Groningen, The Netherlands. He is currently a postdoctoral associate in Materials Science and Engineering departments at Cornell University, Ithaca, New York. His research

interests are materials chemistry, carbon nanostructures (graphene, carbon nanotubes, fullerenes), layered materials (clays, pillared clays, organo-clays), organic-inorganic composite materials, magnetic nanoparticles for multifunctional applications like gas storage, catalytically and environmental applications and CO₂ capture.

Battery Division Research Award



ARUMUGAM MANTHIRAM is currently the Joe C. Walter Chair in Engineering and Director of the Texas Materials Institute and the Materials Science and Engineering Graduate Program at the University of Texas at Austin (UT-Austin).

He received BS (1974) and MS (1976) degrees in chemistry from Madurai University, India, and a PhD degree in chemistry (1980) from the Indian Institute of Technology at Madras. After

working as a senior research fellow at the Indian Institute of Science at Bangalore, as a lecturer at Madurai Kamaraj University in India, and as a postdoctoral researcher at the University of Oxford in England and at UT-Austin with Professor John B. Goodenough, he became a faculty member at UT-Austin in 1991.

Dr. Manthiram's research is focused on rechargeable batteries, fuel cells, and supercapacitors. He has authored more than 550 publications, including 470 journal articles. He has been awarded 9 patents, and 14 patent applications are currently pending. He has graduated 41 PhD students and 22 MS students so far. He currently directs a large research group with about 30 graduate students and postdoctoral fellows.

He is the Regional (USA) Editor of *Solid State Ionics* and is serving as an editorial board member for 5 other journals, including *Chemistry of Materials*, *Journal of The Electrochemical Society*, and *ECS Electrochemistry Letters*. He has served in various capacities at ECS including Chair of the South Texas Section (1998-1999), Texas Section (2005-2007), and Battery Division (2010-2012). He founded the Student Chapter of ECS at UT-Austin in 2006.

Professor Manthiram received the Engineering Foundation Faculty Excellence Award in 1994, Mechanical Engineering Department Faculty Leadership Award in 1996, Charlotte Maer Patton Centennial Fellowship in 1996, Ashley H. Priddy Centennial Professorship in 2002, B. F. Goodrich Endowed Professorship in 2006, Jack S. Josey Professorship in Energy Studies in 2008, Joe C. Walter Chair in 2009, Mechanical Engineering Department Outstanding Teaching Award in 2011, and the University of Texas Outstanding Graduate Teaching award in 2012. He is a Fellow of the American Ceramic Society and The Electrochemical Society.

Battery Division Technology Award



FENG WU is head of the School of Chemical Engineering & the Environment, Beijing Institute of Technology, Beijing, China. He is currently the President of Green Energy Research Institute and the Co-Chair of the China Battery Industry Association.

Professor Wu is a leading scientist in the battery research community in China and one of the internationally recognized materials researchers in this field. He has made outstanding contributions to both basic and applied research as well as commercialization of rechargeable batteries in China.

Professor Wu has been involved in the research of NiMH batteries, lithium ion batteries and advanced power batteries for electric and hybrid vehicle applications. He has made great contributions in the development of high-strength composite membranes, electrolytes with electrochemically compatible flame retardants, as well as electrode materials with good thermal stability for lithium-ion battery applications.

He has been leading several Chinese national key research programs in the battery area, such as the '863 Program,' which is the National High Technology Research and Development Program in China, and the '973 Program,' the Chinese National Basic Research Program in China. Both 863 and 973 programs are supported by the Ministry of Science and Technology (MOST) of the central government of China. In these programs, his teams have been utilizing innovative approaches to successfully achieve enhancement of energy density using multi-valence systems containing light elements.

Dr. Wu has also been leading several projects funded by the National Natural Science Foundation of China. As the first Chief Scientist of

the Chinese Key Electric Vehicle Project of the Chinese National High Tech Research and Development Plan, he has successfully achieved several important milestones in this project.

In the battery research field, Professor Wu has published more than 400 SCI and EI papers, edited two books as chief editors, and awarded 46 patents.

In addition to the multiple national and provincial awards in China, Professor Wu received the International Battery Association 2012 Research Award in 2012 and the 2013 International Automobile Lithium Battery Association (IALB) Research Award in 2013. He has been serving as the lead organizer representing China in the China-US workshops on energy storage and vehicle technologies. He has been actively involving and serving as chairs or co-chairs in the Advanced Batteries for Automotive Applications (ABAA) conferences and International Forums on Li-ion Battery Technology & Industrial Development.

Corrosion Division H. H. Uhlig Award



PAUL M. NATISHAN received a BS in Biology from Wilkes College and a MS and PhD in Materials Science and Engineering from the University of Virginia. He went to the Naval Research Laboratory (NRL) as a National Research Council post-doc, joined NRL as a Research Metallurgist in 1985, and is currently section head in the Center of Corrosion Science and Engineering.

Dr. Natishan has worked in the fields of corrosion science and engineering and electrochemistry for 31 years. His research has resulted in over 100 publications and 7 U.S. patents.

He has been inducted as a Fellow of The Electrochemical Society (ECS) and NACE International. He was the recipient of the 1996 Blum and 1997 Foley Awards (National Capital Section of ECS) and the 2005 Kruger Award (Baltimore/Washington Section of NACE International).

Dr. Natishan is a Past President and Secretary of ECS. He was a member of the Corrosion Division Executive Committee, Chair of the *ECS Transactions* Charter Committee, and has served on most committees within ECS.

He was appointed Adjunct Full Professor at Duke University in 2006. Dr. Natishan was a section editor for the *ASM Handbook on Corrosion*, Volume 13A and co-wrote the chapter "Corrosion and Corrosion Control" for the *Kirk-Othmer Encyclopedia of Chemical Technology* in 1993 with second and third editions in 2002 and 2010. He was an associate editor for *Corrosion Journal*. Currently, Dr. Natishan is the Associate Editor for the Corrosion TIA of the *Journal of The Electrochemical Society*, a member of the Honors and Awards Committee, Audit Subcommittee, and Council of Past Presidents.

Electrodeposition Division Research Award



ALAN WEST received his BS in Chemical Engineering at Case Western Reserve University, where he was first introduced to electrochemical engineering in Uziel Landau's course. He then studied under John Newman, where he focused on the numerical simulation and theory of current distributions; he received his PhD in Chemical Engineering from the University of California. In postdoctoral studies, he worked

with Dieter Landolt in the area of electrochemical etching and polishing of metals at the Ecole Polytechnique Federale de Lausanne.

Dr. West joined Columbia University in 1992 as an Assistant Professor of Chemical Engineering. He is the past chair of the Department of Chemical Engineering at Columbia University and is currently the Samuel Ruben-Peter G. Viele Professor of Electrochemistry.

Professor West is a recipient of The Electrochemical Society's Norman Hackerman Young Author Award, and a co-author on two other papers that garnered the prize for his students, Roberto Vidal

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and Igor Volov. His research interests include electrodeposition, electrochemical sensors, batteries, and electrochemical synthesis.

In addition to his academic studies, Professor West has consulted and collaborated extensively with the industry. He is an author of a self-published text, *Electrochemistry and Electrochemical Engineering: An Introduction*, intended for engineering students at the advanced undergraduate or beginning graduate level. Furthermore, he is working to spin out from the University a technology that couples an electrochemical and biological process to convert dilute sources of CO₂ into fuels and chemicals.

High Temperature Materials Division Outstanding Achievement Award



JANUSZ NOWOTNY is Professor of Solar Energy Technologies, University of Western Sydney. He received his MSc, Silesian Technical University, Gliwice, Poland; and his PhD, at the Polish Academy of Sciences. He completed his postdoc at Northwestern University in Evanston, Illinois; and his ScD at the Academy of Mining and Metallurgy, Cracow.

His former associations include Director, UNSW Centre for Materials Research in Energy Conversion, the Australian Nuclear Science & Technology Organisation, the Institute of Catalysis and Surface Chemistry, the Polish Academy of Sciences, and the Silesian Technical University.

Professor Nowotny has been a visiting Professor at the University of Bordeaux, the University of Grenoble, the Tokyo Institute of Technology, the University of Burgogne, the Max-Planck-Institute for Solid State Research, the University of Paris-Sud, the University of Nancy, and the University of Marseille.

His professional activities include the Director of NATO Advanced Research Workshop on Nonstoichiometric Compounds. Professor Nowotny has been the organizer of over 50 international meetings, including NATO Summer School, Oleron, '88. He is the founder of the International Network on Solar Hydrogen (established in '04). Dr. Nowotny is also the founder of two workshop series, Nonstoichiometric Compounds as well as Ceramic Interfaces.

He is Fellow of the Polish Academy of Science & Art and member of Editorial Boards of 6 international journals, including *Ionic*, *Hydrogen Energy*, and *Materials Science Forum*.

Dr. Nowotny has published more than 20 books, including *Oxide Semiconductors for Solar Energy Conversion* ('12), has more than 440 refereed papers and edition of 5 topical issues of international journals.

Physical and Analytical Electrochemistry Division Max Bredig Award in Molten Salt and Ionic Liquid Chemistry



CHARLES LOGAN HUSSEY is Chair and Professor of Chemistry at the University of Mississippi. He earned his BS and PhD degrees in Chemistry from this institution in 1971 and 1974, respectively. From 1974-78, he was a research chemist and active duty military officer at the Frank J. Seiler Research Laboratory (Air Force Systems Command) located at the United States Air Force Academy. Dr. Hussey joined the

Department of Chemistry at the University of Mississippi as an Assistant Professor in 1978. Concurrently, he served as a member of the United States Air Force Reserve and was assigned to the Battery and Propulsion Directorate, Wright Laboratory, Air Force Materiel Command, retiring in 1994 as a Lieutenant Colonel. Dr. Hussey was promoted to Professor in 1987 and became Department Chair in 1997. During his academic career, Professor Hussey has served as Vice-Chair and Chair of the Gordon Conference on Molten Salts and Liquid Metals, as a consultant for Lawrence Livermore National Laboratory, as a member of the National Research Council Committee on Electrometallurgical Techniques for DOE Spent Fuel Treatment, as a member of the University of Chicago Review Committee for the CMT Division of Argonne National Laboratory, and as a member of the Board of Visitors for the Army Research Office.

Professor Hussey, who is a Fellow of The Electrochemical Society, has been a member of the Electrochemical Society Editorial Board since 2000. As an Associate Editor and now Technical Editor, he has handled manuscripts in many topical areas for the *Journal of The Electrochemical Society* and *ECS Electrochemistry Letters*, but mainly those articles involving electrochemical/electroless deposition and electrochemistry in molten salts and ionic liquids. In addition, he has organized ECS symposia about electrochemistry in molten salts and nonaqueous solvents, and the electrochemistry and spectroscopy of surface-bound molecules. Professor Hussey's scientific research with molten salts/ionic liquids has been directed at the electrochemistry and spectroscopy of d- and f-block elements, the electrodeposition of aluminum and corrosion-resistant aluminum-transition metal alloys, and the electrochemical treatment of spent nuclear fuel. He has also published extensively about the physical and transport properties of molten salts/ionic liquids. More than 25 students have earned advanced degrees in his laboratory, and many of them hold significant positions in industry or academia.

Sensor Division Outstanding Achievement Award



PETER HESKETH received a B.Sc. in Electrical and Electronic Engineering from the University of Leeds (1979) and was a Thouron Fellow at the University of Pennsylvania, obtaining an MS (1983) PhD (1987) in Electrical Engineering. He worked in the Microsensor Group at the Physical Electronics Laboratory of Stanford Research Institute and then Teknekron Sensor Development Corporation before joining the

faculty at the University of Illinois in 1990 in the Department of Electrical Engineering and Computer Science.

Dr. Hesketh is currently a Professor of Mechanical Engineering at the Georgia Institute of Technology, Member of the Parker H. Petit Institute for Bioengineering and Biosciences, and Director of the Micro and Nano Engineering Group in the School of Mechanical Engineering.

Professor Hesketh is a past chair of the Sensor Division, and past chair of the Honors and Awards Committee of the ECS. Currently, he is the Chair of the Georgia Section. He is organizer of the MEMS/NEMS Symposia held at the ECS meeting. His research interests include micro/nanofabrication techniques, micro-cantilever chemical sensors, miniature gas chromatography systems, and microfluidics for sample preparation and sensing of microbial contamination of foods. He has published over seventy journal papers and edited fifteen books on microsystems.

He is a Fellow of the AAAS, ASME, ECS, a member of ASEE, AVS, Sigma Xi, and IEEE. Professor Hesketh is married to Ann Marie with two children, Gabriel and Lillian Hesketh.

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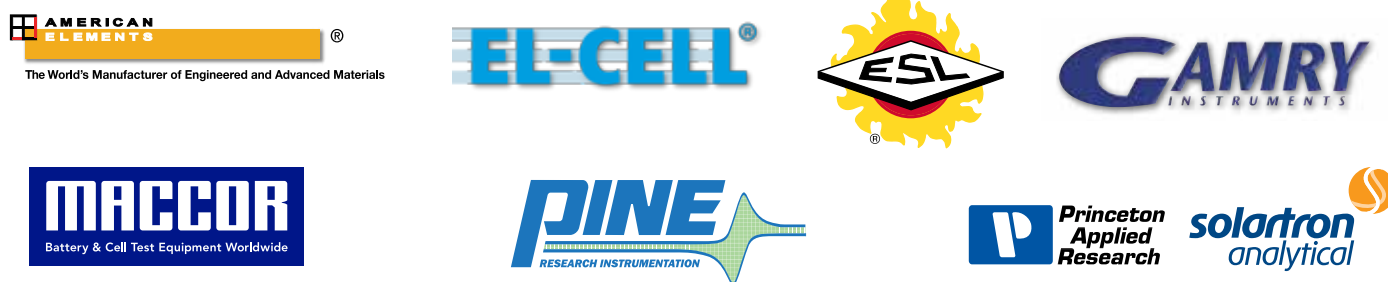
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Technical Exhibit

The Exhibit Hall is well-placed in an area that easily accommodates equipment demos and there will be several special workshops for exhibitors to showcase their equipment and services. Generous exhibit hours include receptions, and poster sessions in the same hall to ensure maximum traffic during peak hours.

Exhibit Hours

Tuesday, October 7, 2014

0800-1300h Exhibitor Move-In
 1300-1400h Lunch in Exhibit Hall
 1300-1600h Technical Exhibit
 1500-1530h Coffee & Snack Break in Exhibit Hall
 1800-2000h Technical Exhibit, General & Student Poster Session

Wednesday, October 8, 2014

0900-1400h Technical Exhibit
 0930-1000h Coffee Break & Continental Breakfast in Exhibit Hall

0930-1030h El Cell Workshop in Exhibit Hall
 1100-1200h Maccor/Ametek Workshop in Exhibit Hall
 1200-1300h Lunch in Exhibit Hall
 1800-2000h Technical Exhibit & General Poster Session

Thursday, October 9, 2014

0900-1200h Technical Exhibit
 0930-1000h Coffee Break & Continental Breakfast in Exhibit Hall
 0930-1030h ESL Electroscience Workshop in Exhibit Hall
 1100-1200h Gamry Workshop in Exhibit Hall

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Pine Research Instrumentation

Booth 5

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Princeton Applied Research/Solartron Analytical

Booths 24, 25, & 26

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Scribner Associates, Inc.

Booth 6

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Ultratech / Cambridge NanoTech

Booth 1

Jim Mckibben
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Student Mixer

Students are invited to join distinguished members and staff of ECS and SMEQ for an evening of fun, networking, and socializing over complimentary food and beverages. Always one of the most popular events of the meeting, the student mixer is by invitation, with RSVP required, and will be held on Monday, October 6 from 1930-2130h. Registered students will receive an e-mail invitation with details of the mixer. Please remember to bring your badge and identification (passport or drivers license) - proof of age is required. Please contact ecs@electrochem.org for more information.

Events-at-a-Glance

SUNDAY, OCTOBER 5

- 0900h.....Short Courses
- 0820h.....Technical Sessions*
- 1400h.....Career Development Series:
Essential Elements for Employment Success
- 1630h.....Plenary Session
- 1730h.....Sunday Evening Get-Together

MONDAY, OCTOBER 6

- 0800h.....E2S Workshop: Applying Electrochemistry to
Complex Global Challenges
- 0800h.....Career Development Series:
Essential Elements for Employment Success
- 0930h.....Technical Session Coffee Break
- 1000h.....Technical Sessions*
- 1200h.....Career Development Series: Résumé Review
- 1700h.....Career Development Series:
Panel of Professionals
- 1930h.....Student Mixer (RSVP required)

TUESDAY, OCTOBER 7

- 0800h.....Technical Sessions*
- 0800h.....Career Development Series: Résumé Review
- 0930h.....Technical Session Coffee Break in Exhibit Hall
- 1300h.....Technical Exhibit
- 1330h.....Exhibitor Workshop in Exhibit Hall
- 1500h.....Exhibitor Workshop in Exhibit Hall
- 1700h.....ECS Publications—Author Information
Session – Room TBD
- 1745h.....Acheson Award Reception in Honor of
Ralph J. Brodd, Arena A
- 1800h.....Technical Exhibit and General and Student
Poster Session

WEDNESDAY, OCTOBER 8

- 0700h.....*Free the Science* 5K Run
- 0800h.....Technical Sessions*
- 0800h.....Career Development Series: Résumé Review
- 0900h.....Technical Exhibit
- 0930h.....Technical Session Coffee Break in Exhibit Hall
- 0930h.....Exhibitor Workshop in Exhibit Hall
- 1100h.....Exhibitor Workshop in Exhibit Hall
- 1800h.....Student Poster Award Presentation
in Exhibit Hall
- 1800h.....Technical Exhibit and General Poster Session

THURSDAY, OCTOBER 9

- 0800h.....Technical Sessions*
- 0900h.....Technical Exhibit
- 0930h.....Exhibitor Workshop in Exhibit Hall
- 1100h.....Exhibitor Workshop in Exhibit Hall
- 1700h.....SMEQ Assembly
(open to SMEQ members only)
- 2000h.....Cena Baile (Dinner and Dance Party)

*Check technical program for exact times

A — Batteries and Energy Storage

- A1** — Batteries and Energy Technology Joint General Session (M-Tu) — A. Manivannan, J. Xiao, B. Y. Liaw, S. Mukerjee, M. M. Doeff, and D. Wang
Battery / Energy Technology
- A2** — Batteries Beyond Lithium Ion (M-Th) — Y. Xing, C. Johnson, M. Yakovleva, V. Di Noto, and K. Zaghbi
Battery / Energy Technology
- A3** — Electrochemical Capacitors: Fundamentals to Applications (M-Th) — W. Sugimoto, D. Bélanger, T. Brousse, P. N. Kumta, J. W. Long, P. Simon, D. Qu, and O. Leonte
Battery / Physical and Analytical Electrochemistry
- A4** — Electrochemical Interfaces in Energy Storage Systems (M-W) — K. Edstrom, R. Kostecki, P. Atanassov, J. St-Pierre, and D. Guyomard
Battery / Energy Technology / Physical and Analytical Electrochemistry
- A5** — Lithium-Ion Batteries (M-Th) — S. Meng, K. Amine, and J. J. Wu
Battery
- A6** — Nano-Architectures for Next-Generation Energy Storage Technologies (M-Tu) — J. Xiao, S. Meng, K. Edstrom, K.-Y. Chan, V. Kalra, and G. Yu
Battery / Energy Technology
- A7** — Non-aqueous Electrolytes (Tu-Th) — B. Lucht, R. Jow, R. V. Bugga, M. C. Smart, and W. A. Henderson
Battery
- A8** — Solar Fuels and Photocatalysts 4 (Su-W) — N. Wu, D. Chu, E. Miller, V. Subramanian, A. Manivannan, J. Lee, H. N. Dinh, P. J. Kulesza, and H. Wang
Energy Technology / Physical and Analytical Electrochemistry / Sensor
- A9** — Stationary and Large-Scale Electrical Energy Storage Systems 4 (Tu-W) — T. Van Nguyen, S. Mukerjee, and J. Liu
Industrial Electrochemistry and Electrochemical Engineering / Battery / Energy Technology

B — Chemical and Biological Sensors

- B1** — Chemical Sensors 11. Chemical and Biological Sensors and Analytical Systems (Tu-W) — Z. P. Aguilar, M. T. Carter, R. Mukundan, J. Li, G. W. Hunter, B. A. Chin, P. K. Sekhar, L. A. Nagahara, and A. Simonian
Sensor HC
- B2** — Microfabricated and Nanofabricated Systems for MEMS/NEMS 11 (Chemical and Biological Sensors) (M-Tu) — P. Hesketh, P. Vanýsek, N. Wu, B. A. Chin, S. Mitra, R. I. Stefan-van Staden, and A. Khosla
Sensor / Physical and Analytical Electrochemistry HC

C — Corrosion Science and Technology

- C1** — Corrosion General Session (M-W) — R. Buchheit and S. Fujimoto
Corrosion
- C2** — Electrochemical Techniques and Corrosion Monitoring (Tu-W) — I. C. G. Tiburcio, H. Castañeda, M. Pech-Canul, and M. Itagaki
Corrosion / SMEQ
- C3** — High Resolution Characterization of Corrosion Process 4 (W) — H. N. McMurray, K. R. Zavadil, and N. Casillas
Corrosion / SMEQ

D — Electrochemical/Electroless Deposition

- D1** — Electrodeposition for Energy Applications 3 (Tu-Th) — S. Brankovic, L. Deligianni, N. Dimitrov, L. Magagnin, S. Calabrese Barton, M. Shao, M. Innocenti, and A. Lavacchi
Electrodeposition / Energy Technology
- D2** — Electrochemical Science and Technology: Challenges and Opportunities in the Path from Invention to Product (M-W) — L. Romankiw, R. Alkire, J. N. Harb, G. G. Botte, E. J. Taylor, and P. Vanýsek
Electrodeposition / Industrial Electrochemistry and Electrochemical Engineering / Physical and Analytical Electrochemistry
- D3** — Magnetic Materials, Processes, and Devices 13 (M-W) — C. Bonhôte, S. R. Brankovic, H. Gatzen, P. Hesketh, Y. Kitamoto, T. Osaka, and G. Zangari
Electrodeposition

E — Electrochemical Engineering

- E2** — Electrochemical Treatments for Organic Pollutant Degradation in Water and Soils (W) — J. M. Peralta Hernandez, M. T. Oropeza-Guzman, and D. G. Peters
Industrial Electrochemistry and Electrochemical Engineering / SMEQ
- E3** — Symposium in Honor of Professor Ralph E. White (M-Tu) — J. W. Van Zee, T. V. Nguyen, G. G. Botte, and V. R. Subramanian
Industrial Electrochemistry and Electrochemical Engineering / Energy Technology
- F2** — Solid State Ionic Devices 10 (M-W) — E. Traversa, G. S. Jackson, A. M. Herring, E. D. Wachsman, R. Mukundan, P. Vanýsek, J. W. Fergus, and M. C. Williams
High Temperature Materials / Energy Technology / Physical and Analytical Electrochemistry / Sensor HC
- F3** — Polymer Electrolyte Fuel Cells 14 (PEFC 14) (Su-Th) — H. A. Gasteiger, Y. Meas, F. N. Büchi, C. Coutanceau, M. Edmundson, J. M. Fenton, T. F. Fuller, D. C. Hansen, D. Jones, R. A. Mantz, S. Mitsushima, S. R. Narayanan, K. A. Perry, V. K. Ramani, T. J. Schmidt, K. Shinohara, P. Strasser, K. Swider-Lyons, H. Uchida, and A. Z. Weber
Industrial Electrochemistry and Electrochemical Engineering / Battery / Corrosion / Energy Technology CD

G — Organic and Bioelectrochemistry

- G1** — Bioelectroanalysis and Bioelectrocatalysis 2 (W) — S. D. Minteer, P. Atanassov, L. V. Gonzalez-Gutierrez, and D. M. Fox
Physical and Analytical Electrochemistry / SMEQ

H — Physical and Analytical Electrochemistry, Electrocatalysis, and Photoelectrochemistry

- H1** — Physical and Analytical Electrochemistry General Session (M-Tu) — P. J. Kulesza
Physical and Analytical Electrochemistry
- H2** — Chemically Modified Electrodes (M-Tu) — M. Anderson, A. Fitch, and J. L. Stickney
Physical and Analytical Electrochemistry / Electrodeposition
- H6** — Molten Salts and Ionic Liquids 19 (Su-Th) — W. M. Reichert, P. C. Trulove, R. A. Mantz, S. Mukerjee, F. Endres, H. C. De Long, A. Bund, and A. Ispas
Physical and Analytical Electrochemistry / Electrodeposition / Energy Technology HC
- H7** — Oxygen Reduction Reactions (M-W) — P. J. Kulesza, R. A. Mantz, V. Di Noto, W. E. Mustain, S. Mukerjee, P. E. Gannon, X. Zhou, H. Xu, Y. Shao-Horn, and M. Shao
Physical and Analytical Electrochemistry / Battery / Energy Technology / High Temperature Materials
- H8** — Systems Electrochemistry (W) — I. Z. Kiss, S. Calabrese Barton, V. R. Subramanian, R. Hanke-Rauschenbach, H. Varela, and S. Nakanishi
Physical and Analytical Electrochemistry / Energy Technology / Industrial Electrochemistry and Electrochemical Engineering

M — Carbon Nanostructures and Devices

- M1** — Nanocarbon Fundamentals and Applications - From Fullerenes to Graphene (W) — R. Weisman, M. E. Rincon-Gonzalez, D. Cliffler, and Y. S. Obeng
Nanocarbons / Dielectric Science and Technology / Physical and Analytical Electrochemistry / SMEQ

N — Dielectric Science and Materials

- N1** — Thermal and Plasma CVD of Nanostructures and Their Applications (Tu) — M. K. Sunkara, U. Cvelbar, M. Meyyappan, and B. A. Chin
Dielectric Science and Technology / High Temperature Materials / Sensor

P — Electronic Materials and Processing

- P1** — Atomic Layer Deposition Applications 10 (M-W) — F. Roozeboom, S. De Gendt, A. Delabie, J. W. Elam, O. van der Straten, and A. Londergan
Dielectric Science and Technology / Electronics and Photonics HC
- P3** — High Purity and High Mobility Semiconductors 13 (M-W) — E. Simoen, O. Nakatsuka, C. Mazure, C. Claeys, and R. J. Falster
Electronics and Photonics HC

- P4** — Plasma Processing 20 (Tu) – S. Mathad, D. W. Hess, O. Leonte, and M. Engelhardt
Dielectric Science and Technology / Electronics and Photonics
- P5** — Processing Materials of 3D Interconnects, Damascene, and Electronics Packaging 6 (M-W) – K. Kondo, R. Akolkar, D. Barkey, W. Dow, M. Hayase, M. Koyanagi, S. Mathad, P. Ramm, F. Roozeboom, and S. Shingubara
Electronics and Photonics / Dielectric Science and Technology / Electrodeposition
- P6** — Semiconductor Wafer Bonding 13: Science, Technology, and Applications (M-W) – H. Moriceau, H. Baumgart, K. D. Hobart, R. Knechtel, T. Suga, M. Goorsky, and C. Tan
Electronics and Photonics **HC**
- P7** — SiGe, Ge, and Related Compounds: Materials, Processing, and Devices 6 (M-Th) – D. L. Harame, J. Boquet, and J. Murota
Electronics and Photonics **HC**
- P8** — Thermoelectric and Thermal Interface Materials (M-Tu) – C. O'Dwyer and J. He
Electronics and Photonics
- P9** — Transparent Conducting Materials for Electronic and Photonics (Tu) – C. O'Dwyer, J. He, J. Kim, and O. Leonte
Electronics and Photonics / Dielectric Science and Technology
- Q** — **Electronic and Photonic Devices and Systems**
- Q1** — Emerging Nanomaterials and Devices (Tu) – Q. Li, H. Baumgart, J. He, C. A. Richter, H. Wang, and O. D. Jurchescu
Electronics and Photonics / Dielectric Science and Technology **SC**
- Q2** — Fundamentals and Applications of Microfluidic and Nanofluidic Devices 2 (W) – H. Baumgart, A. Beskok, J. P. Hsu, S. W. Joo, A. Sharma, S. Qian, and P. Vanýsek
Electronics and Photonics / Physical and Analytical Electrochemistry **SC**
- Q3** — GaN and SiC Power Technologies 4 (M-W) – K. Shenai, M. Bakowski, M. Dudley, and N. Ohtani
Electronics and Photonics / Dielectric Science and Technology **HC**
- Q4** — Low-dimensional Nanoscale Electronic and Photonic Devices 7 (M-W) – Y. Chueh, M. Suzuki, S. Jin, S. Kim, J. C. Ho, Z. Fan, and G. W. Hunter
Electronics and Photonics / Dielectric Science and Technology / Sensor
- Q5** — Nonvolatile Memories (W-Th) – S. Shingubara, Z. Karim, B. Magyari-Kope, T. Ohyanagi, A. Sebastian, K. Kobayashi, K. Rhie, L. Goux, G. Bersuker, and H. Shima
Dielectric Science and Technology / Electronics and Photonics **SC**
- Q6** — Photovoltaics for the 21st Century 10 (Tu) – M. Tao, C. Claeys, L. Deligianni, J. M. Fenton, J. Park, K. Rajeshwar, T. Druffel, and H. Hamada
Dielectric Science and Technology / Electrodeposition / Electronics and Photonics / Energy Technology / Industrial Electrochemistry and Electrochemical Engineering **SC**
- Q7** — Semiconductors, Dielectrics, and Metals for Nanoelectronics 12 (M-W) – S. Kar, M. Houssa, H. Jagannathan, K. Kita, D. Landheer, D. Misra, and S. Van Elshocht
Dielectric Science and Technology / Electronics and Photonics **HC**
- Q8** — Solid-State Electronics and Photonics in Biology and Medicine (M-Tu) – Y. Wang, A. Hoff, M. J. Deen, Z. P. Aguilar, and L. F. Marsal
Electronics and Photonics / Sensor **SC**
- Q9** — State-of-the-Art Program on Compound Semiconductors 56 (SOTAPOCS 56) (M-Tu) – J. He, C. O'Dwyer, F. Ren, C. Jagadish, and Y. Chueh
Electronics and Photonics **SC**
- Q10** — Thin Film Transistors 12 (TFT 12) (M-W) – Y. Kuo, O. Bonnaud, J. Jang, W. I. Milne, M. Shur, and H. Hamada
Electronics and Photonics **HC**
- R** — **Luminescence and Display Materials, Devices, and Processing**
- R1** — Luminescence and Display Materials: Fundamentals and Applications (in Honor of Hajime Yamamoto) (W) – U. Happek, A. A. Setlur, and J. Collins
Luminescence and Display Materials
- Z** — **General**
- Z1** — Student Poster Session (Tu) – V. R. Subramanian, C. S. Johnson, R. H. Lara-Castro, K. B. Sundaram, V. Chaitanya, P. Parkya, M. P. Foley, and A. Khosla
All Divisions / SMEQ
- Z2** — Energy Water Nexus (M-W) – E. D. Wachsman, C. Hensman, S. P. Nunes, R. Kostecki, G. G. Botte, P. M. Natishan, B. R. Stoner, S. D. Minter, W. E. Mustain, and N. Wu
All Divisions / Interdisciplinary Science and Technology Subcommittee
- Z3** — Nanotechnology General Session (W) – O. Leonte, W. E. Mustain, and P. Granitzer
All Divisions / Interdisciplinary Science and Technology Subcommittee

ecstransactions

ECS Transactions – Forthcoming Issues

Symposia with *ECS Transactions* (ECST) issues available “at” the meeting are labeled with the following icons:

- HC** Hardcover (HC) editions of *ECS Transactions* will be available for purchase and pick-up at the meeting; or you may pre-order your hardcover ECST issue using the meeting registration form in this brochure or when registering online.
- CD** Compact Disc (CD) editions of *ECS Transactions* will be available for purchase and pick-up at the meeting; or you may pre-order your CD ECST issue using the meeting registration form in this brochure or when registering online. The CD edition of F3 (PEFC 14) also includes a 1 gigabyte USB drive containing the complete issue.
- SC** Softcover (SC) editions of *ECS Transactions* will be available for purchase at the meeting but will be shipped to you after the meeting ends. Please visit the ECS Exhibit Booth in Cancun to order your softcover ECST issue.
- Electronic (PDF) editions of *ECS Transactions* will be available ONLY via the ECS Digital Library (ecsd.org). Electronic editions of the Cancun “at” meeting issues will be available for purchase beginning September 26, 2014. Please visit the ECS website for all issue pricing and ordering information for the electronic editions.

In addition to those symposia that have committed to publishing an issue of *ECS Transactions*, all other symposia potentially will be publishing an issue of ECST approximately 16 weeks after the Cancun meeting. If you would like to receive information on any of these issues when they become available, please e-mail ecst@electrochem.org. Please include your name, e-mail address, and all issues in which you are interested.

General Meeting Information and Meeting Registration

The 2014 ECS and SMEQ Joint International Meeting will be held in Cancun, Mexico at the meeting headquarters hotel, the Moon Palace Resort (Moon Palace Golf & Spa Resort, Carr. Fed. 307 Cancun-Chetumal, Km 340. Cancun, Quintana Roo, C.P. 77500).

Key Locations in the Moon Palace Resort

Meeting Registration..... Universal, First Floor Expocenter,
Hotel Registration..... Universal, First Floor Expocenter
Information/Message Board..... Universal, First Floor Expocenter,
ECS Headquarters Office..... Sunrise Conference Center, Saturn 1
AV Tech Table..... Located outside select symposium rooms
Technical Exhibit..... Universal, First Floor Expocenter
Symposium Assistance..... Universal, First Floor, Expocenter
Hospitality Desk..... Universal, First Floor, Expocenter

Registration Information

Meeting Registration—The meeting registration area will be located in the Moon Palace Resort, in the Universal Expocenter, first floor. Registration will open on Saturday morning and the technical sessions will be conducted Monday through Thursday.

Registration Hours

Saturday, October 4..... 1100-1900
Sunday, October 5..... 0700-1900
Monday, October 6..... 0700-1900
Tuesday, October 7..... 0700-1730
Wednesday, October 8..... 0800-1600
Thursday, October 9..... 0800-1600

Who must pay the registration fee?

All meeting participants, including invited speakers, are required to pay the appropriate registration fees. Short Course registrants who wish to attend the meeting in addition to their Short Course are required to pay the meeting registration fee in addition to the Short Course fee.

Early-Bird Registration

The deadline for Early-Bird registration is September 5, 2014. Regular registration rates are in effect online after September 5, 2014 and at the meeting. Register online at electrochem.org, or download the registration form from the website and fax your completed form to 1.609.737.2743. If you send a registration by fax, please do not send another copy by e-mail, as this may result in duplicate charges. Early-Bird and post-September 5th registration payments must be made in U.S. Dollars via Visa, MasterCard, American Express, Discover Card, check, or money order payable to ECS.

Registration Fees

ALL PARTICIPANTS AND ATTENDEES ARE REQUIRED TO PAY THE APPROPRIATE REGISTRATION FEE LISTED BELOW.

	Early-Bird Fees (until 9/5/2014)	Regular Fees (after 9/5/2014)
ECS & SMEQ Member	\$475	\$575
Nonmember	\$600	\$700
ECS & SMEQ Student Member.....	\$170	\$270
Student Nonmember.....	\$200	\$300
One Day ECS & SMEQ Member	\$325	\$425
One Day Nonmember	\$410	\$510
Emeritus & Honorary Member.....	\$0	\$0
Nontechnical Registrant	\$25	\$30

Please note, attendees *not staying* at the Moon Palace will be required to pay an additional one-time \$198.00 USD resort access fee to cover unlimited meals, snacks, and beverages throughout the duration of the meeting. This fee is payable directly to the Moon Palace when you pick up your registration materials.

Refunds

Refund requests for Meeting Registration or Short Course Registration (separate fees) must be requested in writing and will be accepted only if received by September 29, 2014. All refunds are subject to a 10% processing fee. Requests for refunds should be e-mailed to customerservice@electrochem.org. Refunds will not be processed until AFTER the meeting.

Lost Badge or Ticket

There will be a \$30 charge for reprinting lost badges or tickets. Admittance will **not** be granted to ticketed events without the actual ticket. Tickets must be reprinted at Registration during scheduled hours and cannot be reprinted at the event itself.

ADA Accessibility

Accommodations for attendees with special needs will be handled on an individual basis provided that adequate notice is given to the ECS Headquarters Office.

Permissions Granted to ECS & SMEQ

ECS and SMEQ reserves the right to electronically record any or all meeting-related events. By registering for and/or attending an ECS and SMEQ meeting you are granting ECS and SMEQ permission to use any recording or photography made of you at any meeting event or anywhere within the meeting venue.

Speaker Indemnification

The ideas and opinions expressed in the technical sessions, conferences, and any handout materials provided are those of the presenter. They are not those of The Electrochemical Society (ECS or SMEQ), nor can any endorsement by ECS or SMEQ be claimed.

Financial Assistance

Financial assistance is limited and generally governed by the symposium organizers. Individuals may inquire directly to the symposium organizers of the symposium in which they are presenting their paper to see if funding is available. Individuals requiring an official letter of invitation should write to ECS headquarters office; such letters will not imply any financial responsibilities of ECS.

ECS Meeting Abstracts

ECS Meeting Abstracts are always right at hand – and as always, are **FREE** with registration. Registrants may easily access them through wireless internet, which will be available at the meeting; download them directly from the 226th ECS Meeting website. Paper editions of meeting abstracts are no longer distributed; attendees who require paper should download abstracts and print them in advance of the meeting.

Author Choice Open Access

ECS has launched of Author Choice Open Access across its four peer-reviewed journals: *Journal of The Electrochemical Society*, *ECS Journal of Solid State Science and Technology*, *ECS Electrochemistry Letters*, and *ECS Solid State Letters*. If you are attending the meeting in Cancun, you will also receive one Article Credit, which may be used for up to 12 months after the meeting. If you have question, please visit electrochem.org/oa or contact oa@electrochem.org for personal assistance.

Travel Companions/Nontechnical Registrants

Travel companions of attendees are invited to register for the meeting as a “Nontechnical Registrant.” The nontechnical registrant registration Early-Bird fee of \$25 (increases to \$30 after September 5) includes admission to non-ticketed social events; use of an exclusive Get-together Lounge with beverage service and light refreshments, Monday through Thursday, 0800-1000h; and a special “Welcome to Cancun” orientation presented at 0900h in the lounge. Nontechnical

registrants not staying at the Moon Palace will be required to pay an additional \$198.00 USD fee to cover unlimited meals, snacks, and beverages during the meeting. The \$198.00 USD resort access fee is for the entire week of the conference and will be paid upon arrival to the resort.



Meeting Tools

ECS and SMEQ are pleased to provide a complimentary wireless network! For the duration of the meeting, ECS and SMEQ will be providing a wireless network for your use. This complimentary service is available throughout the Moon Palace Resort. To use the wireless network, please connect to "Moon Palace" and then open your web browser.

Free the Science™ 5K Run

Claim your space at the starting line of the second ECS *Free the Science* 5K Run and enjoy the scenery of the Moon Palace Resort during a fresh morning run! Plus, the top three finishers will receive prizes. See if you can beat the Orlando 1st place finisher Matthew Thomas Lawder, who had an incredible winning time of 14:12!



The *Free the Science* 5K Run is a ticketed event, with proceeds benefitting the ECS Publications Endowment, in support of our open access initiative. Bring your running shoes and join us for a memorable activity to jog your mind, as well as your body.

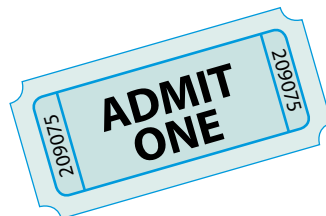
When: Wednesday, October 8, starting time of 0700h
Where: Expocenter Motor Lobby

Cost: Early-Bird rate until September 5, 2014\$15.00
 Between September 5 and October 8, 2014\$20.00
 Event day sign-up.....\$25.00

To register for this exciting event, please add it to your meeting registration. If you have any questions, please contact dan.fatton@electrochem.org.

Letters of Invitation—Individuals requiring an official letter of invitation should complete the electronic form at electrochem.org/visa_application and your letter will be emailed to you within 3 business days. Such letters will not imply any financial responsibility of ECS and/or SMEQ.

Letters of Attendance—Individuals requiring an official letter of attendance should see an Onsite Registration Representative in the Registration Area.



Luncheons & Special Events

We are sorry but meal and event tickets are non-refundable because we are required to provide a guarantee to the venue.

Monday, October 6

	Early-Bird (through Sep. 5)	Regular Rate (Sep. 6 and after)
Symposium Reception in Honor of Ralph White.....	\$10.00	\$15.00

Tuesday, October 7

Battery Division Luncheon and Business Meeting.....	\$5.00	\$10.00
Corrosion Division Luncheon and Business Meeting.....	\$5.00	\$10.00
Corrosion Division Uhlig & Cohen Awards Reception.....	\$10.00	\$15.00
Symposium Reception in Honor of Hajime Yamamoto.....	\$10.00	\$15.00
High Temperature Materials Division Luncheon and Business Meeting.....	\$5.00	\$10.00
Sensor Division Luncheon and Business Meeting.....	\$5.00	\$10.00

Wednesday, October 8

Battery Division Award Reception.....	\$10.00	\$15.00
Electrodeposition Division Luncheon and Business Meeting.....	\$5.00	\$10.00
<i>Free the Science</i> 5K Run.....	\$15.00	\$20.00
Event day sign-up.....		\$25.00

Thursday, October 9

PAE Division Max Bredig Award Reception.....	\$10.00	\$15.00
Cena Baile.....	\$15.00	\$20.00

PHOTOGRAPHY AND RECORDING IS NOT PERMITTED



By attending the ECS and SMEQ meeting, you agree that you will not record any meeting-related activity, without the express, written consent from ECS and SMEQ. Recording means any audiovisual or photographic methods. Meeting-related activity means any presentation

(oral or poster) or social event directly related to the meeting. You may photograph your own personal, non-meeting related activity, but you must obtain permission from all involved parties before photographs can be taken of other people or displays at the meeting or exhibit. Press representatives must receive media credentials and recording permission from the Meeting Headquarters Office. If you violate this policy, you will be removed from the meeting, your registration will be revoked, and you will lose all access to the meeting. In this case, you will not receive a refund of the registration fees. ECS and SMEQ also reserve the right to deny your attendance at future ECS, or ECS sponsored meetings, or SMEQ meetings. Thank you for your consideration.