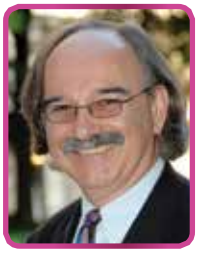
ECS WELCOMES YOU TO PHOENIX



Welcome to Phoenix, Arizona! On behalf of the Board of Directors, volunteer leadership and staff of ECS, it is my pleasure to welcome you to the sunny city of Phoenix for the 228th ECS meeting. Our meeting, being held in downtown Phoenix, at both the Phoenix Convention Center and the Hyatt Regency, is an ideal location that offers convenient access to many of the city's attractions. We hope your time in Phoenix will give you an opportunity to network with colleagues, discuss important research, and discover new opportunities for collaboration.

Please join us for the Sunday Evening Get-Together at 1730h in the Hyatt Atrium to kick-off what is sure to be a successful week! Additionally, you won't want to miss the highly anticipated Plenary Session on Monday, October 12 at 1700h in the Hyatt Ballroom where we will wrap-up the first full day of the 228th ECS Meeting by welcoming all meeting attendees and recognizing the ECS Society Award recipients, and the **2015 Class of Fellows** before turning the spotlight over to Adam Heller, who will present **The ECS Lecture**, "Wealth, Global Warming, and Geoengineering." Dr. Heller is also the recipient of the ECS Europe Section Heinz Gerischer Award. The ECS Society Award recipients include Digby Macdonald receiving the **Olin Palladium Award**, and Martin Winter receiving the **Carl Wagner Memorial Award** and the **ECS Battery Division Research Award**. Be sure to take the time to attend the ECS Society, Division, and Section award talks in various symposia throughout the week. You can find further details in the technical program by using the ECS Meeting Scheduler.

This international conference includes more than 1,900 technical presentations, and features the **Fifth International ECS Electrochemical Energy Summit (E2S)**, which begins on Monday, October 12 at 0800h and runs through Wednesday, October 14. The E2S program is focused around Solar Critical Issues and Renewable Energy. The E2S sessions will be kicked off by Franklin (Lynn) M. Orr Jr., **U.S. Under Secretary for Science and Energy**, delivering the E2S keynote address at 0800h. The program on Monday will be focused on the DOE Hubs, featuring a Plenary and invited talks from the Joint Center for Energy Storage Research (JCESR), the Joint Center for Artificial Photosynthesis (JCAP), and the Energy Efficiency & Renewable Energy Fuel Cell Technologies Office (EERE FCTO). The program on Tuesday and Wednesday will include keynote talks from five Energy Frontier Research Centers (EFRC) Directors, and other relevant invited speakers, and round table discussions. *Learn more at* **www.elecrochem.org/e2s**.

In addition to the surplus of exciting technical presentations, we encourage you to take advantage of our educational short courses offered on Sunday, October 11, and our professional development sessions throughout the week, which are free of charge and provide essential information on enhancing career opportunities, résumé building, and networking. Finally, don't forget to stop by the dynamic exhibit hall where there is certainly no better way to network, or get to know the industry's leading innovators. In the exhibit hall, we have several exciting events planned including the student and general poster presentation receptions.

We encourage you to plan your schedule accordingly in order to make the most of the technical program and social events. The meeting program should be your guide to a productive and enjoyable time here in Phoenix. If you have any additional questions, please do not hesitate to stop by the ECS Registration desk in the Hyatt Atrium for further assistance. We thank you again for your continued support of ECS!

FEATURED EVENTS

MEETING EVENTS-AT-A-GLANCE

Sunday, October 11
0700h..... Registration Opens, Atrium
0800h..... Technical Sessions
(Check Technical Program for exact time)
0800h..... Short Course Breakfast, Regency B
0900h..... Short Courses Begin
1400h..... Professional Development Workshop: Part 1–Essential Elements for Employment Success, Suite 324
1730h..... Sunday Evening Get-Together, Atrium

Monday, October 12
0700h..... Registration Opens, Atrium
0700h..... Session Chair Orientation Breakfast, Sundance
0800h..... Professional Development Workshop: Part 1–Essential Elements for Employment Success, Suite 324
0800h..... E2S- ECS Electrochemical Energy Summit Keynote Address, 101-A&B&C (PCC)
0845h..... E2S – ECS Electrochemical Energy Summit Sessions Begin, 101-C (PCC)
0900h..... Technical Sessions
(Check Technical Program for exact time)
0930h..... Technical Session Coffee Break
1200h..... Professional Development Workshop: Part 2–Résumé Review, Suite 324
1410h..... Digby Macdonald's Olin Palladium Award Address, 102-A (PCC)
1500h..... E2S Breakouts 1 and 2 Begin, 106-B&C (PCC)
1700h..... Plenary Session and The ECS Lecture by Adam Heller, Regency Ballroom
1830h..... Student Mixer (invitation only), Atrium

Tuesday, October 13
0700h..... Registration Opens, Atrium
0800h..... Technical Sessions
(Check Technical Program for exact time)
0800h..... E2S – ECS Electrochemical Energy Summit: EFRC's, 101-C (PCC)
0800h..... Professional Development Workshop: Part 2–Résumé Review, Suite 324
0930h..... Technical Session Coffee Break
1245h..... Leveraging the Labs sponsored by the Fuel Cell Technologies Office, 213-A (PCC)
1300h..... Technical Exhibit, West Hall 1 (PCC)
1400h..... Matteo Bianchini's Battery Division Student Research Award Address, 106-B (PCC)
1400h..... David Shoesmith's Corrosion Division H. H. Uhlig Award Address, 102-A (PCC)
1430h..... Eric Schindelholz's Corrosion Division Morris Cohen Graduate Student Award Address, 102-A (PCC)
1650h..... Martin Winter's Carl Wagner Memorial and Battery Division Research Award Address, 106-B (PCC)
1730h..... Lab Showcase sponsored by the Fuel Cell Technologies Office, 2nd Floor Lobby (PCC)
1735h..... Adam Heller's Heinz Gerischer Award Address, 104-B (PCC)
1800h..... Technical Exhibit and General and Student Poster Session, West Hall 1 (PCC)

Wednesday, October 14
0800h..... Registration Opens, Atrium
0800h..... Technical Sessions
(Check Technical Program for exact time)
0800h..... E2S – ECS Electrochemical Energy Summit: EFRC's, 101-C (PCC)
0800h..... Professional Development Workshop: Part 2–Résumé Review, Suite 324
0800h..... Ashok Shukla's Battery Division Technology Award Address, 106-B (PCC)
0900h..... Technical Exhibit, West Hall 1 (PCC)
0930h..... Technical Session Coffee Break
1400h..... Daniel Schwartz's Electrodeposition Division Research Award Address, 103-A (PCC)
1500h..... Panel of Professionals: Career Exploration in Electrochemical and Solid State Science and Technology, Suite 318
1800h..... Technical Exhibit and General Poster Session, West Hall 1 (PCC)

Thursday, October 15
0800h..... Registration Opens, Atrium
0900h..... Technical Sessions
(Check Technical Program for exact time)
0900h..... Technical Exhibit, West Hall 1 (PCC)
0930h..... Technical Sessions Coffee Break

(PCC) This event will be held in the Phoenix Convention Center.

To get additional information on the 228th ECS meeting events, please visit **www.electrochem.org/228**.

PLENARY SPEAKER AND SOCIETY AWARD WINNERS

JOIN US FOR THE PLENARY SESSION

When: Monday, October 12 at 1700h
Where: Hyatt Regency Ballroom

ECS President **Dan Scherson** will wrap up the first full day of the 228th Meeting by welcoming the ECS meeting attendees and introducing the highly anticipated ECS lecturer, **Adam Heller**.

The Plenary Session is one of the highlight events of the meeting, allowing participants from every symposium to come together and recognize some of the greatest minds in the field. This year in addition to Dr. Heller's lecture "Wealth, Global Warming, and Geoengineering," the Olin Palladium Award will be presented to **Digby Macdonald** in recognition of his contributions to the development of the modern theory of passivity and passivity breakdown, in the form of the Point Defect Model (PDM), and in the development of the deterministic corrosion damage protocol, Damage Function Analysis (DFA). The Carl Wagner Memorial Award will be presented to **Martin Winter** for his highly prolific work, leadership, and important contribution to the fields of energy storage and conversion, development of unique electro-analytical tools, and spectro-electrochemical tools for fundamental studies related to power sources. The Norman Hackerman Young Author Award will be presented to **Nathaniel D. Leonard** for the paper, "Analysis of Adsorption Effects on a Metal-Nitrogen-Carbon Catalyst Using a Rotating Ring-Disk Study," in the *Journal of The Electrochemical Society* (JES, Vol. 161, No. 13, p. H3100). The Bruce Deal and Andy Grove Young Author Award will be presented to **Pengfei Guo, Ran Cheng,** and **Wei Wang** for the paper, "Silicon Surface Passivation Technology for Germanium-Tin P-Channel MOSFETs: Suppression of Germanium and Tin Segregation for Mobility Enhancement," in the *ECS Journal of Solid State Science and Technology* (JSS, Vol. 3, No. 8, p. Q162).

The **2015 Class of Fellows of The Electrochemical Society** will be recognized for their contributions to the advancement of science and technology, for leadership in electrochemical and solid state science and technology, and for active participation in the affairs of The Electrochemical Society: Simon Deleonibus, Raymond Gorte, Ellen Ivers-Tiffée, Deborah Jones, Robert Kostecki, Kailash Mishra, Mogens Mogensen, Emanuel Peled, E. Jennings Taylor, John Turner, and Steven Visco.

Don't miss the opportunity to honor and support your friends and colleagues. Also, be sure to use the meeting app to add the Society and Division and Section award winner's talks to your agenda, they are scheduled in various symposia throughout the week.

5 Questions for Adam Heller

Tell us about the beginning of your interest in science.
I went to—like all the young Israelis—to serve in the Israeli army. And at that time I was interested in a medical career. When I was in boot camp and they learned that I wanted to be a physician, they sent me to the medical corps to work in the pathology institute of a military hospital. There I very quickly discovered at the time, medicine was not yet science. And I saw—being in the pathology institute—mistakes. I decided that I'd rather be a scientist working toward better medicine.

When did you become involved in solar technology?
At GTE Labs, my colleague Heinz Gerischer was interested in electroluminescence. He was teaching me the elements of semiconductor electrochemistry and telling me that we can make a semiconductor liquid junction solar cell. At GTE, I couldn't do much work on these—my responsibilities were totally different and mostly lighting product related. I returned to Bell Laboratories in 1975 and then I really started to work seriously on the semiconductor liquid junction solar cells. And over five years we published a series of papers on efficient, more than 10 percent efficient, electrochemical solar cells.

Tell us about the development of the painless diabetes blood monitor.
People were pricking their fingers, getting large blood drops. It was painful: get a strip, touch it, get a blood sample, measure the glycemia (the blood glucose concentration). Five percent of the people of the world are diabetic. One percent of the people need these measurements. If they don't do it, they go blind, they lose their kidneys, they develop neuropathy, their legs are amputated. It can become a horrible disease, if they don't monitor their blood sugar. [My son] observed that if he pricks his skin in the arm, he can painlessly get a much smaller sample of blood. By pricking his finger, he got, painfully, a large drop of blood. So he asked me, "Can we make a sensor for such a small sample of blood?" I knew that it could be done if I used a small enough electrode.

What does the future of electrochemistry look like?
You see wonderful things in electrochemistry: shrinking down power sources, making electrical car batteries. Sooner or later we will have a long-lived, moderate temperature, high-power-density fuel cell that uses methane instead of hydrogen, followed by one that uses higher boiling hydrocarbons. I think in electrochemistry, that's the greatest challenge that I can imagine. I know that this will come. It's up to the next generation. So pretty soon—on a historical scale of 100 years—there's no question in my mind that we will drive liquid fuel-based fuel cell powered cars.

How was receiving the National Medal of Technology and Innovation?
It certainly was the highlight of my professional life—to be in the White House, to spend time with the president. And it's indeed pretty rare for an individual to get that medal. I feel that it is absolutely wonderful, considering that I come from Cluj, Romania, and passed through a concentration camp. Now that I was allowed to survive, I was honored by the president of the United States. What can I do next to pay Society for this? I am doing my best.

THE ECS LECTURE

When: Monday, October 12 at 1700h
Where: Hyatt Regency Ballroom

Wealth, Global Warming, and Geoengineering

by Adam Heller

Adam Heller's work in electrochemical engineering has touched the lives of people across the globe. As the inventor of the painless diabetes blood monitor, his developments in healthcare have had enormous societal and economic impact. Heller's work spans a range of technologies, touching areas related to battery and energy—including solar cells, the lithium battery, and photoelectrocatalysis.

Heller's journey through the sciences took flight in 1961, when he received his PhD from Ernest David Bergmann at the Hebrew University. From there, he had research related stints at such notable establishments as GTE Laboratories and Bell Laboratories, where he headed the Electronic Materials Research Department from 1977-1988.

His research soon transcended into teaching when he became a professor of engineering at the University of Texas in Austin. During this time, Heller invented what would be one of his most significant contributions to science—the painless blood glucose monitoring system.

It began in 1996 when Heller and his son Ephraim Heller founded TheraSense, which has transitioned to become a major part of Abbott Diabetes Care of Alameda, CA. Here, the FreeStyle™ system of TheraSense was developed, which made the monitoring of blood glucose painless by accurately monitoring the glucose concentration in just 300 nanoliters of blood.

Heller also established the field of the electrical wiring of enzymes (1988-2005), the electrical connection of their catalytic redox centers to electrodes and built, with wired enzymes subcutaneously implanted miniature glucose sensors, which became the core technology of the 2008 FreeStyle Navigator™ and of the 2014 FreeStyle Libre™. This continuous glucose monitoring system of Abbott Diabetes Care intended to replace the 16 billion annual strip assays requiring blood. Its disposable part is factory calibrated, requires no blood samples, and operates for two weeks.

His study of the physical chemistry of inorganic oxyhalide solutions resulted in the first neodymium liquid lasers (1964-1967) and in the publication of the first paper on the lithium thionyl chloride battery with James J. Auborn in 1973, which would be used in implanted medical and defense systems that required a shelf life of greater than 20 years or a higher than average energy density.

Similarly, Heller continued his research in energy by exploring solar cells, which resulted in 11.5% efficient solar cells in 1980 and in 11 % efficient hydrogen evolving photoelectrodes in 1981. Along with Heinz Gerischer, Heller was able to show that the rate of photo-assisted oxidation of organic matter on photocatalytic titanium dioxide particles was controlled by the rate of reduction of adsorbed oxygen by trapped electrons.

Heller has been recognized for his scientific achievements by some of the top establishments in the world. Most notably, he received the United States National Medal of Technology and Innovation in 2008—the top technology award in the U.S.

He has been recognized many times by The Electrochemical Society, including its David C. Grahame Award, Vittorio de Nora Gold Medal, and the Heinz Gerischer Award of its Europe Section. He is an ECS Fellow.

Among Heller's other awards and achievements are his induction to the U.S. National Academy of Engineering (2009) and the American Academy of Arts and Science (2009), Spiers Medal and Faraday Medal of the Royal Society of Chemistry UK, Fresenius Gold Medal of the Society of German Chemists, and the Torbern Bergman Medal of the Swedish Chemical Society—an award he shared with ECS Fellow Allen J. Bard.

PLENARY SPEAKER AND SOCIETY AWARD WINNERS

SOCIETY AWARDS

The ECS Society Awards being given during this meeting at the Plenary Session on Monday, October 12 at 1700h in the Hyatt Regency Ballroom are the Olin Palladium Award of The Electrochemical Society to Digby Macdonald, the Carl Wagner Memorial Award of The Electrochemical Society to Martin Winter, the Norman Hackerman Young Author Award to Nathaniel Leonard, and the Bruce Deal & Andy Grove Young Author Award to Pengfei Guo, Ran Cheng, and Wei Wang.

Olin Palladium Award of The Electrochemical Society

Monday, October 12, 1410-1450h
102-A Phoenix Convention Center

Some Critical Issues of the Breakdown of Passive Films
by Digby Macdonald

Digby D. Macdonald is currently a Professor in Residence at the University of California, Berkeley's Departments of Nuclear Engineering and Materials Science and Engineering. After obtaining his Bachelor's degree in New Zealand, Macdonald moved to Canada to receive his PhD in Chemistry from the University of Calgary.

Throughout his career, Macdonald has held numerous positions at Ohio State University and Pennsylvania State University. He has received many awards for his scientific work, including the 2014 Frumkin Memorial Medal from the International Society of Electrochemistry for his work on passivity and passivity breakdown. His work on the properties of aqueous solutions at high temperatures and pressures also earned him the 2013 Gibbs Award.

Additionally, ECS has presented Macdonald with the Wagner Memorial and Uhlig Awards. Aside from his ECS Fellowship, he also holds fellow status at NACE-International, Royal Society of Canada, Royal Society of New Zealand, ASM International, World Innovation Foundation, Institute of Corrosion, and International Society of Electrochemistry.

Carl Wagner Memorial Award of The Electrochemical Society

Tuesday, October 13, 1650-1730h
106-B Phoenix Convention Center

Anodes for Lithium Ion Batteries Revisited: From Graphite to High-Capacity Alloying- and Conversion-Type Materials and Back Again
by Martin Winter

Martin Winter has focused on R&D of new materials, components and cell designs for batteries and supercapacitors—in particular for lithium-ion batteries—for nearly 25 years. Currently, he holds a Chair for Applied Materials Science for Electrochemical Energy Storage and Conversion at the Institute of Physical Chemistry at Münster University, Germany.

Aside from his position at Münster University, Winter is the Director of the Münster Electrochemical Energy Technology (MEET) Battery Research Center. The center combines outstanding equipment with an international team of 140 scientists, engineers, and technicians. Winter has also been named Director of the new Helmholtz Institute Münster, as well as serving as an associate of the National Platform E-Mobility, where he consults the German chancellor and government.

Additionally, Winter is the head of the research council of the Battery Forum Germany, which advises the German Federal Ministry of Education and Research in the field of electrochemical energy storage. His strides in battery technology have yielded him much recognition, including ECS's Battery Technology Award and the Research and Technology Award of the International Battery Materials Association.

PLENARY SPEAKER AND SOCIETY AWARD WINNERS

2014 ECS YOUNG AUTHOR AWARDS

The Norman Hackerman Young Author Award was established in 1928 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.

Norman Hackerman Young Author Award

Awarded to Nathaniel D. Leonard for "Analysis of Adsorption Effects on a Metal-Nitrogen-Carbon Catalyst Using a Rotating Ring-Disk Study" (JES, Vol. 161, No. 13, p. H3100).

Nathaniel D. Leonard received his PhD in Chemical Engineering from Michigan State University under the supervision of Scott Calabrese Barton. Nathaniel's work focused on synthesis, characterization, and modeling of non-precious metal catalysts for oxygen reduction in proton-exchange membrane fuel cells. During his time at Michigan State University he was selected to be a Transatlantic Program Young Technology Leader in automotive research and development. He completed his undergraduate studies in Mechanical Engineering and German from Valparaiso University where he found his appreciation for electrochemistry while conducting high temperature electrolysis studies in molten salt electrolytes. He was also a German Academic Exchange Service (DAAD) undergraduate scholar. His research interests include electrode design and optimization for non-precious metal catalysts, modeling of transport phenomena in porous electrochemical systems, and rotating ring-disk electrode studies of metal-nitrogen-catalysts.

Bruce Deal & Andy Grove Young Author Award

Awarded to Pengfei Guo, Ran Cheng, and Wei Wang for "Silicon Surface Passivation Technology for Germanium-Tin P-Channel MOSFETs: Suppression of Germanium and Tin Segregation for Mobility Enhancement" (JSS, Vol. 3, No. 8, p. Q162).

Pengfei Guo received the Bachelor of Engineering (Electrical, first class honors) degree and the Doctor of Philosophy degree from the National University of Singapore (NUS), in 2008 and 2013, respectively. His PhD dissertation was focused on investigation of advanced transistors with low supply voltage, including tunneling field-effect transistors and high-mobility transistors. He has authored or co-authored over 40 journal and conference papers during his PhD study. He is now working in the Technology Development department in GLOBALFOUNDRIES, Singapore. Dr. Guo was a recipient of the Ministry of Education (Singapore) scholarship in 2003 and the NUS Graduate School scholarship in 2008.

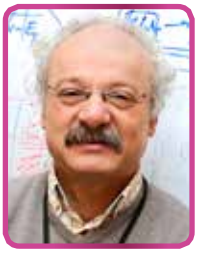
Ran Cheng received the BEng (with honors) and PhD degrees in Electrical Engineering from National University of Singapore (NUS), Singapore. Her research interests include advanced strain engineering, Si, Ge, and GeSn transistors with advanced structures. She has authored and co-authored over 20 papers during her PhD study. She is now working as a research fellow in Zhejiang University in China. Dr. Cheng was awarded the Bachelor's scholarship from the Ministry of Education (Singapore, 2005-2009) and the fellowship from Zhejiang University (China, 2014-2016).

Wei Wang received the BS degree in Electronic Science and Technology from Huazhong University of Science and Technology, in 2006, and PhD degree in physical electronics from the Institute of Semiconductors, Chinese Academy of Sciences, in 2011. From 2011 to present, he is a Research Fellow in Department of Electrical and Computer Engineering, the National University of Singapore (NUS). His research interests are in semiconductor epitaxial growth, semiconductor devices and device physics.

PLENARY SPEAKER AND SOCIETY AWARD WINNERS

2015 CLASS OF FELLOWS

Established in 1989 for advanced individual technological contributions in the field of electrochemical and solid-state science and technology. These members are being recognized for contributions to the advancement of science and technology, for leadership in electrochemical and solid state science and technology, and for active participation in the affairs of The Electrochemical Society.



Simon Deleonibus began his career at Thomson Semiconductors, where he co-invented the contact/via plug technology principal in 1984. This technology is used today as a standard by the microelectronics industry in all integrated circuits produced worldwide. Deleonibus went on to join CEA Leti in 1986, where he currently serves as the Research Director. Here, he developed a recognized expertise on process modules like filed isolation, especially on Flash memories.

Earlier in his career, Deleonibus realized the world's smallest transistor at the Electronic Nanodevices Laboratory. During this time, he and his team pioneered numerous breakthrough process modules for future miniaturization of integrated circuits.

Among his many accomplishment, Deleonibus was awarded the IEEE Fellow award in 2006 for his "contributions to nanoscaled complementary metal oxide semiconductor (CMOS) devices technology." He has served as Associate Editor for *IEEE Transactions on Electronic Devices* (2008-2014) and the *European Physical Journal* (2008-2014). He has recently edited two books on nanodevices and integrated nanosystems and has been a Visiting Professor at the Tokyo Institute of Technology since 2014.

Raymond J. Gorte is currently the Russell Pearce and Elizabeth Crimian Heuer Professor of Chemical & BIomolecular Engineering—with a secondary appointment in Materials Science & Engineering—at the University of Pennsylvania. Since joining the university in 1981, Gorte's esteemed research has focused on electrodes for solid oxide fuel cells and the catalytic properties of core-shell materials. He is also known for his research on zeolite acidity and for metal-support effects, especially with ceria-supported precious metals, used in automotive emissions control.

Gorte is currently an Associate Editor of the *Journal of The Electrochemical Society* and has chaired numerous conferences, including the Gordon Conference on Catalysis (1998).

Among the many honors attributed to him, Gorte has received the Parravano Award of the Michigan Catalysis Society (1997), the Philadelphia Catalysis Club Award (1998), the Paul Emmett Award of the North American Catalysis Society (1999), the Penn Engineering Distinguished Research Award (2001), and the AIChE Wilhelm Award (2009).

Ellen Ivers-Tiffée has been a researcher in the field of functional ceramics for the energy sector for more than three decades, with her focus being on electrochemical energy storage and conversion devices. Currently, she heads the Institute of Applied Materials – Materials for Electrical and Electronic Engineering at Karlsruhe Institute of Technology in Germany. Previously, she has worked with such notable companies as Siemens AG, Corporate Research and Technology, and the Center of Applied Materials Research.

Her research aims at characterizing electrical/electrochemical reactions & transport processes, developing nanoscaled functional layers & interfaces and modelling/simulating materials properties in solid oxide fuel cells, lithium-ion batteries and oxygen-permeation membranes. Through her career, she has published 350 full research papers and conferences proceedings, as well as many book contributions including a German-language standard textbook on materials for electrical engineering.

Since joining ECS in 2003, Ivers-Tiffée has served in the High Temperatures Materials Division and is co-organizer of the ECS "Solid-Gas Electrochemical Interfaces" symposium. She is a member of many additional societies, including the German Academy of Science & Engineering.

Deborah Jones has been dedicated to innovation in fuel cell and electrolyzer materials for the past 20 years, introducing new concepts for fuel cell membrane compositions and architectures and contributed to understanding of membrane degradation mechanisms. Currently, she is the Full Senior Researcher of the French National Scientific Research Council and the Associate Director of the Institute for Molecular Chemistry and Materials, where she has co-authored more than 200 international journal articles and 17 review articles and book chapters.

Jones has been involved in collaborative research across Europe for many years, initiating the European Coordination Action on Membrane Electrode Assemblies and the biennial international CARISMA conferences on materials for medium and high temperature polymer electrolyte fuel cells. She has led several large European collaborative efforts, and is currently member of the European Fuel Cells and Hydrogen Joint Undertaking Scientific Committee.

Additionally, Jones has served as Senior Editor of the journal *Fuel Cells,* co-edited volumes of *ECS Transactions*, and was the co-organizer of the 2015 ECS Conference on Electrochemical Energy Conversion & Storage with SOFC-XIV.

Robert Kostecki is often recognized for his groundbreaking work in the field of electrochemical energy storage and conversion systems, photocatalysis, and water treatment technologies, which often helped bridge the gap between fundamental science and applications of significant technological importance. As a pioneer in advanced characterization of electrochemical interface in lithium-ion batteries, his research interests focus on fundamental interfacial phenomena that determine the function and performance of electrical energy storage systems, including degradation modes and failure mechanisms.

Among his many scientific achievements, Kostecki is most recognized for developing and deploying novel characterization methodologies, including *in situ* and *ex situ* optical far- and near-field spectroscopy and imaging techniques to probe basic properties of materials, interfaces and interphases at the atomic, molecular, and nanoparticulate levels.

Kostecki is currently a Senior Scientist in the Energy Storage and Distributed Resources Division at Lawrence Berkeley National Laboratory, where he contributes to areas of energy and environment through research initiatives and partner relationships. Additionally, he has served as officer and Chair of the ECS San Francisco Section and he is currently Chair of the Battery Division of ECS.

PLENARY SPEAKER AND SOCIETY AWARD WINNERS

Kailash C. Mishra is engaged in the research and development of luminescent materials, working in close collaboration with various phosphor research groups, as well as within academia and national labs. Currently, he is the Head of Technology Scouting of Osram Corporate Innovation at Central Research and System Laboratories of Osram Sylvania.

Mishra's area of expertise includes theory of electronic structures and associated properties of materials, theory of luminescence, and optical and luminescence properties of III-V semiconducting materials. He has published extensively on luminescence of solids, and on the electronic structures and associated properties of atoms, molecules, metals, semiconductors and ionic crystals.

Since joining ECS in 1998, Mishra has served as Chair of the ECS Luminescence and Display Materials Division, co-organized several ECS symposia, and co-edited multiple volumes of *ECS Transactions*. Additionally, he is currently one of the technical editors of the *ECS Journal of Solid State Science and Technology* and *ECS Solid State Letters*.

Mogens Mogensen's research focuses on electrochemistry, materials science, solid and liquid electrolytes, electrochemical kinetics, electrolysers, reversible fuel cells, and energy conversion and storage. He is currently a professor at the Technical University of Denmark's Department of Energy Conversion and Storage. In addition to his involvement in academia, Mogensen has been involved in electrochemistry research and development for 42 years, continuously leading Danish and European electrochemical projects.

Mogensen has co-authored more than 350 scientific papers, of which over 200 were published in international refereed journals. He has participated in a large number of international conferences and given more than 40 invited talks, some of which were keynote and plenary talks.

Throughout his career in academia, he has supervised over 10 Master students, more than 20 PhD students, and approximately 25 postdoctoral researchers. Among his many honors, Mogensen has received the Christian Friedrich Schönbein Medal of Honour in 2008 and the Science of Hydrogen & Energy Award in 2012.

Emanuel Peled is known among the scientific community as the inventor and developer of the solid electrolyte interphase (SEI) model for nonaqueous alkali-metal batteries. His in-depth exploration of batteries has allowed him to develop unique state of charge meter (residual capacity) for lithium batteries in his laboratory that was manufactured by a startup company Chemtronics, for which he was a co-founder. While here, he and his team also developed high power hydrogen bromine fuel cells, direct methanol and direct ethylene glycol fuel cells with world record power.

Peled is also a co-founder of EnStorage, a startup company aimed at the development and commercialization of very large energy storage systems based on regenerative fuel cell and a co-founder of a start-up company (Honeycomb) aimed at the development and commercialization of a novel 3D lithium battery. He has since broadened his industrial roots and delved into academia, joining the staff at Tel Aviv University's School of Chemistry as an emeritus professor.

ECS's Battery Division has previously awarded Peled their Research Award for his outstanding achievements in the field of energy.

E. Jennings (EJ) Taylor's 35 year career in industrial electrochemistry has been focused on developing innovative electrochemical technologies both as an "intrapreneur" while employed at corporate R&D laboratories and as an entrepreneur at Faraday Technology. As Faraday Technology's Founder and Chief Technical Officer, his approach to technology development is based on a careful balance between fundamental understandings combined with the rational acceptance of evolving observations that do not necessarily fit the current electrochemical paradigm. Taylor has created a culture at Faraday that encourages teamwork across a variety of science and engineering disciplines, to enable technology development from conception to beta-scale demonstration.

Taylor's involvement with ECS over the years has been immense, serving on many committees and co-organizing numerous symposia. Currently, he serves as ECS's Treasurer.

Taylor has over 190 publications and is a recipient of the 2008 Blum Scientific Achievement Award of the National Association of Surface Finishers based on Faraday Technology's Contributions to the field of pulse/pulse reverse electrolytic surface finishing. In conjunction with a team from Faraday Technology, Taylor also received a 2013 Presidential Green Chemistry Challenge Award for electrodeposition of functional chromium coatings from a trivalent electrolyte.

John A. Turner started his scientific career working on sodium and potassium amalagam batteries as an undergraduate student at Idaho State University. Throughout his academic career, he worked with such pillars of electrochemistry as Bob and Janet Osteryoung, Fred Anson, and Heinz Gerischer.

Upon joining the National Renewable Energy Laboratory in 1979—where he is currently a Research Fellow—Turner began to work on photoelectrochemical water splitting for hydrogen production. His research topics include the direct conversion (photoelectrolysis) systems for hydrogen production from sunlight and water, catalysts for the hydrogen and oxygen reactions, materials for advanced fuel cell membranes, and corrosion studies of fuel cell metal bipolar plates. Other work involves the study of electrode materials for high energy density lithium batteries and fundamental processes of charge transfer at semiconductor electrodes

Turner has co-authored over 160 peer-reviewed publications in the areas of photoelectrochemistry, fuel cells, batteries, general electrochemistry and analytical chemistry. He has received a multitude of awards, including the Midwestern Research Institute President's Award for Exceptional Performance in Research and the Hydrogen Technical Advisory Panel Award for Research Excellence.

Steven Visco is currently the Founder and Chief Executive Officer of PolyPlus Battery Company, which he co-founded in 1991 to research and develop next generation batteries. Visco's company was selected by TIME magazine in its "50 Best Inventions" issue, as well as awarded the Gold Edison Award in 2012.

Aside from his role at PolyPlus Battery Company, Visco also serves as a Guest Scientist in the Materials Science Division at the Lawrence Berkeley National Laboratory, where his research interests have included advanced batteries and fuel cells. He currently holds 103 U.S. patents, more than 200 international patents, and has authored over 70 publications.

His immense impact in battery technology and industry has yielded Visco the City of Berkeley's Visionary Award. Additionally, he was awarded the 2011 International Battery Association Award for "outstanding contributions to the development of lithium-air and lithium-water batteries."

DIVISION & SECTION AWARD WINNERS

Take the time to honor and support your friends and colleagues, be sure to add the Division and Section award winners' talks to your calendar, they are scheduled in various symposia throughout the week.

ECS Battery Division Student Research Award

Tuesday, October 13, 1400-1440h
106-B Phoenix Convention Center

Real-time Diffraction Studies of Electrode Materials for Li-ion and Na-ion Batteries
by Matteo Bianchini

Matteo Bianchini began his scientific career at the Polytechnic University in Milan, where he obtained his Bachelor's degree (2009) and Master of Science (2012) in Physics Engineering. During this time, he had many transformative experiences in the sciences, including a semester spent at the University of Amsterdam in 2010 as part of the Erasmus Programme.

Bianchini's PhD focused on advanced characterization of electrode materials for lithium-ion and sodium-ion batteries in a shared program among three French institutions: the Institut Laue-Langevin (ILL, Grenoble), the Laboratoire de Réactivité et de Chimie de Solides (LRCS, Amiens) and the Institut de Chimie de la Matière Condensée (ICMCB, Bordeaux). Research focuses primarily on real-time (operando) diffraction experiments using neutrons, x-rays, and synchrotron radiation to student lithium and sodium (de)intercalation processes inside rechargeable batteries. Through the collaboration, Bianchini has been able to access different domains of electrochemical and diffraction fields.

ECS Corrosion Division H. H. Uhlig Award

Tuesday October 13, 1400-1430h
102-A Phoenix Convention Center

Application of Electrochemistry in the Development of Performance Assessment Models for High Level Nuclear Waste Disposal
by David Shoesmith

David Shoesmith's research interests cover a wide range of areas in corrosion science and engineering, with an emphasis on electrochemical and surface analytical methods, the development of techniques to analyze corroding surfaces, and the development of deterministic and probabilistic models to describe and predict corrosion performance. After a 25 year career at Atomic Energy of Canada Limited's Whiteshell Laboratories, Shoesmith moved to the University of Western Ontario where he currently holds the position of Canadian Natural Science and Engineering Research Council/Nuclear Waste Management Organization Industrial Research Chair.

Shoesmith has a substantial body of work with over 290 journal articles and refereed conference proceedings published, including 27 book chapters and review articles, and approaching 150 commercial and company reports.

His main research area of focus shows an emphasis on corrosion issues (containers, wasteforms) related to the storage and disposal of high level nuclear waste. Outside of this area, he has funded research programs in the areas of gas transmission pipelines, the automotive industry and a fundamental research grant to investigate the basic science

ECS Corrosion Division Morris Cohen Graduate Student Award

Tuesday, October 13, 1430-1500h
102-A Phoenix Convention Center

Impact of Salt Deliquescence on the Humidity-Dependence of Atmospheric Corrosion
by Eric Schindelholz

Eric Schindelholz is a senior member of technical staff at Sandia National Laboratories. He received his PhD in Materials Science at the University of Virginia in 2014 under the direction of Professor Robert Kelly. His graduate work focused on understanding the interrelationship between the hygroscopic behavior of marine atmospheric particles and the humidity dependence of steel corrosion associated with these particles.

Prior to his studies, Schindelholz served as a conservator in both federal and private institutions, specializing in the corrosion assessment and mitigation of historic artifacts and monuments.

His present work includes electrochemical measurement and modeling of atmospheric corrosion, corrosion in supercritical fluids and advanced materials.

ECS Battery Division Research Award

Tuesday, October 13, 1650-1730h
106-B Phoenix Convention Center

Anodes for Lithium Ion Batteries Revisited: From Graphite to High-Capacity Alloying- and Conversion-Type Materials and Back Again
by Martin Winter

Martin Winter has focused on R&D of new materials, components and cell designs for batteries and supercapacitors—in particular for lithium-ion batteries—for nearly 25 years. Currently, he holds a Chair for Applied Materials Science for Electrochemical Energy Storage and Conversion at the Institute of Physical Chemistry at Münster University, Germany.

Aside from his position at Münster University, Winter is the Director of the Münster Electrochemical Energy Technology (MEET) Battery Research Center. The center combines outstanding equipment with an international team of 140 scientists, engineers, and technicians. Winter has also been named Director of the new Helmholtz Institute Münster, as well as serving as an associate of the National Platform E-Mobility, where he consults the German chancellor and government.

Additionally, Winter is the head of the research council of the Battery Forum Germany, which advises the German Federal Ministry of Education and Research in the field of electrochemical energy storage. His strides in battery technology have yielded him much recognition, including ECS's Battery Technology Award and the Research and Technology Award of the International Battery Materials Association

DIVISION & SECTION AWARD WINNERS

ECS Europe Section Heinz Gerischer Award

Tuesday October 13, 1735-1815h
104-B Phoenix Convention Center

A Perspective of Photoelectrochemistry: Past Expectations and Present Realities
by Adam Heller

Adam Heller's work in electrochemical engineering has touched the lives of people across the globe. As the inventor of the painless diabetes blood monitor, his developments in healthcare have had an enormous societal and economic impact. Heller's work spans a range of technologies, touching areas related to battery and energy—including solar cells, the lithium battery, and photoelectrocatalysis.

Heller's innovation and research has impacted both industry and academia. He began his career with such notable companies as GTE Laboratories and Bell Laboratories, where he headed the Electronic Materials Research Department. He transitioned into academia soon after when he joined the staff at the University of Texas in Austin. During this time, Heller invented what would be one of his most significant contributions to science—the painless blood glucose monitoring system.

Aside from this development, Heller's research also resulted in the first paper on the lithium thionyl chloride battery, which would be used in implanted medical and defense systems that required a shelf life of greater than 20 years or a higher than average energy density. Additionally, his early work in solar resulted in 11.5% efficient solar cells in 1980 and in 11 % efficient hydrogen evolving photoelectrodes in 1981. These achievements and many others earned him the U.S. National Medal of Technology and Innovation in 2008.

ECS Battery Division Technology Award

Wednesday, October 14, 0800-0840h
106-B Phoenix Convention Center

Lead-Carbon Ultracapacitors: How, Why, and Where Is the Technology
by Ashok Shukla

Ashok Shukla's creative, interdisciplinary, and cutting-edge research has made extensive fundamental and applied contributions to the fields of storage batteries, fuel cells, and supercapacitors. In particular, his research works on novel electrocatalysts, lithium-ion cathodes/anodes, lead-carbon ultracapacitors, nickel-iron batteries, and tropical lead-acid batteries are truly path breaking.

As the current Honorary Professor at Indian Institute of Science, Bangalore, Shukla has pioneered work in electrochemical storage science and technology. His research has also been actively engaged in innovative engineering of self-supported polymer electrolyte, direct methanol and direct borohydride fuel cell systems.

Shukla is a member of many editorial advisory boards of several international journals. Among his many honors, Shukla also been named fellow of the Indian National Science Academy, Indian National Academy of Engineering, National Academy of Sciences India, India Academy of Sciences, and The International Society of Electrochemistry.

ECS Electrodeposition Division Research Award

Wednesday October 14, 1400-1440h
103-A Phoenix Convention Center

The Scanning Bipolar Cell: Design Principles for Patterning of Diverse Metals without Contact to the Substrate
by Daniel Schwartz

Daniel T. Schwartz's interest in chemical engineering was first kindled in the mid-1980s when he began working for the Silicon Valley start-up Cybernex Corporation. He then transitioned from industry to a national lab setting when he joined the team at Lawrence Berkeley National Laboratory for his postdoc.

In 1991, Schwartz joined the University of Washington as an assistant professor, where he founded the Electrochemical Materials and Interfaces Laboratory. Schwartz still resides at the University of Washington where he now holds the position of Boeing-Sutter Professor of Chemical Engineering and Director of the Clean Energy Institute. Here, his students combine electrochemical fundamentals and engineering principles to understand, design, and improve a wide range of electrochemical systems.

He has served the ECS as Chair of the Electrodeposition Division, Chair of the Council of Sections, and as a member of several other committees. Select honors include the University of Washington Marsha Landolt Distinguished Graduate Mentor Award and ECS's Henry B. Linford Award.

ELECTROCHEMICAL ENERGY SUMMIT 2015

SOLAR CRITICAL ISSUES AND RENEWABLE ENERGY

October 12-14, 2015

With population growth and industrialization, global energy needs continue to grow as well. Economic, political, and environmental issues are largely dictated by energy needs. The **Fifth International ECS Electrochemical Energy Summit (E2S)** is designed to foster an exchange between leading policy makers and energy experts about society needs and technological energy solutions.

The E2S program will be focused around Solar Critical Issues, and Renewable Energy. It will begin on **Monday, October 12** and run **through Wednesday, October 14, 2015**. The program on Monday will be focused on the DOE Hubs, featuring a keynote address, and invited talks from the Joint Center for Energy Storage Research (JCESR), the Joint Center for Artificial Photosynthesis (JCAP), and the Energy Efficiency & Renewable Energy Fuel Cell Technologies Office (EERE FCTO). The program on Tuesday and Wednesday will include keynote talks from five Energy Frontier Research Centers (EFRC) Directors, relevant invited speakers, and round table discussions.

ORGANIZERS

- Daniel Scherson, Case Western Reserve University
- Adam Weber, Lawrence Berkeley National Laboratory
- Krishnan Rajeshwar, University of Texas, Arlington

KEY PARTICIPANTS

David Wesolowski
Oak Ridge National Laboratory

The Fluid Interface Reactions, Structures and Transport (FIRST) Energy Frontier Research Center

The overarching goal of the FIRST Center, which is in its sixth year of operation, is to develop fundamental understanding and validated, predictive models of the unique nanoscale environment at fluid-solid interfaces, that will enable transformative advances in electrical energy storage and electrocatalysis.

In order to achieve our goal, we integrate novel substrate and electrolyte synthesis and characterization, advanced electron (TEM) and scanning probe microscopies (SPM), neutron and X-ray scattering, and multiscale computational modeling ranging from quantum Monte Carlo to classical density functional theory approaches. Electrolytes investigated include aqueous, polar organic and room temperature ionic liquids (RTILs), representing increasing cost and electrochemical stability, and decreasing viscosity, competing factors in device performance.

Our recent efforts have focused on predicting the functionality of interfacial systems for capacitive and pseudocapacitive electrical energy storage in microdevice to grid scale applications.

M. Stanley Whittingham
Binghampton University

NorthEast Center for Chemical Energy Storage (NECCES)

The mission of the NorthEast Center for Chemical Energy Storage (NECCES) is to develop an understanding of how key electrode reactions occur, and how they can be controlled to improve electrochemical performance, from the atomistic level to the macroscopic level throughout the life-time of the operating battery.

The processes that occur in batteries are complex, spanning a wide range of time and length scales. The team of experimentalists and theorists will make use of, and develop new methodologies to determine how model compound electrodes function in real time, as batteries are cycled.

The specific goals of NECCES are to close the gap between the realized and the theoretical energy density for intercalation compounds, to attain reversible multi-electron transfer in a cathode material using lithium, and to understand performance limiting transport in positive electrode structures from the local through the meso to the macroscale.

Gary Rubloff
University of Maryland

Nanostructures for Electrical Energy Storage (NEES) Energy Frontier Research Center

NEES seeks to understand the electrochemical behavior of nanostructures, particularly in dense mesoscale architectures, for their use in energy storage: how to precisely control the multiple components of the nanostructures; how to densely pack and connect them to optimize their performance; how they behave–individually and collectively–during charging and discharging, and why; and how to make them safe and long-lasting over thousands of charging cycles.

With its past achievements creating and characterizing precise multi-component (heterogeneous) nanostructures, NEES now focuses on four areas: (1) understanding and controlling interfaces in storage nanostructures; (2) revealing new mesoscale challenges which dense assemblies of nanostructures pose, and the correlation of these architectures with electrochemical performance and degradation; (3) identifying the fundamental degradation mechanisms which accompany storage nanostructures and architectures; and (4) pursuing advances in the synthesis and characterization of 3D nanostructured solid state storage configurations.

Esther Takeuchi
Stony Brook University

The Center for Mesoscale Transport Properties, m2M, (molecular to mesoscale)

Understanding the underlying ionic and electronic conduction phenomena is needed to further improve energy storage systems in order to bridge the gap between theoretical and achievable values.

During the operation of an energy storage system, ions and electrons are transported over multiple size domains where the sum of these processes leads to complex physics. Exploration of local conduction and transport phenomena is needed, encompassing investigations from the molecular to nano to mesoscale.

The vision of the m2M center is to minimize heat and maximize work of electrical energy storage devices. The center will accomplish this through understanding and ultimately controlling transport properties in complex battery systems with respect to multiple length scales. Redox active materials from several families are under investigation including 1D, 2D, and 3D structures. Further, the influences of the electrode environment as well as the battery system on the electrochemical performance are key considerations.

Paul Fenter
Argonne National Laboratory

Center for Electrochemical Energy Science (CEES)

CEES seeks to develop a fundamental understanding of the lithium ion electrochemistry of oxides in lithium ion battery systems, through coordinated studies of three types of chemistries with a focus on model materials: Li ion insertion reactions, Li ion conversion reactions, and Li-O_2/Li-ion hybrid reactions.

One broad theme in these studies is the role of interfaces in these reactions and I will also summarize recent work in which we seek to isolate and understand the role of interfacial reactivity in these systems using X-ray based approaches (e.g., X-ray reflectivity).

Harry Atwater
Director JCAP

Joint Center for Artificial Photosynthesis-Progress and Prospects (JCAP)

JCAP is pioneering revolutionary methods of synthesizing transportation fuels simply by combining three of Earth's most abundant resources: carbon dioxide, water, and sunlight.

The goal is to generate liquid hydrocarbon or alcohol fuel products whose heating value equals or exceeds that of methanol, using selective and efficient chemical pathways.

The grand challenge at the heart of solar fuels production is controlled catalysis. Over the last five years, JCAP made significant advances in solar-driven catalytic production of hydrogen from water - but as yet there remains no known catalyst, whether electrochemical or photoelectrochemical, which can reduce carbon dioxide with high efficiency and selectivity under mild conditions.

To tackle CO_2 reduction, JCAP's efforts are aligned along four fronts: experimental and theoretical discovery of fundamental electrocatalysis mechanisms and materials, experimental and theoretical discovery of photocatalysts and light absorbers, systems integration, and testbed prototyping.

George Crabtree
Director JCESR

The Joint Center for Energy Storage Research (JCESR)

The Joint Center for Energy Storage Research (JCESR) seeks to establish next-generation electricity storage through a new research paradigm that unites discovery science, battery design, research prototyping, and manufacturing collaboration.

JCESR focuses exclusively on beyond-lithium-ion batteries. Its vision is to transform transportation and the electricity grid with high performance, inexpensive electricity, storage that enables widespread deployment of electric cars, broad penetration of wind and solar electricity and breaks the century-old constraint of matching instantaneous electricity generation with instantaneous electricity demand. Its mission is to deliver two prototypes, one for transportation and one for the grid, which when scaled to manufacturing are capable of delivering five times the energy density at one-fifth the cost of the commercial batteries available at its launch in 2012.

JCESR intends to leave three legacies: a library of fundamental science of the materials and phenomena of energy storage at atomic and molecular levels; two prototypes, one for transportation and one for the grid, that when scaled to manufacturing are capable of meeting JCESR's aggressive performance and cost targets; and a new paradigm for battery research and development that integrates discovery science, battery design, research prototyping, and manufacturing collaboration.

Franklin (Lynn) M. Orr, Jr.
Oak Ridge National Laboratory

U.S. Under Secretary for Science and Energy

Franklin (Lynn) M. Orr was sworn in as the Under Secretary for Science and Energy on December 17, 2014.

As the Under Secretary, Dr. Orr is the principal advisor to the Secretary and Deputy Secretary on clean energy technologies and science and energy research initiatives.

Dr. Orr is the inaugural Under Secretary for the office, which was created by Secretary of Energy Ernest Moniz to closely integrate DOE's basic science, applied research, technology development, and deployment efforts. As Under Secretary, he oversees DOE's offices of Electricity Delivery and Energy Reliability, Energy Efficiency and Renewable Energy, Fossil Energy, Indian Energy Policy and Programs, Nuclear Energy, and Science. In total, these programs steward the majority of DOE's National Laboratories (13 of 17).

ELECTROCHEMICAL ENERGY SUMMIT 2015

PROGRAM

The full technical program can be viewed online, and within the meeting scheduler. Unless noted otherwise, all E2S events take place in room 101-C (PCC).

Monday, October 12, 2015

0800h-0845h.....Electrochemical Energy Summit Keynote Address, 101-AB&C (PCC)

Speaker: U.S. Under Secretary for Science and Energy, F. (Lynn) M. Orr Jr.

Chair: D. Scherson

0845h-0955h.....Electrochemical Energy Summit Session 1–JCESR Talks

Speakers: G. Crabtree, K. R. Zavadil, F. R. Brushett

Chair: D. Scherson

1005h-1125h.....Electrochemical Energy Summit Session 2–JCAP Talks

***Speakers*:** H. A. Atwater, M. T. McDowell, I. D. Sharp

Chair: K. Rajeshwar

1135h-1300h.....Electrochemical Energy Summit Session 3–Industry Talks

Speaker: S. Satyapal

Chair: A. Z. Weber

1245h-1400h.....Leveraging the Labs: This session will demystify the process of working with national labs and discuss the mechanisms put in place to put labs to work on industry problems,
213-A (PCC)

1500h-1600h.....Electrochemical Energy Summit Breakout Session 1: Public-Private Partnerships for Research and Development

Chair: J. P. Chamberlain

1500h-1600h.....Electrochemical Energy Summit Breakout Session 2: Team Science

Chair: G. Crabtree

1730h-1800h.....Lab Showcase: The second session, during the Business-2-Business Product Theater, will highlight technologies developed at the national labs, their unique capabilities, and opportunities for collaboration,
2nd Floor Lobby (PCC)

Tuesday, October 13, 2015

0800h-1010h.....Electrochemical Energy Summit Session 4–EFRC Talks

Speakers: P. Fenter, A. C. Marschilok, C. Lian, K. W. Chapman, C. Wang

Chair: E. S. Takeuchi

1030h-1220h.....Electrochemical Energy Summit Session 5–EFRC Talks

Speakers: G. W. Rubloff, A. A. Gewirth, J. Come, S. Meng

Chair: D. J. Wesolowski

1400h-1550h.....Electrochemical Energy Summit Session 6–EFRC Talks

Speakers: M. S. Whittingham, Y. Wang, A. Ulysal, J. W. Elam

Chair: P. Fenter

Wednesday, October 14, 2015

0800h-1010h.....Electrochemical Energy Summit Session 7–EFRC Talks

Speakers: E. S. Takeuchi, M. Beidaghi, H. Iddir, K. Leung, L. F. J. Piper

Chair: G. W. Rubloff

1030h-1220h.....Electrochemical Energy Summit Session 8–EFRC Talks

Speakers: D. J. Wesolowski, S. P. Ong, A. A. Talin, M. K. Y. Chan

Chair: M. S. Whittingham

(PCC) This event will be held in the Phoenix Convention Center.

The Electrochemical Society

electrochemical energy summit 2015

Featuring Hydrogen Fuel Cells

Sponsored by the Fuel Cell Technologies Office

Phoenix Convention Center, Phoenix, AZ

PLENARY SPEAKER

Monday, October 12, 2015 at 0800h

Lynn Orr
Under Secretary for Science and Energy
U.S. Department of Energy

DOE EERE LAB TECH TO MARKET SHOWCASE

LEVERAGING NATIONAL LAB CAPABILITIES TO SOLVE INDUSTRY PROBLEMS

TUESDAY, OCTOBER 13

On Tuesday, October 13, join us at these two one-day-only events to increase collaboration between national labs and industry:

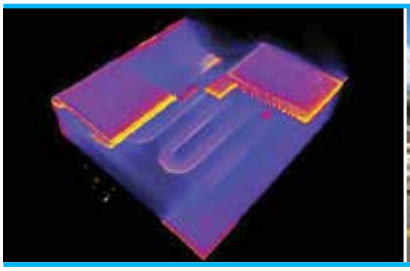
LEVERAGING THE LABS | 1245-1400h

The first session will demystify the process of working with national labs and discuss the mechanisms put in place to put labs to work on industry problems.

LAB SHOWCASE | 1730-1800h

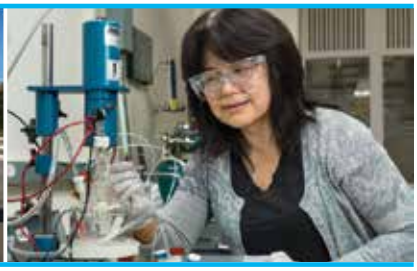
The second session, during the Business-2-Business Product Theater, will highlight technologies developed at the national labs, their unique capabilities, and opportunities for collaboration.

Following presentations from each lab, representatives will be available in the room to further discuss their industrial solutions.



3-D X-ray Tomography of a mixed-potential hydrogen sensor at LANL. Sensor response is controlled by the kinetics of the electrode reactions occurring at the gas-electrode-electrolyte interface.

NREL has received four Fuel Cell Hybrid Vehicles—Advanced (FCHV-adv) on loan from Toyota, enhancing their research capabilities related to hydrogen fueling infrastructure.



Xiaoping Wang of Argonne National Laboratory prepares a cell for testing the activity of fuel cell catalysts.

U.S. DEPARTMENT OF ENERGY

Energy Efficiency & Renewable Energy

EERE-funded research has:

- Reduced cost of fuel cells by more than 50% since 2006 and 30% since 2008
- Achieved a more than five-fold reduction in the platinum content of fuel cells
- Led to more than 500 patents, 45 commercial technologies, and 65 emerging technologies that will be commercialized in the next 3-5 years
- http://energy.gov/eere/fuelcells/downloads/2014-pathways-commercial-success-technologies-and-products-supported-fuel

www.energy.gov/eere/fuelcells

228TH MEETING EXHIBITORS & SPONSORS

TECHNICAL EXHIBIT

The ECS Technical Exhibit is always the talk of the meeting—technical exhibits are popular networking opportunities, as attendees gather together with colleagues and meet new contacts. The exhibitors in Phoenix will provide demonstrations and showcase instruments, materials, systems, publications, and software, as well as other products and services. Complimentary coffee breaks are scheduled on Wednesday and Thursday at 0930h in the Exhibit Hall. In addition, the Poster Sessions and receptions will be held in the Exhibit Hall on Tuesday and Wednesday evenings, beginning at 1800h. **The Exhibit Hall will be located in West Hall 1 in the Phoenix Convention Center.**

EXHIBIT HOURS

Tuesday, October 13, 2015

0800-1300h ..... Exhibitor Move-In
1300-1600h ..... Technical Exhibit
1800-2000h ..... Technical Exhibit, General & Student Poster Session

Wednesday, October 14, 2015

0900-1400h ..... Technical Exhibit
0930-1000h ..... Coffee Break in Exhibit Hall
1800-2000h ..... Technical Exhibit & General Poster Session

Thursday, October 15, 2015

0900-1200h ..... Technical Exhibit
0930-1000h ..... Coffee Break in Exhibit Hall
1200-1600h ..... Technical Exhibit Tear Down

EXHIBITORS

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Bio-Logic is the exclusive provider of EC-Lab electrochemical instruments. The EC-Lab family of products includes modular single-channel (SP-50/150/200/300) and multi-channel (VSP/VMP3/VSP-300/VMP-300) potentiostats/galvanostats, High current potentiostats (HCP-803/1005) and easy to use software. Additionally, Bio-Logic offers a complete line of electrochemical accessories, including cells, electrodes, and ancillary instruments. Bio-Logic is also the provider of BT-Lab line of battery cyclers (MPG-2xx and BCS-8XX families), the SCAN-Lab line of localized electrochemical scanning systems (M370 and M470 modular systems), and the MT-Lab materials analysis systems (MTZ-35 FRA and high temperature sample holder). Come to booths 312, 314, and 316 to see our exciting showcase of products.

The Department of Energy Fuel Cell Technologies Office

Booth 401

U.S. DEPARTMENT OF ENERGY
Energy Efficiency & Renewable Energy

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The U.S. Department of Energy's Fuel Cell Technologies Office is a comprehensive portfolio of activities that address the full range of barriers facing the development and deployment of hydrogen and fuel cells with the ultimate goals of decreasing our dependence on oil, reducing carbon emissions, and enabling clean, reliable power generation.

ECOTEC Solutions, Inc.

Booth 403

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As the leader in gas and humidity analysis equipment for PEM fuel cell testing, greenhouse gas measurement at landfills, and many other applications, **ECOTEC** continues to provide innovative solutions with superior service and support. The ECOTEC HS-1000 solves the challenges of accurately measuring humidity levels in fuel cell gas conditions.

El Cell

Booth 116

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EL-CELL® develops electrochemical test equipment to enable testing of new battery materials at the edge of actual knowledge. We are focusing on lithium-ion batteries, but we also provide equipment for other battery materials. Our product portfolio encompasses battery test cells, electrochemical dilatometers, lab tools, consumables and other customized turnkey solutions for complete battery research labs.

ESL ElectroScience

Booth 214

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ESL ElectroScience specializes in providing solutions to enable customers to take technologies from concept through high volume production using thick film pastes and ceramic tapes. ESL products can be found in hybrid microcircuits, multilayer microelectronics, transformers, thick film heaters, sensors, and fuel cells. For more information visit us at www.electroscience.com

Gamry Instruments

Booths 100 & 102

GAMRY INSTRUMENTS

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Gamry Instruments designs and manufactures high-quality electrochemical instrumentation and accessories. Our full lineup includes single and multichannel potentiostats from 600 mA to 30 A (all capable of EIS), fully-integrated spectroelectrochemical setups for both UV/Vis and Raman, four-terminal battery holders and an EQCM that can handle any crystal from 1-10 MHz. Stop by to see our new potentiostats including one specially designed for testing batteries, fuel cells, and supercapacitors.

HORIBA Scientific

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HORIBA Scientific, world leader in spectroscopic instrumentation, offers elemental analyzers, GD-OES Spectrometers, and products for Raman, steady-state and lifetime Fluorescence, Photoluminescence, XRF, spectroscopic ellipsometry, atomic emission spectroscopy, optical components, gratings and high performance CCDs. We specialize in Glow Discharge and Raman spectrometers and their application for analysis of Li Ion batteries.

HORIBA Semiconductor

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(continued from previous page)

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SYMPOSIUM TOPICS & ORGANIZERS

A — Batteries and Energy Storage

A01 — Joint General Session: Batteries and Energy Storage -and- Fuel Cells, Electrolytes, and Energy Conversion
B. Y. Liaw, K. M. Abraham, A. Manivannan, S. R. Narayanan, D. Wang
Battery, Energy Technology

A02 — Batteries - Theory, Modeling, and Simulation
Y. Qi, A. Van der Ven, P. B. Balbuena
Battery
CD/USB

A03 — Batteries Beyond Lithium-Ion
D. A. Steingart, V. Thangadurai, V. Kalra, Y. Xing, V. Di Noto
Battery, Energy Technology

A04 — Battery Safety
D. H. Doughty, G. G. Botte, C. J. Orendorff
Battery, Industrial Electrochemistry and Electrochemical Engineering

A05 — Electrolytes and Electrochemical Interfaces in Energy Storage Systems
B. L. Lucht, T. R. Jow, R. Kostecki, D. Guyomard, A. M. Herring, V. Di Noto
Battery, Energy Technology

A06 — High-Energy Li-Ion Intercalation Materials
S. Meng, G. Koenig, W.-S. Yoon
Battery

A07 — Intermetallic Anodes
K. Edstrom, D. Wang, V. Di Noto
Battery

A08 — Materials and Cell Designs for Flexible Energy Storage and Conversion Devices
G. Yu, J. Xiao, M. A. Allen, J. St-Pierre, J. Wu
Battery, Energy Technology

A09 — Recent Advances in Supercapacitors
V. Kalra, O. M. Leonte, A. Manivannan, R. Kostecki
Energy Technology, Battery, Dielectric Science and Technology

B — Carbon Nanostructures and Devices

B01 — Carbon Nanostructures: Fullerenes to Graphene
R. B. Weisman, P. J. Kulesza, V. Di Noto
Nanocarbons, Dielectric Science and Technology, Physical and Analytical Electrochemistry

C — Corrosion Science and Technology

C01 — Corrosion General Poster Session
R. Buchheit, S. Virtanen
Corrosion

C02 — Coating and Surface Modification for Corrosion Protection
H. N. McMurray, S. Fujimoto
Corrosion

C03 — Contemporary Aspects of Corrosion and Protection of Magnesium and Its Alloys
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Corrosion, Luminescence and Display Materials
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D — Dielectric Science and Materials

D02 — Nonvolatile Memories
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E — Electrochemical/Electroless Deposition

E01 — Current Trends in Electrodeposition - An Invited Symposium
C. Bonhôte
Electrodeposition

E02 — Fundamentals of Electrochemical Growth and Surface Limited Deposition
S. Brankovic, J. L. Stickney, N. Vasiljevic, N. Dimitrov
Electrodeposition, Physical and Analytical Electrochemistry

E03 — Novel Design and Electrodeposition Modalities 2
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F — Electrochemical Engineering

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F03 — Membrane-based Electrochemical Separations
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Energy Technology, High Temperature Materials, Industrial Electrochemistry and Electrochemical Engineering, Physical and Analytical Electrochemistry

G — Electronic Materials and Processing

G01 — Atomic Layer Deposition Applications 11
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I — Fuel Cells, Electrolyzers, and Energy Conversion

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Energy Technology, Physical and Analytical Electrochemistry

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Energy Technology, Battery, Industrial Electrochemistry and Electrochemical Engineering, Physical and Analytical Electrochemistry
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SYMPOSIUM TOPICS & ORGANIZERS

J — Luminescence and Display Materials, Devices, and Processing

J01 — Physics and Chemistry of Luminescent Materials
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L — Physical and Analytical Electrochemistry, Electrocatalysis, and Photoelectrochemistry

L01 — Physical and Analytical Electrochemistry, Electrocatalysis, and Photoelectrochemistry General Session
P. J. Kulesza
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L06 — Photocatalysts, Photoelectrochemical Cells, and Solar Fuels 6
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Physical and Analytical Electrochemistry, Battery, Industrial Electrochemistry and Electrochemical Engineering, Sensor e

M — Sensors

M01 — Sensors, Actuators, and Microsystems General Session
N. Wu, M. T. Carter, R. Mukundan, L. A. Nagahara, G. W. Hunter, B. A. Chin
Sensor e

M03 — Sensors for Agriculture
B. A. Chin, A. Simonian, S. Mitra, P. Hesketh, Y. Chai
Sensor e

Z — General

Z01 — General Student Poster Session
V. Subramanian, V. Chaitanya, K. B. Sundaram, P. Pharkya
All Divisions e

Z02 — Nanotechnology General Session
O. M Leonte, M. K. Sunkara
All Divisions, Interdisciplinary Science and Technology Subcommittee e

Z03 — Impedance Technologies, Diagnostics, and Sensing Applications
P. Vanýsek, V. Lvovich, M. E. Orazem, M. Itagaki
Physical and Analytical Electrochemistry, Corrosion, Industrial Electrochemistry and Electrochemical Engineering, Sensor e

Z04 — Electrochemical Energy Summit (E2S)
D. Scherson, K. Rajeshwar, A. Z. Weber
All Divisions e

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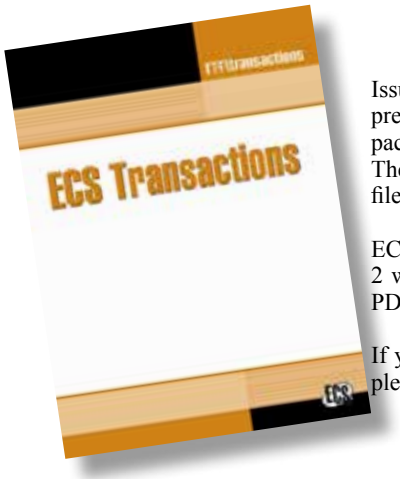

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