68th Annual Meeting of the International Society of Electrochemistry

27 August - 1 September 2017 Providence, RI, USA

Electrochemistry without Borders



2nd Announcement and Call for Papers

http://annual68.ise-online.org e-mail: events@ise-online.org



Invitation to ISE 2017

You are warmly invited to the 68th Annual ISE Meeting in Providence, RI, USA. The meeting will be held at the Rhode Island Convention Center (RICC). Providence is the capital city of Rhode Island and one of the oldest cities in the United States. Providence combines the accessibility and friendliness of a small town with the culture and sophistication of a big city. With a thriving arts community, vibrant and diverse neighborhoods, outstanding hotels, a renowned restaurant scene and so many things to do, Providence is named one of "America's Favorite Cities".

The scientific theme of the meeting is Electrochemistry without Borders, meant to emphasize the global character of the electrochemical community encompassed by the ISE.

Summary of Symposia

- Symposium 1: New Experimental Trends in Analytical Electrochemistry
- Symposium 2: Flow and Microfluidic Systems in Analytical Electrochemistry
- Symposium 3: Electrochemical Approaches to Clinical Diagnostics and Medical Devices
- Symposium 4: Bioelectrochemistry without Borders
- Symposium 5: Novel Materials and Devices for Energy Storage: Batteries for Tomorrow's World
- Symposium 6: Fuel Cells and Electrolyzers
- Symposium 7: Supercapacitors from Materials and Processes to Applications
- Symposium 8: Dealloying: Fundamentals, Application, and Control
- Symposium 9: Ionic Liquids as Media for Electrochemical Synthesis
- Symposium 10: Corrosion: Fundamentals, Passivity, and Prevention
- Symposium 11: Synthesis and Applications of Electrochemically Active Materials
- Symposium 12: Electrochemical Technology for solving 21st Century Challenges
- Symposium 13: The Green Potential of Molecular Electrochemistry
- Symposium 14: Let there be Light in Electrochemistry:
 - From Electrogenerated Chemiluminescence to Fluorescence
- Symposium 15: Physical and Interfacial Electrochemistry: Structural, Spectroscopic, and Theoretical Studies of the Electrochemical Interface
- Symposium 16: Electrochemistry of Metal Clusters and Nanoparticles
- Symposium 17: Advances in Theory and Modeling of Electrochemical Systems
- Symposium 18: Education for Electrochemistry and Electrochemical Engineering
- Symposium 19: General Session



Organizing Committee

Plamen Atanassov, Albuquerque, NM, USA (co-Chair)
Philip N. Bartlett, Southampton, UK
Gerardine Botte, Athens, OH, USA
Ignacio Gonzalez, Mexico, Mexico
E. Jennings Taylor, Englewood, OH, USA
Hasuck Kim, Daegu, South Korea
Daniel Little, Santa Barbara, CA, USA
Shelley Minteer, Salt Lake City, UT, USA
Sanjeev Mukerjee, Boston, MA, USA (co-Chair)
Mark E. Orazem, Gainesville, FL, USA (co-Chair)

2016 ISE Prize Winners and Award Lecturers

Electrochimica Acta Gold Medal Hector Abruña, Cornell University, USA

Bioelectrochemistry Prize of ISE Division 2 Jacek Lipkowski, University of Guelph, Canada

- Brian Conway Prize for Physical Electrochemistry Marc Koper, Leiden University, the Netherlands
- Early Career Analytical Electrochemistry Prize of ISE Division 1 Kosuke Ino, Tohoku University, Sendai, Japan
- ISE-Elsevier Prize for Experimental Electrochemistry Nongjian Tao, Arizona State University, USA
- ISE Prize for Electrochemical Materials Science Claire Villevieille, Paul Scherrer Institute, Villigen, Switzerland
- ISE Prize for Applied Electrochemistry Shaojun Guo, Peking University, China
- ISE-Elsevier Prize for Green Electrochemistry Javier Llanos, University of Castilla-la Mancha, Spain
- Jaroslav Heyrovsky Prize for Molecular Electrochemistry Ismael Diez Perez, University of Barcelona, Spain

Tajima Prize

Mikhail L. Zheludkevich, University of Kiel, Germany

Oronzio and Niccolò De Nora Foundation Young Author Prize Lin Lu-Yin, National Taipei University of Technology, Taiwan

Electrochemistry without Borders

Plenary Lecturers

Adam Heller

University of Texas, USA



Clare Grey University of Cambridge UK



Krishnan Rajeshwar

University of Texas Arlington, USA



Adam Heller is Chief Science Officer of SynAgile Corporation, Research Professor at the McKetta Department of Chemical Engineering of the University of Texas, and Consultant to Abbott Diabetes Care. He pioneered liquid lasers (1966), the lithium thionyl chloride battery (1972), efficient photoelectrochemical solar cells (1977-1981), and the electrical wiring of redox enzymes (1987-2005), underlying the bloodless FreeStyle LibreTM continuous glucose monitoring system of Abbott Diabetes Care. He co-founded with Ephraim Heller TheraSense, where he caodeveloped in 1996-2000 the first painless FreeStyle microcoulometric blood glucose monitoring system. The impact of his contributions is evident from his Google citation index of 49,885, his h-index of 124 and his having been granted 269 US patents and numerous international patents, most on actually manufactured and worldwide available products. The benefit of his work to society, particularly to the world's diabetic people, was recognized by US President George W. Bush who awarded him in 2008 in a White House ceremony the United States National Medal of Technology and Innovation. He was elected to the US National Academy of Engineering in 1987 and to the American Academy of Arts and Sciences in 2009. The first and the latest of his 20 awards, medals and honorary doctorates were from The Electrochemical Society: In 1978 he received the ECS Battery Division's Research Award and in 2015 he was named the 78th Honorary Member of The Electrochemical Society in about 100 years.

Clare P. Grey is the Geoffrey Moorhouse-Gibson Professor of Chemistry at Cambridge University and a Fellow of Pembroke College Cambridge. She received a BA and D. Phil. (1991) in Chemistry from the University of Oxford. After post-doctoral fellowships in the Netherlands and at DuPont CR&D in Wilmington, DE, she joined the faculty at Stony Brook University (SBU) as an Assistant (1994), Associate (1997) and then Full Professor (2001-2015). She moved to Cambridge in 2009, maintaining an adjunct position at SBU. She was the director of the Northeastern Chemical Energy Storage Center, a Department of Energy, Energy Frontier Research Center (2009-2010) and Associate director (2011-2014). Her recent honors and awards include the 2011 Royal Society Kavli Lecture and Medal for work relating to the Environment/Energy, Honorary PhD Degrees from the Universities of Orleans (2012) and Lancaster (2013), the Gunther Laukien Award from the Experimental NMR Conference (2013), the Research Award from the International Battery Association (2013), the Royal Society Davy Award (2014), and the Arfvedson-Schlenk-Preis from the German Chemical Society (2015). She is a Fellow of the Royal Society. Her current research interests include the use of solid state NMR and diffraction-based methods to determine structure-function relationships in materials for energy storage (batteries and supercapacitors), conversion (fuel cells) and carbon capture.

Krishnan Rajeshwar is a Distinguished University Professor at the University of Texas at Arlington. He is also the founding director of the Center for Renewable Energy Science & Technology (CREST) on campus. He is currently the Senior Vice President of The Electrochemical Society and has served as an elected officer for the last two years. Rajeshwar has served as Editor of Interface, the Electrochemical Society's authoritative yet accessible quarterly publication for those in the field of solid-state and electrochemical science and technology. Currently, he serves on the editorial boards of several electrochemical journals.

After post-doctoral training at Colorado State University, he joined UT Arlington in 1983. His research interests span a wide spectrum and include photoelectrochemistry; solar energy conversion; renewable energy; materials chemistry; semiconductor electrochemistry; and environmental chemistry. Rajeshwar is a Fellow of The Electrochemical Society and received the Energy Technology Division Research Award in 2009. He has authored monographs and edited books, special issues of journals, and conference proceedings on energy conversion. He is the author of over 350 refereed and well-cited publications.



Hector Abruña

Cornell University, USA



Electrochimica Acta Gold Medal Winner

Hector Abruña, Emile M.Chamot Professor of Chemistry, is Director of the Energy Materials Center at Cornell (emc2). He completed his graduate studies with Royce W. Murray and Thomas J. Meyer at the University of North Carolina at Chapel Hill in 1980 and was a postdoctoral research associate with Allen J. Bard at the University of Texas at Austin. After a brief stay at the University of Puerto Rico, he moved to Cornell in 1983. He was Chair of the Department of Chemistry and Chemical Biology from 2004-2008.

Abruña has been the recipient of numerous awards including a Presidential Young Investigator Award, Sloan Fellowship, J. S. Guggenheim Fellowship, and J. W. Fulbright Senior Fellow. He is the recipient of the Electrochemistry Award for the American Chemical Society (2008), and the C.N. Reilley Award in Electrochemistry for 2007. He was elected Fellow of the American Association for the Advancement of Science in 2007, member of the American Academy of Arts and Sciences in 2007, and Fellow of the International Society of Electrochemistry in 2008. He received the D. C. Grahame Award from the Electrochemical Society for 2009, the Faraday Medal of the Royal Society for 2011, and the Brian Conway Prize from the International Society of Electrochemistry for 2013. In 2013, he was made Fellow of the Electrochemical Society. Abruña is the co-author of over 440 publications and has given over 575 invited lectures world-wide. Out of the 50 students that, to date, have obtained a Ph.D. under his direction, 14 have gone on to faculty positions.

Jose Zagal Universidad de Santiago, Chile



Professor at the Faculty of Chemistry and Biology of the University of Santiago de Chile, Jose H. Zagal directs the Laboratory of Electrocatalysis. He got his PhD from Case Western Reserve University in 1978 and was a posdoctoral Fellow at Brookhaven National Laboratory in 1982. He has conducted pioneering studies on establishing reactivity descriptors and volcano correlations for non precious metal M-Nx molecular catalysts covering not only fuel cell reactions like O₂ reduction, but also for many other ET processes. He has also contributed in the field of conductive polymers, sensors and corrosion. He was awarded the Presidential Chair in Science in 1996 by a Committee chaired by Chemistry Nobel Laureate Rudolph A. Marcus. He has also received several other Chilean awards. In 2014 he was elected a Fellow of the International Society of Electrochemistry and also became a Fellow of The Electrochemical Society. He is President of the Chilean Association of Carbonaceous Materials and has been elected Vice-president of the Iberoamerican Society of Electrochemistry (SIBAE).

He has published 208 papers and 7 book chapters, co-authored and edited 4 books, and has been awarded 3 patents. He has served in Editorial Boards for J. Appl. Electrochem. (1988-2010), J. Chil. Chem. Soc. (1984-2007) Electrocatalysis, (2009-2015) and is presently a member of the Editorial Boards of: J. Solid State Electrochem., Internat. J. Electrochem., Electrochem. Comm., J. Serbian Chemical Soc., Electrochemical Energy Tech, and Chimica Nova. He has been a Guest Editor of Special Issues of the International Journal of Electrochemistry and of the Journal of Applied Electrochemistry.



Tutorials

Symposium 1

New Experimental Trends in Analytical Electrochemistry

Sponsored by : Division 1, Analytical Electrochemistry

Tutorial 1

Platinum Group Metal Free Catalysts Frédéric Jaouen Université Montpellier II, Montpellier, France

Tutorial 2

Biomedical Applications of Electrochemical Systems

Shawn C. Kelley Medtronic Incorporated, Minneapolis, MN, USA Erik Scott Medtronic Incorporated, Minneapolis, MN, USA Our quest is to measure more effectively the world around us, to evaluate the future needs, and to drive advances in electroanalytical chemistry from many directions. New and optimized instrumental techniques and experimental trends that are aimed at filling gaps and addressing shortcomings in established methods have to be developed. These should enable convenient monitoring of newly identified analytes important to human and environmental health and will provide faster analyses in real complex media and harsh conditions. This symposium will highlight recent advances in all these areas of analytical electrochemistry.

Symposium Organizers

Priscilla Baker (Coordinator), University of the Western Cape, South Africa pbaker@uwc.ac.za
Carol Korzeniewski, Texas Tech University, USA
José M. Pingarron, Complutense University of Madrid, Spain

Philippe Buhlmann, University of Minnesota, USA





Flow and Microfluidic Systems in Analytical Electrochemistry

Sponsored by: Division 1, Analytical Electrochemistry

Flow systems with electrochemical detection offer many advantages including convenience of sample handling, minimization of sample size, speed of analysis, and generation of rich data. Both 'macro' scale systems and miniaturized portable lab-on-a-chip devices are the focus of this symposium. Contributions are invited on all aspects of flow systems with electrochemical detection and are expected to range from theory, to design, to applications for the study of real-world problems.

Symposium Organizers

- Vincent Vivier (Coordinator), LISE CNRS UPR15, France vincent.vivier@upmc.fr
- Ingrid Fritsch, University of Arkansas, USA

Lane Baker, University of Indiana, USA

Daniel Mandler, The Hebrew University of Jerusalem, Israel

Symposium 3

Electrochemical Approaches to Clinical Diagnostics and Medical Devices

Sponsored by: Divisions 1 Analytical Electrochemistry Division 2 Bioelectrochemistry

This symposium covers the broad field of science and technology where electrochemistry is utilized to develop diagnostic instruments for diseases and medical devices in the broadest sense.

Topics include:

- Electrochemical biosensors and arrays for medical diagnostics
- Cancer diagnostics using electrochemical arrays
- Automated multiplexed electrochemical and ECL immunoarrays
- Electrochemical detection of DNA damage and DNA oxidation
- Measuring proteins and other molecular biomarkers for disease
- Electrochemistry in cell signaling and communication
- Electrochemistry in design and development of medical devices
- Medical devices at the interface of medicine, biology and electrochemistry

Symposium Organizers

James F. Rusling (Coordinator), University of Connecticut, USA james.rusling@uconn.edu

Fethi Bedioui, Université Paris Descartes - Chimie ParisTech, France

Woonsup Shin, Sogang University, South Korea

Frédérique T. Deiss, Indiana University Purdue University Indianapolis, USA



Bioelectrochemistry without Borders

Sponsored by: Division 2, Bioelectrochemistry

Bioelectrochemistry aims to understand electron transfer processes in biology, from living cells to enzymes. In this symposium, we will discuss new fundamental concepts, from electron transfer in single biomolecules, metabolic chains, molecular assemblies, membranes, and cells to biocatalysis. Papers presenting experimental as well as theoretical and modeling aspects of biological electron transfer systems and processes are invited.

Imaging of nanostructured interfaces as well as spatiotemporal analysis of biological activity on electrode surfaces will be highlighted. New experimental tools will be discussed, which expand bioelectrochemistry with surface analytical techniques, and push the design limits of bioelectrochemistry, biosensors and bioenergy devices.

Applications of electrochemistry in biosensors and bioelectronic devices, biocatalysis for fuel production, energy production via enzymatic or microbial fuel cells, photosynthetic system exploration, waste degradation, and CO_2 reduction, will be emphasized.

Topics include but are not limited to:

- Theoretical or experimental approaches that lead to improved understanding of the electrochemical and catalytic behavior of biological systems
- Surface analytical methods coupled to electrochemistry for imaging biointerfaces and for providing structural and spatio-temporal information of bio-objects
- Bioelectrocatalysis using nanoparticles, supramolecular assemblies, or mesoporous networks
- Biosensors and bioanalytical devices
- Biofuel cells
- Photobioelectrochemistry
- Bioelectronics

Symposium Organizers

Elisabeth Lojou (Coordinator), CNRS Marseille, France lojou@imm.cnrs.fr

Shelley Minteer, University of Utah, USALars Jeuken, University of Leeds, UKScott Calabrese Barton, Michigan State University, USA

Symposium 5

Novel Materials and Devices for Energy Storage: Batteries for Tomorrow's World

Sponsored by: Division 3, Electrochemical Energy Conversion and Storage

The next generation of advanced rechargeable batteries will continue to rely on Li-ion chemistry, possibly with the integration of alloying, conversion and conversionalloying anode materials. Post Li-ion systems such as Me-S, Na-ion, etc. are expected to enter the market, however, in the foreseeable future. Irrespective of the technology, the development of a detailed understanding of the fundamental properties of battery materials and the interactions of these materials with their environment will be the key to further improvements in the energy density, safety, and lifetime of batteries. The electrolyte is also crucial for the improvements of these devices, especially with respect to safety. This symposium is therefore devoted to recent progress in the fundamental science related to batteries, especially for advanced battery systems. Studies related to all other (applied) aspects of batteries, including solid-state electrolytes, are also welcome.

Symposium Organizers

Robert Kostecki (Coordinator), Lawrence Berkeley National Laboratory, USA R_Kostecki@lbl.gov

Stefano Passerini, Karlsruhe Institute of Technology, Germany

Daniel Abraham, Argonne National Laboratory, USA Vojtech Svoboda, Binergy Scientific, USA



Symposium 6 Fuel Cells and Electrolyzers

Symposium 7

Supercapacitors from Materials and Processes to Applications

Sponsored by:

Division 3, Electrochemical Energy Conversion and Storage

Topics will include but are not limited to:

- Synthesis and design of fuel cell materials (catalysts, electrolytes, gas diffusion layers, bipolar plates, etc.) and materials for low and high temperature electrolyzers
- New experimental approaches for characterization of fuel cell and electrolyzer materials
- Novel catalysts for oxygen reduction, and electrooxidation of hydrogen and organic fuels
- Fuel cell electrolyte materials synthesis, structural and electrochemical characterization
- Improved understanding of electrochemical reaction processes in fuel cells
- New insights into the degradation and aging modes of component materials and failure mechanisms of fuel cells and electrolyzers
- Fuel cell *in-operando* diagnostics, *in situ* characterization

Symposium Organizers

Hiroyuki Uchida (Coordinator), Clean Energy Center, University of Yamanashi, Japan h-uchida@yamanashi.ac.jp
Piotr Zeleney, Los Alamos National Lab, USA
Deborah Jones, Université Montpellier 2, France
Bryan Pivovar, NREL, USA

Sponsored by:

Division 3, Electrochemical Energy Conversion and Storage

This symposium will concern all fundamental and practical aspects of electrochemical capacitor research, development, and applications, with a focus on materials and systems sustainability. Studies on advanced electrode materials and electrolytes and new fabrication processes are welcome. Novel characterization techniques, including *in-situ* and *in-operando* methods for the study of the electrode/electrolyte interfaces, and modeling studies will be considered. New concepts and new devices for applications ranging from micro- to large-size energy storage, with attention to materials and system integration, will be included.

Symposium Organizers

Francesca Soavi (Coordinator), University of Bologna, Italy francesca.soavi@unibo.it
John Miller, JME, USA
Andrew Herring, Colorado School of Mines, USA
Roseanne Warren, University of Utah, USA



Electrochemistry without Borders

Symposium 8 Dealloying: Fundamentals, Application, and Control

Symposium 9 Ionic liquids as Media for Electrochemical Synthesis

Sponsored by: Division 4, Electrochemical Materials Science

Although traditionally considered as a corrosion subject, dealloying studies have found a growing base among many different disciplines where the word "nano" is a commonly used prefix. Selective dissolution of a less noble component from binary or ternary alloys has been shown to be of interest as a fabrication route for high surface to volume ratio materials and structures with applications in catalysis, energy storage, electronics, sensing, separations, and others. This symposium provides a forum for discussion of fundamental processes controlling the morphology evolution during dealloying and its applications in different fields. The relation between dealloying conditions and resulting material properties are discussed, benefiting from the synergy between well-designed experiments and theory and simulations.

Symposium Organizers

Nikolay Dimitrov (Coordinator), SUNY at Binghamton, USA dimitrov@binghamton.edu E. Jennings Taylor, Faraday Technologies, USA Natasa Vasiljevic, University of Bristol, UK Thomas Moffatt, NIST, USA

Sponsored by: Division 4, Electrochemical Materials Science

This symposium will discuss latest results on the use of ionic liquids (ILs) in electrochemical reactions. Such processes usually exploit the large electrochemical windows of ILs. Both experimental and theoretical papers are welcome. Examples are the electrodeposition of reactive metals such as aluminum, tantalum, niobium, titanium, or of other metals/semiconductors/alloys that cannot be electrodeposited from aqueous electrolytes, or applications of ILs for energy conversion and storage. Papers on new analytical methods, such as in situ Raman Spectroscopy, Atomic Force Microscopy, Scanning Tunneling Microscopy or X-Ray Photoelectron spectroscopy, used for (in situ) characterization of the electrochemical process in ILs are encouraged. Theoretical approaches could discuss the structure and dynamics of the bulk and the electrode-electrolyte interfaces of ILs.

Symposium Organizers

Roberto Torresi (Coordinator), Univ. de Sao Paulo, Brazil rtorresi@iq.usp.br

Charles Hussey, University of Mississippi, USA

Andreas Bund, Technische Universitaet Ilmenau, Germany



Corrosion: Fundamentals, Passivity, and Prevention

Symposium 11

Synthesis and Applications of Electrochemically Active Materials

Sponsored by: Division 4, Electrochemical Materials Science

The goal of this symposium is to address the range of issues pertinent to corrosion and passivity. The breadth of the topic is intended to cover the latest developments, with particular focus on new scientific advances regarding: corrosion, passive films, *in-situ* corrosion measurements, and corrosion in harsh environments (e.g. nuclear, bio). Topics in closely related areas will also be considered, including environmentally assisted corrosion, corrosion modeling and the advanced characterization of corrosion.

Symposium Organizers

Scott Lillard (Coordinator), University of Akron, USA lillard@uakron.edu
David Shifler, Naval Research Lab, USA
Nick Birbilis, Monash University, Australia,
Homero Castaneda, Texas A&M University, USA

Sponsored by: Division 4, Electrochemical Materials Science Division 6, Molecular Electrochemistry

This symposium will cover all aspects of electrochemically active materials as well as molecular and supramolecular architectures, ranging from their modeling and syntheses and characterization to various applications in functional electrodes (electrochemical energy conversion and storage, sensors, actuators, micro/nanoelectronics, electrochromic devices, etc.). The materials under discussion include, but are not limited to, conjugated and redoxactive polymers, ion-intercalation solids, carbon-based and other highly porous materials, nanostructured and functionalized surfaces and thin layers, and electrocatalysts.

Symposium Organizers

Francesco Paolucci (Coordinator), University of Bologna, Italy francesco.paolucci@unibo.it
Mikhail A. Vorotyntsev, D. Mendeleev University of Chemical Technology, Russia
Ross Milton, University of Utah, USA
Giovanni Zangari, University of Virginia, USA



Symposium 12 Electrochemical Technology for solving 21st Century Challenges

Symposium 13

The Green Potential of Molecular Electrochemistry

Sponsored by: Division 5, Electrochemical Process Engineering and Technology

Electrochemistry and electrochemical technology in particular is used in a range of industries and offers prospective solutions to many important global challenges, including pollution abatement, resource sustainability by recycling valuable and scarce materials, and energy conversion, storage and utilization efficiency. To solve these problems, existing technologies may be optimized using recently developed tools change to e.g. in material science or mathematical modeling, and novel technological approaches may offer new opportunities and processes. The Symposium aims to address these issues and to provide a broad forum for exchange of information, not only between academic research groups, but also between academia and industry.

Symposium Organizers

Gerardine Botte (Coordinator), Ohio University, USA botte@ohio.edu

Karel Bouzek, Institute of Chemical Technology Prague, Czech Republic

Geoffrey H. Kelsall, Imperial College London, UK Joaquin Rodriguez Lopez, University of Illinois, USA Sponsored by: Division 6, Molecular Electrochemistry

Electrochemistry is naturally suited to the principles of green chemistry: use of green solvents (ionic liquids, water, alcohol, solvents from renewable resources, ...), use of green catalysts immobilized or not, recyclability, miniaturization of cells and electrodes (e.g. microfluidic systems), easy separation of electrodes and products, the use and exploitation of biomass, use of a variety of energy sources, preparation of fine chemicals, safety, and other factors as well. The Symposium will address fundamental aspects, recent developments, in terms of electrosynthesis with original strategies, mechanistic investigations, new applications, modified surfaces, flow electrochemistry, strategies for asymmetric synthesis, combined methods, biomass, biomimetic methods, and so on. The purpose of the Symposium is thus to bring together the leading scientists working in all the aspects of organic and organometallic electrosynthesis in order to stimulate intensive discussions and improve collaborations within the electrochemical and the synthetic communities.

Symposium Organizers

 Daniel Little (Coordinator), University of California, Santa Barbara, USA little@chem.ucsb.edu
 Marilia O. F. Goulart, Universidade Federal de Alagoas,

Brazil

Olivier Buriez, Ecole Normale Superieure, France **Carlos Frontana**, Centro de Investigacion y Desarrollo Tecnologico en Electroquimica S. C., Mexico





Let there be Light in Electrochemistry: From Electrogenerated Chemiluminescence to Fluorescence

Sponsored by: Division 1, Analytical Electrochemistry Division 2, Bioelectrochemistry Division 6, Molecular Electrochemistry

The ability to merge intimately electrochemistry with luminescence offers the opportunity to develop original analytical strategies and to acquire complementary information on complex phenomena. For example, electrogenerated chemiluminescence (ECL) is a powerful technique with extremely broad applications, such as light-emitting devices, immunoassays, biosensors, etc. The great success of ECL for *in vitro* diagnosis with hundreds of millions dollars in sales per year greatly promotes recent ECL studies and significant development.

This symposium will address fundamental aspects, recent developments, bioanalytical and commercialized applications of ECL and of fluorescence combined with electrochemistry. We wish to cover future development of the field which may include new molecular luminophores, nanoluminophores (metal cluster, nanostructured carbon, Q-dots, nanohybrids), high-throughput assays, bipolar electrochemistry, point-of-care testing, microchips, mechanistic study, light emitting electrochemical cells, etc. The purpose of this symposium is thus to bring together the leading scientists working in all these aspects, in order to stimulate intensive discussions and initiate collaborations in these topics within the electrochemical community.

Symposium Organizers

Gary Blanchard (Coordinator), Michigan State, USA blanchard@chemistry.msu.edu

Zhifeng Ding, University of Western Ontario, Canada Pawel Krysinski, University of Warsaw, Poland Neso Sojic, University of Bordeaux, France Giovanni Valenti, University of Bologna, Italy

Symposium 15

Physical and Interfacial Electrochemistry: Structural, Spectroscopic, and Theoretical Studies of the Electrochemical Interface

Sponsored by: Division 7: Physical Electrochemistry

This symposium focuses on spectroscopic, structural, electrochemical, analytical and theoretical investigations of the electrified interface with the objective of identifying and quantifying atomic-level phenomena playing important roles in electrochemical adsorption and faradaic reactions. Recent advances in ex situ and in situ experimental methodologies, in combination with progress in the development of theoretical and computational approaches, create suitable conditions for obtaining a detailed picture of interfacial structures in relation to their surface and bulk compositions. These developments are fundamental in recognizing structurereactivity relationships. The symposium will cover a broad range of topics from fundamental studies of interfacial phenomena, employing a variety of experimental and theoretical methods, to the design, fabrication and characterization of materials of relevance to both well-established as well as emerging electrochemical technologies.

Symposium Organizers

Jamie Noël (Coordinator), The University of Western Ontario, Canada jjnoel@uwo.ca Pawel J. Kulesza, University of Warsaw, Poland Karl Mayrhofer, Max-Planck-Institut für Eisenforschung, Germany

Daniel Scherson, Case Western University, USA



Electrochemistry without Borders



Electrochemistry of Metal Clusters and Nanoparticles

Symposium 17

Advances in Theory and Modeling of Electrochemical Systems

Sponsored by: Division 6, Molecular Electrochemistry Division 7, Physical Electrochemistry

Monolayer-protected metal clusters (MPCs) and small nanoparticles characterized by a well-defined composition are very promising materials in various applied areas, such as catalysis, sensing and biomedicine. MPCs and nanoparticles display chemical and physicochemical properties that are defined, mostly but not exclusively, by their size. When very small, they display a distinct electrochemical behavior or, more generally, a well-defined electrochemical activity. The ease by which they can undergo reduction or oxidation, also through surface modification, makes them as valuable electron-transfer reactants or redox catalysts in which the metal core may play an active role. Therefore, the number of electrochemical studies of MPCs and nanoparticles in solution, supported on electrodes, or in films keeps increasing. This symposium will highlight the most recent advances in this broad area with a special emphasis on the pivotal role played by electrochemistry and electrochemical methods in understanding the properties of these nanomaterials on a molecular level and developing possible redox applications.

Symposium Organizers

Flavio Maran (Coordinator), University of Padova, Italy flavio.maran@unipd.it
Anne Co, Ohio State University, USA
Dongil Lee, Yonsei University, South Korea
Michael V. Mirkin, City University of New York Energy Institute, USA

Sponsored by: Division 7, Physical Electrochemistry

Physical-mathematical theory and electrochemical simulations provide increasingly powerful tools to understand, predict and interpret phenomena in electrochemical materials and systems. Relations between structure, properties and performance of any electrochemical material or system must be investigated in consistency with basic theoretical principles of transport and reaction phenomena. This fundamental rationale applies across scales and disciplines, including: molecular electrochemical processes in complex matter; charge storage and transfer at microscopic electrochemical interfaces; electrostatic, kinetic and transport phenomena in nanostructured materials; self-assembly and emergence of structure vs. property relations in random heterogeneous materials for ion transport, charge storage and charge transfer (e.g. colloids, porous media, composites); interplay of functional components and electrochemical cells in energy storage and conversion systems. The symposium will address the full bandwidth of methods and approaches and it will showcase numerous applications of modeling tools to basic understanding of electrochemical phenomena, materials design, advanced diagnostics and optimization of complex electrochemical systems. Contributions will embrace spatial scales from the atomic to the macroscopic level, and time scales from fast reactions to long-term degradation processes.

Symposium Organizers

- **Michael Eikerling** (Coordinator), Simon Fraser University, Canada meikerl@sfu.ca
- Alejandro A. Franco, Université de Picardie Jules Verne, France
- Adam Weber, Lawrence Berkeley National Laboratory, USA
- Douglas P. Riemer, Hutchinson Technology, Inc., USA



Education for Electrochemistry and Electrochemical Engineering

Symposium 19 General Session

Sponsored by: all divisions Co-Sponsored by the Electrochemical Society (ECS)

Following the successful symposium on education held at the 64th annual meeting in Mexico, the objective of this symposium, jointly sponsored by ISE and ECS, is to provide a forum for original contributions covering present and future trends in electrochemistry and electrochemical engineering education at undergraduate and/or graduate levels. Papers shall discuss the teaching of fundamental principles, applied techniques, experimental design, curriculum design, evaluation strategies, modeling and simulation of experimental data from the educational standpoint.

Topics of interest include but are not limited to:

- Alternative enunciations and discussions of selected electrochemistry, electrochemical, and corrosion principles,
- Presentation of the theory and applications of applied techniques for optimal understanding,
- Factors involved in the design of electrochemical and corrosion experiments for the educational laboratories,
- The importance of interdisciplinary contributions to the learning of electrochemistry and corrosion,
- Strategies for modeling and simulation of experimental data from the educational standpoint,
- Curriculum design for electrochemistry, electrochemical engineering, and corrosion courses,
- Question and problem design and evaluation of learning in electrochemistry and corrosion courses.

Symposium Organizers

Ignacio Gonzalez (Coordinator), Universidad Autonoma Metropolitana – Iztapalapa, Mexico igm@xanum.uam.mx

Johna Leddy, University of Iowa, USA

Sponsored by: All Divisions

This Symposium will cover all ISE areas not compatible with topical symposia.

Symposium Organizers

John Stickney (Coordinator), University of Georgia, USA stickney@uga.edu

Gery R. Stafford, NIST, USA



Electrochemistry without Borders



68th Annual Meeting

of the International Society of Electrochemistry 27 August to 1 September 2017 Providence, RI, USA



Call for Papers

Authors are invited to submit an abstract in English of no more than one page in length, including figures, tables and references. Abstracts must be submitted online through the ISE website (http://annual68.ise-online.org). The site will open for submission of abstracts on 8 December 2016. The closing date for submission of abstracts will be 15 March 2017. For details please refer to the ISE website. At the close of the submission, the Symposium Organizers will assign contributions to either oral or poster presentations.

Electrochimica Acta

A special issue of the Society's journal, *Electrochimica Acta*, is planned based on selected original contributions made at the conference. Selection will be made by an international Editorial Committee comprising a Guest Editor for each Symposium, appointed and co-ordinated by the Special Issues Editor.

General Information

Travel

Located between New York City and Boston, at the head of Narragansett Bay with the Providence River running through the city, Providence is easily accessible. T.F. Green Airport in nearby Warwick, offers many low cost and regular flights to cities in the United States. Boston Logan International Airport offers flights to many domestic and international destinations. The Amtrak train station is located within walking distance from Rhode Island Convention Center and offers rail service throughout the Northeast Corridor. The need to rent a car is minimized by easy connections. T.F. Green airport is directly accessible via commuter train from Boston South Station (approx. 1hr train ride), which in turn is connected to Logan Airport via various means such as the red line (subway) and the hybrid bus (Silverline). Amtrak trains from New York Penn Station provide easy connectivity between JFK airport (connection to Penn Station via shuttle or cab) and Providence (approx. 3hr train ride).

Important Dates and Deadlines

Opening date for abstract submission: 8 December 2016 Deadline for abstract submission: 15 March 2017 Conference begins: 27 August 2017

Accommodation

Providence offers lodging choices for every taste and budget. Several hotels are within walking distance from RICC, others are available in Warwick and surrounding areas. Rooms have been secured at special rates for the ISE participants in the Omni Providence Hotel, as well as in the nearby Providence Biltmore Hotel. For further information, please refer to the website.

Climate

Providence is home to seasonal weather and a moderate climate. The summer months in Providence, from June to September, feature typically hot, sunny weather, with a fairly humid climate and cooler evenings. In August, weather in Providence peaks at around 28°C/82° F.

Venue

The Rhode Island Convention Center (RICC) is conveniently located in the heart of the city, surrounded by a broad spectrum of dining, shopping, arts and entertainment options.



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