CSTIC 2012 Holds Successful Meeting in Shanghai, China

ECS and SEMI are pleased to announce that the annual **China Semiconductor Technology International Conference** (CSTIC 2012) successfully concluded on March 19, 2012 in Shanghai, China with over 300 speakers and more than 800 attendees from around the world. The successful conclusion of CSTIC 2012 marked another milestone of this annual international conference on semiconductor technology in China to promote technical exchanges on the latest developments in semiconductor technology and manufacturing and to facilitate investment and collaboration in the semiconductor industry in Asia, particularly in China.

CSTIC 2012 covered all the aspects of semiconductor technology and manufacturing, including devices, design, lithography, integration, materials, processes, and manufacturing, as well as emerging semiconductor technologies and silicon material applications. Hot topics, such as 3D integration, LEDs, and MEMS, were also included in the conference. **Leo Esaki** (Nobel Laureate, IBM Fellow and Chairman of the Science and Technology Promotion Foundation of Ibaraki, Japan), **Kinam Kim** (Samsung Fellow, President and CEO of Samsung Institute of Advanced Technology and former Sr. VP of R&D of Samsung, Korea), and **Luc Van den hove** (President and CEO of IMEC, Belgium) delivered the keynote speeches at the conference plenary session. Over 100 other world's leading experts in semiconductor technology presented invited talks in the ten parallel symposia.

*Scenes from the annual **China Semiconductor Technology International Conference** (CSTIC 2012) in Shanghai, China this past March. ECS Executive Director* **Roque Calvo** *is at the far right in the lower photo.*

Qinghuang Lin (IBM), CSTIC 2012 Conference Chair, said, "With the support of SEMI, ECS, and the dedicated volunteer service of more than 100 committee members, CSTIC has become an increasingly important international conference on semiconductor technology and manufacturing." Among the 340 accepted papers, about half of them were from the U.S., Europe, Japan, and Korea, while the other half were from China.

CSTIC 2012 was organized jointly by ECS and SEMI. A record number of about 200 CSTIC 2012 papers were published in *ECS Transactions* in the ECS Digital Library after peer reviews by the conference committee members. **Dennis McGuirk** (President and Chief Executive Officer of SEMI) and **Paul Kohl** (Georgia Institute of Technology and ECS Vice-President) gave opening speeches at the plenary session.

CSTIC 2012 was co-organized by China's High-Tech Expert Committee (CHTEC), and co-sponsored by IEEE, MRS, CEMIA, and CSE. It was supported by Shanghai Pudong Association for Science & Technology, Shanghai Pudong New Area Science & Technology Development Fund. About 20 industry companies provided financial support for this industrial semiconductor technology conference.

Six students and young engineers won the SEMI–ECS Student & Engineer Awards (SESEA) at CSTIC 2012. The Best Student Award winners were **C. C. Chien** of National Tsing Hua University, Taiwan, China; **Jiewen Fan** of Peking University, China; and **S. Kano** of Tokyo Institute of Technology, Japan. The Best Young Engineer Award winners were **Cangran Guo** of Tsinghua University, Beijing, China; and **Kobe Wang** and **Shijian Zhang**, both of SMIC, China.

CSTIC 2013 is scheduled to be held on March 17-18, 2013 in Shanghai, China. More information about CSTIC is available at http://www.semi.org.cn/cstic.

Leo Esaki: One-Half Century of Research and a Nobel Prize

by Dennis W. Hess

On March 18 and 19, 2012, I had the pleasure of attending the China Semiconductor Technology International Conference (CSTIC 2012); this conference has been co-sponsored annually by ECS since 2001. The conference drew much attention (~800 attendees) worldwide, but particularly in the Asian semiconductor community. Sunday activities began with a morning Plenary Session. The first speaker was **Leo Esaki**, who is currently President of Yokohama College of Pharmacy in Japan. Dr. Esaki's lecture was entitled, "What did I Explore in Half a Century of Research?" His remarks spanned nearly one hour; however, to those of us listening intently, it seemed that no more than 20 minutes had passed. He held the attendees spell-bound with the extraordinary account of his 'journey' over the past 87 years and particularly with his perspective on life, science, and personal development.

My good fortune continued after the Plenary Session. At the Sunday evening banquet for CSTIC 2012 attendees, Dr. Esaki and his wife sat at our table. He and his wife are most endearing, gracious, and humble, making the day and especially that evening even more special and memorable. At my request, Dr. Esaki kindly had a copy of his Plenary lecture remarks sent to me to be used for this article. The historical account of his numerous technical accomplishments and advances were most impressive in scope and fascinating in detail and creativity. However, in this article, I will focus primarily on his insightful perspective of science, technology, and creativity, and the important role that these play in our lives. I will describe his views of how young (and older) minds can be developed to appreciate the pure beauty science offers to us individually and to our cultures, and specific questions that scientists/engineers (and others who wish to enhance their personal and professional development) should address to facilitate the planning of their lives. Finally, I will present the suggestions that Dr. Esaki enumerated for those aspiring toward a Nobel Prize. The text *in italics* is taken verbatim from his presentation materials at CSTIC 2012.

Professor **Leo Esaki** *(center) talking with students at the campus of Yokohama College of Pharmacy in 2010 (from the Yomiuri Shimbun).*

Education, Motivation and Plans

Dr. Esaki was a teenager during World War II and only 20 years old when the war ended. He remarked that:

> *Under wartime conditions, when death and destruction felt all too close to us, we seriously questioned ourselves: What should be our top priority, the most essential thing of all, in this life. We somehow thirsted for the truth of the universe. I was fascinated by the progress of science, for science has indeed enhanced our human abilities substantially by using the power of "reason." I dreamed of becoming a student with an inquiring scientific mind, so I entered the Physics Department of Tokyo Imperial University in September, 1944.*

In 1945, bombs were dropped on Tokyo and Dr. Esaki had to evacuate his living quarters. Dr. Esaki recounted that:

> *Although many people had had a sleepless night, at the university, Prof. Tsutomu Tanaka surprisingly began to teach his course of classes on Experimental Physics at 8:00 AM sharp as though nothing had happened. We were forcibly immersed in the world of physics, leaving the human calamity outside. We were taught that learning had to be a top priority, no matter what happened.*

Dr. Esaki became enamored with quantum mechanics as he recognized how pervasive this concept was. As he stated:

> *Then, I had to think about my future:*
>
> > *What should I do with my life?*
> > *What am I best at?*
> > *What is my mission in life?*
> > *Those are the ultimate questions which will rule the future.*
>
> *The main purpose of receiving a proper education is to get the adequate answer for the above questions, which is indispensable to plan the course of life. The course of life can be considered to be a drama in which you play the leading role. The point at issue is, who is the scenario-writer? You or somebody else? In*

(continued on next page)

Leo Esaki: One-Half Century of Research and a Nobel Prize

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> *a democratic society, since you can decide your own future, you yourself should be the scenario-writer. When I graduated from university, I wrote a unique scenario for myself; that is,* ***I would put the new knowledge of quantum mechanics to practical use.*** *In 1947, after graduation, I moved on to life as a researcher in the electronics industry, where I explored the possibility of creating quantum electronic devices. Coincidentally, 1947 was the year in which the epoch-making transistor was invented at Bell Telephone Laboratories. The advent of the transistor is a great breakthrough.*

Indeed, Dr. Esaki achieved his "unique scenario." He went on to describe how he used quantum mechanics to devise a quantum device, the Esaki tunnel diode. This earned him a (shared) Nobel Prize in Physics in 1973.

Dr. Esaki continued:

> *There is a tendency, especially in stable societies, to assume that the future is simply a natural extension of the past, and the present. However, the transistor is substantially different from the vacuum tube which was widely used at that time, and no amount of research and improvement of the vacuum tube could have led to the birth of the transistor. That taught us an important lesson:* ***in periods of great change, innovations and breakthroughs shape and form the future.*** *Needless to say, it is the power of individual creativity which plays the decisive role in this process.*

The invention of the transistor motivated Dr. Esaki to investigate semiconductors. After completion of his PhD at the University of Tokyo, he joined Sony Corporation. His work on tunneling, using heavily doped Ge and Si at Sony, led to the development of the Esaki tunnel diode, the first quantum electron device; this discovery fulfilled his original and highly ambitious scenario. His continuing interest in this field caused him to visit Bell Telephone Laboratories, where he was particularly enamored with the inscription below the bust of Alexander Graham Bell at the entrance to Bell Laboratories: "Leave the beaten track occasionally and dive into the woods. You will be certain to find something that you have never seen before." Indeed, he took this advice; in 1960, he joined the IBM Thomas J. Watson Research Center because he felt that this environment would offer him the opportunity to continue to put quantum mechanics into practice. At IBM, he proposed a man-made semiconductor superlattice which is engineered by the growth technique of molecular beam epitaxy (MBE), after designing the structure in accordance with the principles of quantum theory in such a way as to exhibit unprecedented electronic properties. The one-dimensional periodic potential is introduced along the superlattice axis (perpendicular to the deposited plane layers). Thus, elegantly simple examples in one-dimensional quantum physics from the 1930s, for instance resonant electron tunneling, the Kronig-Penney band model, Stark localization, or Bloch oscillation, which had all remained textbook exercises, could, for the first time, be practiced in a laboratory: *Do-it-yourself quantum mechanics would be possible.*

Dr. Esaki and his coworkers' pioneering research on superlattices and quantum wells in the 1970s and 1980s triggered a wide spectrum of experimental and theoretical investigations resulting in the observation of a number of intriguing phenomena. Perhaps more importantly, these studies led to the emergence of a new class of transport and optoelectronic devices such as high electron-mobility transistors (HEMT), high-speed resonant tunnel diodes, and quantum-cascade lasers.

Dr. Esaki then offered solace for all of us who believe that we have had manuscripts rejected as a result of "closed minded" reviewers and editors. Specifically, his initial pioneering work in superlattices was not appreciated immediately. The authors, reviewers, and editors in the audience paid close attention as he showed a portion of a review of the initial 1969 paper submitted by he and Raphael Tsu entitled, "Superlattice and Negative Differential Conductivity in Semiconductors," which was rejected by *Physical Review*:

> *In summary then, the paper is highly speculative and presents little material not already known and understood. While one should not arbitrarily dismiss speculative papers* per se*, in a case such as the present where an experimental test of the speculation is close at hand, I believe one should incorporate the material of the paper into one which reports the performance of the device so constructed. The paper as it now stands has the flavor of a publication whose principal purpose is to establish priority of an interesting idea. Such arguments can be settled by reference to internal laboratory reports, and already overcrowded journals should not be burdened with these matters.*

How to Win a Nobel Prize

In order to assist scientists and engineers in improving the impact and directions of their work, as well as to mentor those in the audience whose goals include receipt of a Nobel Prize, Dr. Esaki offered the following advice.

> *A list of "five don'ts" which anyone with an interest in realizing his or her creative potential should follow. Who knows, it may even help you win a Nobel Prize.*
>
> Rule number one: *Don't allow yourself to be trapped by your past experiences. Don't hold on to your preconceived notion. If you allow yourself to get caught up in social conventions or circumstances, you will not notice the opportunity for a dramatic leap forward when it presents itself. You should be a free spirit. Looking back at history, most laureates have received the Nobel Prize for work done during their thirties. In my case, I was 32 years old when I developed the "Esaki Tunnel Diode." The point that I am trying to make is that, because of their candor, younger people are able to look at things with a clearer vision, one that is not clouded by social conventions and past history.*
>
> Rule number two: *Don't allow yourself to become overly attached to any one authority in your field – the great professor, perhaps. By becoming closely involved with the great professor, you risk losing sight*

of yourself and forfeiting the free spirit of youth. Although the great professor may be awarded the Nobel Prize, it is unlikely that subordinate researchers will ever receive it.

Rule number three: *Don't hold on to what you don't need. The information-oriented society facilitates easy access to an enormous amount of information. The brain can be compared to a personal computer with an energy consumption of about 25 watts only. In terms of memory capacity or computing speed, the human brain has not really changed much since ancient times. Therefore, we must constantly be inputting and deleting information, and we should save only truly vital and relevant information. As the president of a university, I have the opportunities to meet with many people and to exchange "meishi" (name cards) with them. I try to discard the name cards as soon as possible, so that I always leave maximum memory space open. I'm kidding, of course.*

Rule number four: *Don't avoid confrontation. I myself became embroiled in a dispute with the company I was working for many years ago. At times, it is necessary to put yourself first and to defend your own position. My point is that fighting is sometimes unavoidable for the sake of self-defense.*

Rule number five: *Don't forget your spirit of childhood curiosity. It is the most vital component of imagination.*

Having listed the five rules, let me say that they do not constitute sufficient conditions for success. They are merely suggested guidelines. ***Good Luck!***

As is evident from Dr. Esaki's quoted text, his presentation at CSTIC 2012 was filled with insight and advice for scientists and engineers that resulted from his half a century of research and experience in science and technology. My annotation of his Plenary lecture content does not do justice to the excitement and motivation that he displayed on stage. I can attest to the fact that his excitement, sincerity, and warmth come through most clearly when he is conversing with others. The following photograph shows Dr. Esaki in one of his favorite poses: discussing education with and supplying career guidance to students (and others who never want to stop learning). I would like to end this brief synopsis of Dr. Esaki's CSTIC 2012 Plenary lecture by thanking him for both his words of wisdom and for permission to share his comments, remarks, and photograph with the readers of *Interface*.

About the Author

Dennis W. Hess is the Thomas C. DeLoach, Jr., Professor of Chemical & Biomolecular Engineering at the Georgia Institute of Technology and the Director of the Georgia Tech NSF Materials Research Science and Engineering Center. He has served as ECS President (1996-1997), Editor of *Electrochemical and Solid State Letters* (2004-2012) and is currently Editor of *ECS Journal of Solid State Science and Technology* and of *ECS Solid State Letters*. He may be reached at dennis.hess@chbe.gatech.edu.

ECS Co-sponsored Conferences for 2012

In addition to the regular ECS biannual meetings, ECS, its Divisions, and Sections cosponsor meetings and symposia of interest to the technical audience ECS serves. The following is a list of the cosponsored meetings for 2012. Please visit the ECS website for a list of all co-sponsored meetings.

- **Workshop on Electrochemical Measurements,** August 6-10, 2012, Cleveland, Ohio, USA
- **63rd Annual Meeting of the International Society of Electrochemistry**, August 19-24, 2012, Prague, Czech Republic
- **13th International Conference on Advanced Batteries, Accumulators, and Fuel Cells**, August 26-30, 2012, Brno, Czech Republic
- **27th Symposium on Microelectronics Technology and Devices (SBMicro 2012)**, August 30-September 2, 2012, Brasília, Brazil
- **1st International Conference on Nanomaterials: Fundamentals and Applications**, October 3-10, 2012, Strbske Pleso, Slovakia
- **Fuel Cell Seminar & Exposition**, November 5-8, 2012, Uncasville, Connecticut, USA

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

Corporate Member News

Spotlight on Precious Plate Inc.

Since 1973, **Precious Plate** has provided selective electroplating services by continually adapting electroplating equipment and processes to the specific needs of a wide variety of manufacturers.

Constantly escalating prices of gold, palladium, silver, and other metals have made precious metal conservation essential, and Precious Plate's electroplating equipment and selective electroplating processes can deposit precious metals to critical locations with extreme selectivity, which greatly reduces the amount of precious metals such as gold, palladium, or silver plating used during the electroplating process and ultimately the cost to customers.

Precious Plate maintains a close working relationship with its sister company, Precision Process Inc., utilizing their unique selective spot plating equipment designs. Their large modern facility is equipped with the latest in machining and fabrication equipment and is staffed with an experienced team of engineers and technicians. Precision Process has designed and installed reel-to-reel selective electroplating systems worldwide.

Precious Plate's commitment to quality is based on the principles and procedures of ISO 9001:2008 and TS 16949:2009 quality management standards. Precious Plate is proud of being certified to both. Its performance has been recognized by numerous awards of excellence and supplier certifications from world class corporations. Precious Plate's team is committed to the concept of continuous improvement in all aspects of its business including strategic partnerships with customers and suppliers.

Results of the 2012 Election of Officers and Slate of Officers for 2013

Fernando Garzon
President

The ECS Tellers of Election have announced the results of the 2012 election of Society officers, with the following persons elected: President—**Fernando Garzon**, Los Alamos National Laboratory; Vice-President—**Daniel Scherson**, Case Western Reserve University; and Secretary—**Hariklia Deligianni**, IBM Corporation. The terms of **Tetsuya Osaka** (Vice-President), **Paul Kohl** (Vice-President), and **Christina Bock** (Treasurer) were unaffected by this election.

At the Board of Directors meeting in Seattle, Washington, USA, on May 10, 2012, members of the Board voted to approve the slate of candidates recommended by the ECS Nominating Committee. The slate of candidates for the next election of ECS officers, to be held in January-February 2013, include: for President—**Tetsuya Osaka**; for Vice-President (one to be elected)—**Krishnan Rajeshwar** and **Jerzy Ruzyllo**. Full biographies and candidate statements will appear in the winter 2012 issue of *Interface*.

Daniel Scherson
Vice-President

Have you moved or are you planning to move?

Please take a moment to fill out this form with your updated contact information and return it to ECS.
(The Electrochemical Society, 65 South Main Street, Building D, Pennington, NJ, 08534-2839, USA)

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New address

Organization _____

Address _____

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State/Province _____

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ECS Division Contacts

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Bor Yann Liaw, Vice-Chair
Robert Kostecki, Secretary
Christopher Johnson, Treasurer

Corrosion

Douglas Hansen, Chair
University of Dayton Research Institute
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Shinji Fujimoto, Vice-Chair
R. Scott Lillard, Secretary/Treasurer

Dielectric Science and Technology

Oana Leonte, Chair
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Dolf Landheer, Vice-Chair
Peter Mascher, Secretary
Yaw Obeng, Treasurer

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Elizabeth Podlaha-Murphy, Vice-Chair
Stanko Brankovic, Secretary
Philippe Vereecken, Treasurer

Electronics and Photonics

Pablo Chang, Chair
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Fan Ren, 2nd Vice-Chair
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Luis Echegoyen, Vice-Chair
Slava V. Rotkin, Secretary
Dirk Guldi, Treasurer

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Mekki Bayachou, Vice-Chair
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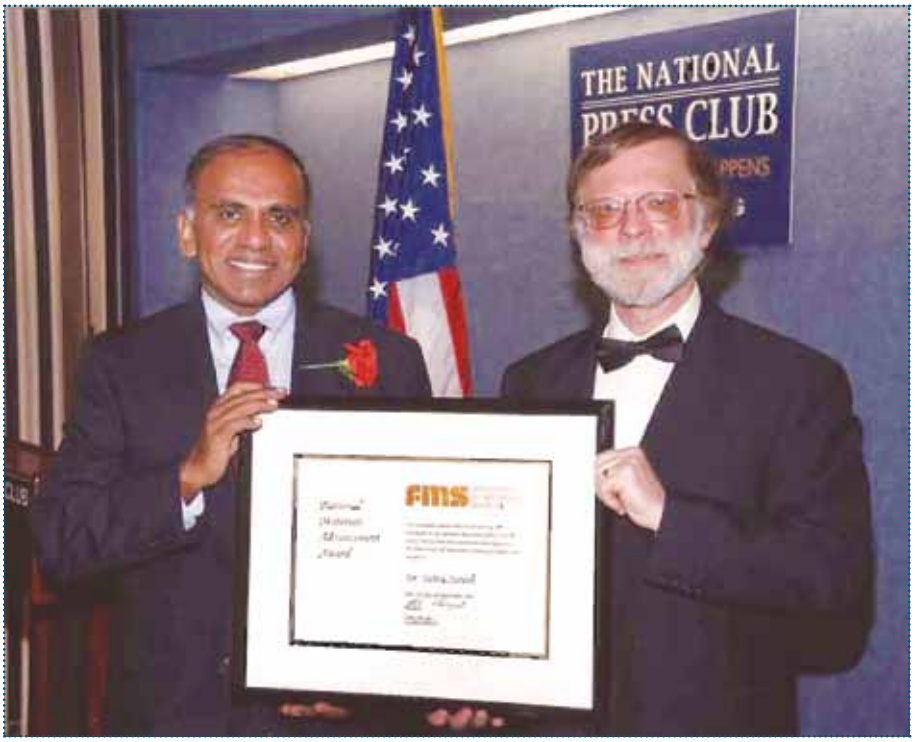
Sensor

Zoraida Aguilar, Chair
Ocean Nano Tech, LLC
zapaguilar@yahoo.com • 479.571.5500 (USA)

Michael Carter, Vice-Chair
Bryan Chin, Secretary
Nianqiang (Nick) Wu, Treasurer

Subra Suresh Receives FMS National Materials Advancement Award



Subra Suresh *(left) received the FMS National Materials Advancement Award from* **Petr Vanýsek**, *FMS President.*

Subra Suresh, Director of the National Science Foundation, received the National Materials Advancement Award of the Federation of Materials Societies (FMS) at a reception in December at the National Press Club.

The National Materials Advancement Award, now in its 27th year, is presented to recognize individuals who have demonstrated outstanding capabilities and contributions in: advancing the multi-disciplinary field of materials science and national engineering; the effective and economic use of materials in the marketplace and the application of materials developments to national problems and defense; and the development and implementation of national policy which furthers the impact of materials sciences and engineering on our society.

ECS is a member of FMS, which is an umbrella organization whose member societies and affiliates represent the professional societies, universities, and National Research Council organizations involved with materials science, engineering ,and technology. FMS constituent societies have more than 700,000 individual members.

Dr. Suresh became the 13th director of the National Science Foundation in October 2010. Prior to his confirmation as NSF Director, Dr. Suresh served as Dean of Engineering and the Vannevar Bush Professor of Engineering at the Massachusetts Institute of Technology. During his more than 30 years as a practicing engineer, he held joint faculty positions in four departments at MIT as well as appointments at the University of California at Berkeley, Lawrence Berkeley National Laboratory, and Brown University.

A mechanical engineer interested in materials science and biology, Dr. Suresh pioneered research to understand the mechanical properties of materials. His most recent research tackled the biomechanics of red blood cells under the influence of diseases such as malaria. In 2006, *Technology Review* magazine selected Dr. Suresh's work on nanobiomechanics as one of the top ten emerging technologies that "will have a significant impact on business, medicine or culture."

Dr. Suresh is committed to increasing the number of women and minority engineers. He has received many prestigious awards for his innovative research and commitment to improving engineering around the world. He has been elected a fellow or honorary fellow of all the major societies in the United States and India. The author of more than 230 research articles in international journals and co-inventor in more than 18 U.S. and international patent applications, he is author or co-author of several books that are widely used in materials science and engineering and has consulted with more than 20 international corporations and research laboratories and served as a member of several international advisory panels and nonprofit groups.

Dr. Suresh has been elected to the National Academy of Engineering, American Academy of Arts and Sciences, Spanish Royal Academy of Sciences, German National Academy of Sciences, Academy of Sciences of the Developing World, Indian National Academy of Engineering, and Indian Academy of Sciences. He earned his bachelor's degree from the Indian Institute of Technology in Madras, his master's from Iowa State University, and his doctorate from MIT.

New Division Officers

New officers for the 2012-2014 term have been elected for the following Divisions.

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Vice-Chair
Dolf Landheer, National Research Council-Canada
Secretary
Peter Mascher, McMaster University
Treasurer
Yaw Obeng, NIST
Awards Chair
Vimal Desai Chaitanya, New Mexico State University
Symposium Chair
Ana Londergan, Qualcomm MEMS Technologies
Membership Chair
Purushothaman Srinivasan, Texas Instruments, Inc.
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Sacharia Albin, Norfolk State University
Charles Arvin, IBM Corporation
Gautam Banerjee, Air Products
William Brown, University of Arkansas
Uros Cvelbar, Jozef Stefan Institute
Stefan De Gendt, IMEC
John Flake, Louisiana State University
Reenu Garg, International Rectifier
Dennis Hess, Georgia Institute of Technology
Michel Houssa, University of Leuven
Hiroshi Iwai, Tokyo Institute of Technology
P.C. Joshi, Oak Ridge National Laboratory
Samares Kar, Indian Institute of Technology
Zia Karim, Aixtron
Paul Kohl, Georgia Institute of Technology
G. Swami Mathad, S/C Tech Consulting USA
Durgamadhab Misra, New Jersey Institute of Technology
Hazara S. Rathore
R. Ekwal Sah, Fraunhofer-Institut
Sudipta Seal, University of Central Florida
Krishna Shenai, University of Toledo
Mahendra Sunkara
John Susko
Robin Susko
Ravi Todi, IBM Corporation
Katalin Voros, University of California, Berkeley

Fullerenes, Nanotubes, and Carbon Nanostructures Division

Chair
R. Bruce Weisman, Rice University
Vice-Chair
Luis Echegoyen, University of Texas-El-Paso
Secretary
Slava V. Rotkin, Lehigh University
Treasurer
Dirk Guldi, University of Erlangen-Nürnberg
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Francis D'Souza, Wichita State University
Shunichi Fukuzumi, Osaka University
Karl M. Kadish, University of Houston
Prashant Kamat, University of Notre Dame
Nazario Martin, Universidad Complutense de Madrid
Jean-François Nierengarten, Laboratoire de Chimie de Coordination
Maurizio Prato, University of Trieste
David Schuster, New York University
Lon Wilson, Rice University

Industrial Electrochemistry & Electrochemical Engineering Division

Chair
Gerardine Botte, Ohio University
Vice-Chair
Venkat Subramanian, Washington University in St. Louis
Secretary/Treasurer
E. Jennings Taylor, Faraday Technologies, Inc.
Members-at-Large
Trung van Nguyen, University of Kansas
John Weidner, University of South Carolina
Richard Wycisk, Vanderbilt University
Peter Pintauro, Vanderbilt University
James M. Fenton, University of Central Florida/Florida Solar Energy Center
Robert Savinell, Case Western Reserve University
John Staser, University of South Carolina

Due to vacancies in the Executive Committee, the following divisions have established new leadership in accordance with their bylaws, to finish terms until their next scheduled elections in 2013.

Electrodeposition Division

Chair
Giovanni Zangari, University of Virginia
Vice-Chair
Elizabeth Podlaha-Murphy, Northeastern University
Secretary
Stanko Brankovic, University of Houston
Treasurer
Philippe Vereecken, IMEC
Members-at-Large
Natasa Vasiljevic, University of Bristol
Xiaoyan (Ingrid) Shao, IBM Corporation

Organic & Biological Electrochemistry Division

Chair
James Burgess, Case Western Reserve University
Vice-Chair
Mekki Bayachou, Cleveland State University
Secretary/Treasurer
Graham Cheek, United States Naval Academy
Members-at-Large
David Cliffel, Vanderbilt University
Toshio Fuchigami, Tokyo Institute of Technology
Chang Ji, Texas State University-San Marcos
Christine Kranz, University of Ulm
Donal Leech, National University of Ireland
Flavio Maran, University of Padova
Kevin Moeller, Washington University
Ikuzo Nishiguchi, JST, Satellite Niigata
James Rusling, University of Connecticut
Dennis Peters, Indiana University
Hideo Tanaka, Okayama University
Richard West, Case Western Reserve University

2012-2013 ECS Committees

Executive Committee of the Board of Directors

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Tetsuya Osaka ... *Senior Vice-President*, Spring 2013
Paul Kohl ... *Second Vice-President*, Spring 2014
Daniel Scherson ... *Third Vice-President*, Spring 2015
Hariklia Deligianni ... ***Secretary***, Spring 2016
Christina Bock ... *Treasurer*, Spring 2014

Board of Directors, Presidential Appointment

Lloyd George ... Spring 2013

Audit Committee

Peter Fedkiw, Chair ... Spring 2014
John Susko ... Spring 2013
Petr Vanýsek ... Spring 2014
Paul Natishan ... Spring 2015
Lloyd George ... *Nonprofit Financial Professional*, Spring 2013

Education Committee

Jeffrey Fergus, Chair ... Spring 2013
Jeremy Meyers ... Spring 2013
Al Barnes ... Spring 2013
Vimal Chaitanya Desai ... Spring 2014
Jeff Long ... Spring 2014
Randy Leising ... Spring 2015
Chris Apblett ... Spring 2015
Kalpathy Sundaram ... Spring 2016
Mark Orazem ... Spring 2016
Daniel Scherson ... *Third Vice-President*, Spring 2013
Kevin Rhodes ... *Chair, Individual Membership Committee*, Spring 2013

Finance Committee

Christina Bock, Chair ... *Treasurer*, Spring 2014
Vijay Ramani ... Spring 2013
Pete Peterson ... Spring 2013
Nancy Missert ... Spring 2014
Elizabeth Opila ... Spring 2014
Tetsuya Osaka ... *Senior Vice-President*, Spring 2013
Hariklia Deligianni ... *Secretary*, Spring 2016

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Enrico Traversa ... Spring 2013
Gerald Frankel ... Spring 2013
Gerardine Botte ... Spring 2013
Ralph White ... Spring 2014
D. Noel Buckley ... Spring 2014
Richard Alkire ... Spring 2014
Kalpathy Sundaram ... Spring 2015
Paul Natishan ... Spring 2015
Peter Pintauro ... Spring 2015
Jean St-Pierre ... Spring 2016
Durga Misra ... Spring 2016
Masayoshi Watanabe ... Spring 2016
Fernando Garzon ... *President*, Spring 2013

Individual Membership Committee

Kevin Rhodes, Chair ... Spring 2013
Rick Wise ... Spring 2013
Scott Lillard ... Spring 2013
Steve Maldonado ... Spring 2014
Robert Savinell ... Spring 2014
David P. Huang ... Spring 2015
Parag Banarjee ... Spring 2015
Hariklia Deligianni ... *Secretary*, Spring 2016

Nominating Committee

Esther Takeuchi ... *Immediate Past President*, Spring 2013
Paul Natishan ... Spring 2013
Barry MacDougall ... Spring 2013
D. Noel Buckley ... Spring 2013
Daniel Scherson ... *Third Vice-President*, Spring 2013

Sponsorship Committee

E. Jennings Taylor, Chair ... Spring 2013
Hubert Gasteiger ... Spring 2013
Luis F. Garfias-Mesias ... Spring 2013
Curt Holmes ... Spring 2013
Rob Sides ... Spring 2014
Michael Kubicsko ... Spring 2014
Ana Londergan ... Spring 2014
Bill Eggers ... Spring 2015
William Brown ... Spring 2015
Paul Trulove ... Spring 2015
Fernando Garzon ... *President*, Spring 2013
Christina Bock ... *Treasurer*, Spring 2014
Roque J. Calvo ... *ex officio-nonvoting, Term as Executive Director*
Jean St-Pierre ... *from defunct Development Committee*, Spring 2013
Viola Birss ... *from defunct Development Committee*, Spring 2013

Technical Affairs Committee

Tetsuya Osaka, Chair ... *Senior Vice-President*, Spring 2013
Fernando Garzon ... *President*, Spring 2013
Esther Takeuchi ... *Immediate Past President*, Spring 2013
William Brown ... *2nd Immediate Past President*, Spring 2013
Daniel Scherson ... *Chair, Symposium Subcommittee*, Spring 2013
Paul Kohl ... *Chair, Publications Subcommittee*, Spring 2013
Eric Wachsman ... *Chair, New Technology Subcommittee*, Spring 2013

Tellers of Election

Norman Goldsmith, Chair ... Spring 2013
Robert Comizzoli ... Spring 2013
Ronald Enstrom ... Spring 2013
William Ayers ... *Alternate*, Spring 2013
Craig Arnold ... *Alternate*, Spring 2013
James Amick ... *Alternate*, Spring 2013

Ways and Means Committee

Hariklia Deligianni, Chair ... *Secretary*, Spring 2012
Peter Pintauro ... Spring 2013
Nancy Dudney ... Spring 2013
Robert Glass ... Spring 2014
Petr Vanýsek ... Spring 2014
Tetsuya Osaka ... *Senior Vice-President*, Spring 2013
Paul Kohl ... *Second Vice-President*, Spring 2013

Career Development Subcommittee

Jeremy Meyers, Chair ... Spring 2013
Jeffrey Fergus ... *Chair, Education Committee*, Spring 2013
Paul Kohl ... *Second Vice-President*, Spring 2013
Hariklia Deligianni ... *Secretary*, Spring 2013

Development Subcommittee

William Brown, Chair ... Spring 2013
Bruno Scrosati ... Spring 2013
E. Jennings Taylor ... *Chair, Sponsorship Committee*, Spring 2013
Petr Vanýsek ... Spring 2013
Tetsuya Osaka ... *Senior Vice-President*, Spring 2013
Roque J. Calvo ... *Term as Executive Director*

Fuel Cells Subcommittee

Hubert Gasteiger, Chair ... *High Temperature Materials Division*, Spring 2013
Trung Nguyen ... *Industrial Electrochemistry and Electrochemical Engineering Division*, Spring 2013
Thomas Fuller ... *Battery Division*, Spring 2013
Eric Wachsman ... *High Temperature Materials Division*, Spring 2013
Prashant Kamat ... *Fullerenes, Nanotubes, and Carbon Nanostructures Division*, Spring 2013
Thomas Zawodzinski ... *Physical and Analytical Electrochemistry Division*, Spring 2013
James Fenton ... *Energy Technology Division*, Spring 2013
Claude Lamy ... *Energy Technology Division*, Spring 2013
Christina Bock ... *Energy Technology Division*, Spring 2013
Ernesto Gonzalez ... *Energy Technology Division*, Spring 2013

New Technology Subcommittee

Eric Wachsman, Chair ... *High Temperature Materials Division*, Spring 2013
Huyen Ngoc Dinh ... *Energy Technology Division*, Spring 2013
Earl William Mustain ... *Energy Technology Division*, Spring 2013
Rachid Yazami ... *Battery Division*, Spring 2013
Jim Burgess ... *Organic and Biological Electrochemistry Division*, Spring 2013
Uwe Happek ... *Luminescence and Display Materials Division*, Spring 2014
Rick Wise ... *Electronics and Photonics Division*, Spring 2014
Xiao-Dong Zhou ... *High Temperature Materials Division*, Spring 2014
Ana Londergan ... *Dielectric Science and Technology Division*, Spring 2014
Joseph Stetter ... *Sensor Division*, Spring 2015
Shelley Minteer ... *Physical and Analytical Electrochemistry Division*, Spring 2015
Vijay Ramani ... *Industrial Electrochemistry and Electrochemical Engineering Division*, Spring 2015
Prashant Kamat ... *Fullerenes, Nanotubes, and Carbon Nanostructures Division*, Spring 2015

Publications Subcommittee

Paul Kohl, Chair ... *Second Vice-President*, Spring 2013
Petr Vanýsek ... *EST Board Chair* to 9/30/2012
Krishnan Rajeshwar ... *Interface Editor* to 5/31/2013
Dennis W. Hess ... *SSST Board Chair* to 9/30/2013
John Weidner ... *ECS Transactions Editor* to 12/31/2012
Mary E. Yess ... *Term as Publisher*
Alanah Fitch ... Spring 2013
Jerzy Ruzyllo ... Spring 2013
Subhash C. Singhal ... Spring 2014
Johna Leddy ... Spring 2014
Hariklia Deligianni ... *Secretary*, Spring 2016
Don Roeper ... *from defunct Publication Committee*, Spring 2013
Rangachary Mukundan ... *from prior Technical Affairs Committee*, Spring 2013
David Lockwood ... *from prior Technical Affairs Committee*, Spring 2013

Symposium Subcommittee

Daniel Scherson, Chair ... *Third Vice President*, Spring 2013
Arumugam Manthiram ... *Chair, Battery Division*, Fall 2012
Doug Hansen ... *Chair, Corrosion Division*, Fall 2012
Oana Leonte ... *Chair, Dielectric Science and Technology Division*, Spring 2014
Giovanni Zangari ... *Chair, Electrodeposition Division*, Fall 2013
Pablo Chang ... *Chair, Electronics and Photonics Division*, Spring 2013
Jean St-Pierre ... *Chair, Energy Technology Division*, Spring 2013
Bruce Weisman ... *Chair, Fullerenes, Nanotubes, and Carbon Nanostructures Division*, Spring 2014
Jeffrey Fergus ... *Chair, High Temperature Materials Division*, Fall 2013
Gerardine Botte ... *Chair, Industrial Electrochemistry and Electrochemical Engineering Division*, Spring 2014
John Collins ... *Chair, Luminescence and Display Materials Division*, Fall 2013
James Burgess ... *Chair, Organic and Biological Electrochemistry Division*, Spring 2013
Shelley Minteer ... *Chair, Physical and Analytical Electrochemistry Division*, Spring 2013
Zoraida Aguilar ... *Chair, Sensor Division*, Fall 2012
Eric Wachsman ... *Chair, New Technology Subcommittee*, Spring 2013

Society Historian

Forrest A. Trumbore ... Spring 2013

Representatives to Other Societies

American Association for the Advancement of Science
- Roque J. Calvo ... *Term as Executive Director*

Chemical Heritage Foundation
- Kathryn R. Bullock ... *Heritage Councilor*, Spring 2013

Federation of Materials Societies
- Petr Vanýsek ... *Trustee*, Spring 2013
- Patrick Moran ... *Alternate*, Spring 2013
- Roque J. Calvo ... *Advisory Board, Term as Executive Director*

National Inventors Hall of Fame
- Peter Hesketh ... *Chair, Honors & Awards Committee*, Spring 2016

ECS Awarded Google Grant Valued at $120,000 per Year

ECS has been awarded a Google Grant, comparable to $120,000 worth of online advertising, through the Google AdWords program. The grant will automatically renew each year. ECS will use the award to encourage interest in many aspects of the Society—such as the Society's Summer Fellowship programs, travel grants, career development programs, and student awards, among many other efforts—as well as introduce Redcat (redcatresearch.org) to our community.

Google Grants is a part of the Google for Nonprofits initiative. Launched in 2003, Google Grants now empowers over 6,000 organizations to achieve their goals by helping them promote their websites. The program helps nonprofits use Google AdWords to reach those who are searching for information relevant to their organization and fields of study. Organizations that receive a Google Grant are awarded an in-kind online advertising stipend that can be used it in a variety of ways, including general outreach, fundraising activities, and recruitment of volunteers.

This Google grant will help ECS in fulfilling its mission, which is to disseminate research and education in the fields of electrochemistry and solid state science and technology.