Frankenthal Receives Acheson Award

Robert P. Frankenthal, the ECS 2008 Edward Goodrich Acheson awardee, was unable to come to Hawaii last October to receive the Medal, so the Medal came to him at a special luncheon a month later. (**Ed. Note**: See *Interface*, winter 2008, p. 10, for the story about Dr. Frankenthal and his award address.) Dr. Frankenthal is shown here (at right) receiving the award from ECS Vice-President **Paul Natishan**.

ECS Welcomes New Staff

Jennifer Tripp joined the ECS staff as the Associate Director of Human Resources in June of 2008. Jen graduated from the University of Hartford (Connecticut) with a Bachelor's degree in Communication, with an emphasis on Interpersonal Skills and a minor in English. Prior to joining ECS she worked for a distribution company managing the human resources department where she was responsible for recruitment, benefits, employee reviews, payroll, and many other human resource functions.

Prior to her employment with the distribution company, Jen has worked in the staffing agency industry for many years as a staffing specialist, working her way up to a branch manager. At this level, she took on the responsibility of the sales and retention for the branch office, managed her recruiters to fulfill their staffing responsibilities, while maintaining an excellent rapport with her colleagues, clients, and employees. She looks forward to learning the many new roles she has taken on at ECS, including working with several committees, Divisions, and assisting with the awards program.

Executive Director Roque Calvo said, "I look forward to working with Jen to assure that ECS continues to develop talented, resourceful, and highly motivated volunteer leaders and staff."

Division News

Division Officer Slates Announced

New officers for the 2009-2011 term have been nominated for the following Divisions. All election results will be reported in the summer 2009 issue of *Interface*.

Electronics & Photonics Division

Chair
Yue Kuo, Texas A&M University
First Vice-Chair
Ping-Chih (Pablo) Chang, Northrop Grumman
Second Vice-Chair
Bernd Kolbesen, J. W. Goethe University
Secretary
Andrew Hoff, University of South Florida
Treasurer
Fan Ren, University of Florida
Members-at-Large
Albert Baca, Sandia National Laboratories
Helmut Baumgart, Old Dominion University
D. Noel Buckley, University of Limerick
George Celler, SOITEC
Cor Claeys, IMEC
Sorin Cristoloveanu, IMEP-INPG-Minatec
Stefan De Gendt, IMEC
M. Jamal Deen, McMaster University
Manfred Engelhardt, Qimonda
Brent Gila, University of Florida
Ulrich Goesele, Max Planck Institute
David Harame, IBM Corp.
Takeshi Hattori, Sony retired
Dennis Hess, Georgia Tech
Howard Huff, SEMATECH retired
Hiroshi Iwai, Tokyo Institute of Technology
Hisham Massoud, Duke University
Paul Mertens, IMEC
Durgamadhab Misra, New Jersey Institute of Technology
Junichi Murota, Tohoku University
Colm O'Dwyer, University of Limerick
Gerald Oleszek, GMO Enterprises, Inc.
Carlton Osburn, North Carolina State University
Mark Overberg, Sandia National Laboratories
Fred Roozeboom, NXP Research
George Rozgonyi, North Carolina State University
Jerzy Ruzyllo, Pennsylvania State University
Kenji Shiojima, University of Fukui
Edward Stokes, University of North Carolina
Tadatomo Suga, University of Tokyo
Ravi Todi, IBM Corp.
Masaharu Watanabe, SEZ Japan Inc.
Jennifer Wang, Northrop Grumman
Jian Xu, Pennsylvania State University

Energy Technology Division

Chair
S. R. Narayanan, JPL-NASA
Vice-Chair
Jean St-Pierre, University of South Carolina
Secretary
Jeremy Meyers, University of Texas at Austin
Treasurer
Jim P. Zheng, Florida A&M University

Organic & Biological Electrochemistry

Chair
Albert J. Fry, Wesleyan University
Vice-Chair
James D. Burgess, Case Western Reserve University
Secretary-Treasurer
Jun-ichi Yoshia, Kyoto University

Physical & Analytical Electrochemistry Division

Chair
Paul Trulove, U.S. Naval Academy
Vice-Chair
Shelley Minteer, Saint Louis University
Secretary
Robert Mantz, U.S. Army Research Office
Treasurer
Pawel Kulesza, University of Warsaw
Members-at-Large
Pawel Kulesza, University of Warsaw
Robert Mantz, U.S. Army Research Office
Shahzada Ahmad, Max Planck Institute for Polymer Research
Andrew C. Hillier, Iowa State University
Michael J. Kelly, Sandia National Laboratories
Ian Suni, Clarkson University
Vincent Vivier, Laboratoire Interfaces et Systèmes Electrochimiques
Shaowei Chen, University of California at Santa Cruz
Alanah Fitch, Loyola University
David E. Cliffel, Vanderbilt University
Svetlana Mitrovski, Eastern Illinois University
Mark R. Anderson, University of Colorado at Denver
Wesley Henderson, North Carolina State University
Petr Vanýsek, Northern Illinois University
Serge Cosnier, CNRS and Joseph Fourier University of Grenoble
Marcelle Gaune-Escard, Ecole Polytechnique, CNRS
Stanley Bruckenstein, SUNY Buffalo

PEM Fuel Cells Symposium Presents Outstanding Student Paper Awards

At the PRiME 2008 meeting in Honolulu, Hawaii in October 2008, the Physical and Analytical Electrochemistry, Energy Technology, and the Industrial Electrolysis and Electrochemical Engineering Divisions hosted the **Proton Exchange Membrane Fuel Cells Symposium**. It was organized by T. F. Fuller, S. Cleghorn, H. A. Gasteiger, M. Inaba, C. Lamy, S. Mitsushima, H. Nakagawa, V. Ramani, K. Shinohara, P. Shirvanian, P. Strasser, H. Uchida, and T. Zawodzinski. Since its inception in 1995, the PEMFC symposium has continued to grow and 2008 was the largest to date with well over 370 invited and contributed talks and posters. The symposium was held over five full days with parallel sessions focused on fuel cell systems, cell stack and component hardware, durability, new materials and electrode processes, and direct fuel cells.

There was generous support for this symposium by the four sponsoring ECS Divisions (Energy Technology, Industrial Electrochemistry and Electrochemical Engineering, Physical and Analytical Electrochemistry, and Battery), as well as the Fuel Cell Association of The Electrochemical Society of Japan. The symposium was also generously supported by many industrial sponsors, including Acta S.p.A., Asahi Glass Company, Asahi Kasei Corporation, Eneos Celltech, Fuji Electric Advanced Technology Co., Honda Research Institute, Nissan Motor Co., Tanaka Kikinzoku Kogyo, Tokuyama Corporation, Toshiba Fuel Cell Power Corporation, Toyota Motor Engineering & Manufacturing North America, Umicore, and UTC Fuel Cells. The funding allowed for the support of 14 student travel grants of $500 each. In addition, outstanding student/postdoc presentation awards of $500 were made to the following people in each of the three topic areas.

Kevin Gallagher, of Georgia Institute of Technology, awarded for his paper in the cell systems, cell stack, and component hardware section. This paper was co-authored by Tom Fuller (Georgia Institute of Technology) and was entitled, "Electro-osmotic Drag Coefficient and Water Uptake in Polymer Electrolytes in Equilibrium with Water Vapor at Low Temperatures."

Shirlaine Koh, of the University of Houston, awarded for her paper in the new materials and electrode processes section. This paper was co-authored by C. Yu (University of Houston), M. Toney (SLAC), and P. Strasser (University of Houston), and was entitled, "Effects of Compositions, Annealing Conditions, and Lattice Strain on Catalytic Oxygen Reduction Activities of Pt-Cu Nanoparticles."

Panagiotis Trogadas, of Illinois Institute of Technology, awarded for his paper in the durability section. This paper was co-authored by J. Parrondo (University of the Basque Country), and V. Ramani (Illinois Institute of Technology), and was entitled, "Degradation Mitigation in Polymer Electrolyte Membranes Using Free Radical Scavengers."

L. Arnadottir, of the University of Washington, awarded for a paper in the direct fuel cells section. The paper was co-authored by H. Jónsson (University of Iceland) and E. M. Stuve (University of Washington), and was entitled, "The Effect of Co-adsorbed Water on the Stability and Configuration of Formyl (HCO) and Hydroxymethylidyne (COH) Intermediates on Pt(111): A Density Functional Theory Study."

Corporate Member News

Panasonic

Spotlight on Panasonic

This quarter we would like to focus on one of our loyal meeting sponsors and sixteen-year corporate member, the **Panasonic Corporation**. Matsushita Battery Industrial was merged into Panasonic Corporation and the new Energy Company started afresh as an internal divisional company of Panasonic Corporation in October 2008, the year of the Corporation's 90th anniversary. Panasonic Corporation Energy Company is in charge of energy business, whose markets are promising, with substantial growth expected. The expansion of the energy market is accelerating globally. Energy Company will play an important role in the future growth of the Panasonic Group, toward its goal of attaining "Global Excellence."

The Energy Company will develop and propose products and services that satisfy individual customer's demands and expectations, which will include more advanced dry batteries, safer high-energy batteries that respond to the ever-evolving performance of mobile devices, environmentally-friendly batteries, such as power supplies for hybrid electric vehicles, and others.

New Corporate Members

In the face of growing economic uncertainty, the number of companies supporting ECS and enjoying the benefits of corporate membership continues to grow with fifteen new partners joining over the last part of 2008. Our newest corporate members include: Gelest Inc. at the Benefactor level; ENER1 and Eneos Celltech at the Patron level; Acta SpA, Asahi Kasei Chemicals Corporation, BASF Fuel Cell, Chemtall GmbH, fortu Research, Semitool, Tokuyama Corporation, Toyota Motor Engineering and Manufacturing North America,

Umicore, and VIOX Corporation all at the Sponsoring level; and Next Energy and the National Research Institute for Electrical Engineering (Romania) at the Sustaining level. In addition to our new partners, Saft Batteries upgraded its membership to the Benefactor level as did Occidental Chemical Corporation, which moved up to the Sponsoring level.

Gelest Inc., headquartered in Morrisville, PA, is recognized worldwide as an innovator, manufacturer, and supplier of commercial and research quantities of organosilicon, metal-organic compounds, and silicones. Gelest serves advanced technology markets through a materials science driven approach. The company provides focused technical development, application support, and manufactures molecular materials that enable nanotechnology through surface modification to include adhesion, reactivity, bioactivity, electro-optic coatings, anti-sticktion, and dielectrics for industrial applications in displays, optics, telecommunications, microelectronics, optoelectronics, energy, biotech, health science, consumer goods, and personal care. View the company's website, at www.gelest.com, to explore silicon, germanium, tin, lead, titanium, zirconium, hafnium, and other compounds that will enable your technology.

Acta, an Italian corporation, founded in 2004 and listed on AIM in October 2005, was created to exploit a breakthroughs in catalyst technology. With its laboratory and pilot plant facility in Tuscany, Italy, Acta has more than forty staff focused on the development and manufacture of catalysts for the renewable energy, clean tech, and industrial catalyst sectors. With a growing product and intellectual property portfolio, Acta is well positioned to offer unique catalyst, electrode, MEA (Membrane Electrode Assembly), and system design know-how to its customers.

BASF is the world's leading chemical company, with a portfolio ranging from chemicals, plastics, performance products, agricultural products, and fine chemicals to crude oil and natural gas. A member of the BASF Group, **BASF Fuel Cell** has expertise and market strength in all materials-based components for fuel cells such as the Selectra® line of electrochemical and reformer catalysts, ELAT® gas diffusion media and gas diffusion electrodes, Celtec® high temperature MEAs, and low temperature membrane electrode assemblies. The company also offers precious metal management and recovery services.

Next Energy (EWE-Forschungs-zentrum für Energietechnologie e.V.) is an independent "An-lnstitut" located at Oldenburg in Germany, which supported by both the EWE Group and the University of Oldenburg. As a non-profit association, the company does research for the direct benefit of regional, national, and international companies and for the benefit of society at large. The focus of the research works are the focal points of renewable energies, energy efficiency, and the storage of energy. With this background, Next Energy develops materials, components, systems, and production techniques in the following three areas: photovoltaics, fuel cells, and storage batteries.

The Tokuyama Group consists of parent company **Tokuyama Corporation**, 48 subsidiaries, and 40 affiliates. The Group is producing and selling mainly chemical products such as soda ash and caustic soda, vinyl chloride monomer/polymers, film products, fine chemicals, medical materials, electronics materials, cement, ion exchange membranes, and more, as well as providing services related to those products. One of the fast-growing products in recent years is high purity polycrystalline silicon (polysilicon), which is used to produce semiconductor integrated circuits and solar cells. Tokuyama's polysilicon production capacity ranks first in Japan and second in the world.

Corporate membership is a relationship of great mutual benefit to both member organizations and ECS. As a corporate member, your organization can receive: online access to current and archived content in both of ECS's serial publications, the *Journal of The Electrochemical Society* and *Electrochemical and Solid-State Letters* for company facilities; complimentary individual memberships; free meeting registra-tions to our biannual events, which attract upward of 3,500 scientists each year; subscriptions to ECS's two highly rated journals and the quarterly, *Interface*; recognition throughout ECS's website publications; and much more.

Siegfried Hecker Receives National Materials Advancement Award

Siegfried Hecker received the 2008 National Materials Advancement Award from the Federation of Materials Societies (FMS). Dr. Hecker is Co-Director of the Center for International Security and Cooperation at Stanford University, and emeritus director of the Los Alamos National Laboratory. His research interests include plutonium science, nuclear weapons policy and international security, nonproliferation and counter-terrorism, and cooperative nuclear threat reduction. Over the past 15 years, he has fostered cooperation with the Russian nuclear laboratories to secure and safeguard the vast stockpile of ex-Soviet fissile materials.

Among his professional distinctions, Dr. Hecker is a member of the National Academy of Engineering, a Fellow of both ASM International and TaMS, and an honorary member of the American Ceramic Society. He received the Alumni Association Gold Medal and the Undergraduate Distinguished Alumni Award from Case Western Reserve University, where he earned his BS, MS, and PhD in metallurgy. Most recently, Dr. Hecker was honored with the Los Alamos Medal, the highest honor the Laboratory can bestow on an individual.

The FMS National Materials Advancement Award "recognizes individuals who have demonstrated outstanding capabilities in advancing the multi-disciplinary field of materials science and engineering; the effective and economic use of materials in the marketplace and the application of materials development to national defense; and the development and implementation of national policy, which furthers the impact of materials sciences and engineering on our society."

ECS members who have received the award include: Morris Cohen, Institute Professor Emeritus, MIT (1988); Lyle H. Schwartz, Director of Materials Science and Engineering Laboratory at the National Institute of Standards and Technology (1993); Robert Baboian, retired, Fellow of Texas Instruments (1998); and Jerry M. Woodall, the Barry M. and Patricia L. Epstein Distinguished Professor of Electrical and Computer Engineering at Purdue University (2002).

FMS, of which ECS is a founding member, is a consortium of technical and professional societies and associations whose constituencies include scientists, engineers, and other professionals active in the areas of materials policy as well as R&D, processing, manufacturing, recovery, and resource availability. On the web at www.materialsocieties.org.

Letters to the Editor

Dear Editor:

I must congratulate you on your choice of both topics and authors, especially the lead article by S. R. Narayan and also for *Interface* (winter 2008) to recognize the changes we must make, first their recognition, then as the title of the lead article. As you will surmise from this letter, I am very much in favor of the theme of Dr. Narayan's paper. I wish to add essentially as a codicil to it that what is also needed besides these green energy generating systems is an efficient energy storage system.

In the case of solar energy in any of its type of generation, the maximum time of generation occurs once every 24 hours when the sun is directly overhead. If there were not two wide oceans separating the Western and Eastern Hemisphere's land masses, it would be a simple thing to add the energy to a world-wide grid so that the times of greatest generation of power could be shunted forward or back ward to coincide with local need. But, without a world-wide power grid, we need an efficient energy storage system. Since all of the systems, solar cells, tidal energy, even wind energy to an uncertain extent have a diurnal variation, the need is acute and almost universal among them.

The ingenuity of engineers has found many ways of storing energy such as pumping water up to a reservoir, air down an old mine, electrolyzing water and storing the gas and on a smaller scale batteries. If we go to large scale variable energy generating systems the smoothing systems need to be efficient because having endured the less than total efficiency of generation at considerable expense it would be foolhardy to waste some in an inefficient energy storage system, yet in rechargeable batteries with high internal impedance we are doing just that. If the plug-in hybrid or pure EV arrives in quantity with battery packs that waste up to 28% of the energy presented in electrolyte resistance and then another 28% on discharge, the wastage is large, about half that in internal combustion engines and our progress is only half a step forward.

Sincerely,

Robert N. O'Brien
Professor Emeritus, U. of Victoria

Dear Editor:

I had to remind myself that I was not holding "World Oil Magazine" while reading your editorial "Red, Blue or Green?" I must say I am dismayed to read your support for liquid fuel research as a means to energy security when electrochemistry is the solution. As for processing bitumen, Canada has created some wealth and employment by developing the tar sands, but at huge cost. Pollution from extracting tar sands oil far exceeds that for conventional oil. A surface mining process is used and an area approaching the size of the State of Florida is being strip mined to get access to the tar sands. It is not well known, but the largest dam in the world is not the Three Gorges Dam in China, but a tailings waste pond in the Alberta Tar Sands. You are correct in asserting that vast amounts of water are used in the process, but also huge amounts of natural gas, one of the cleanest burning fuels available. By promoting tar sands development, Canada is in effect turning gold into lead. The energy, environmental and social ills associated with the production of oil from tar sands are covered in detail in the book "Tar Sands" by Andrew Nikiforuk.

Coal-to-liquids (CTL) is viable when coal is abundant and oil supplies are scarce. This was the case in pre-Second World War Germany and apartheid South Africa (during the economic sanctions), and both regimes perfected the technology. Pollution from producing CTL fuel is about twice that for conventional oil. We are certainly in desperate times to be embracing CTL technology. The coal is better to be burned to produce electricity, where at least there is the hope to control pollution by reducing emissions from a stationary source.

The effect of pollution, from producing and burning fossil fuels, on climate change continues to be debated, but the effect on human health cannot be ignored. Smog days and respiratory illness are on the rise everywhere. Burning carbon based liquid fuels can never be "green." Truly clean energy solutions are urgently needed and the benefits are enormous: energy security, lower cost, better human health.

A fleeting mention is made in the Editorial about solar energy conversion but not a word on the other clean energy contenders wind and geothermal energy. I also respectfully submit that solar hydrogen is a terrible waste of solar

ECS Transactions Publishes 5,000th Paper

In March 2009, *ECS Transactions* successfully published its 5,000th article, totaling over 50,000 pages from more than 15 regional and international conferences. Over a decade ago, when the subject of creating a digital proceedings publication was first broached at the Society, no one could have expected that *ECS Transactions* (ECST) would hit such a seminal milestone in such a short period of time.

ECS Transactions, established to replace the long-running Proceedings Volumes (PVs), began publishing printed, hardcopy books in 2005. In May 2006, when the ECS Digital Library was launched, ECST electronic issues (e-issues) were added. In 2005, the 208th Society meeting was held in Los Angeles, California and produced eight hardcover and electronic issues and another 27 e-only issues, which was a significant increase over the average 12 PVs published per meeting. Continuing that trend, in its first full year, ECST published four full volumes; in 2008, ECST published nine full volumes.

From its 2005 commencement through to the current publication schedule, ECST has been well accepted in the scholarly world as a useful tool for students and researchers alike. Dana Roth, Chemistry Librarian for the California Institute of Technology, speaks highly of ECST and its goals, stating "I have long respected *ECS Transactions* for publishing a wide variety of very interesting and significant conference papers. I also appreciate the ease of availability, now provided by the new electronic subscription, as well as the ECS's history of providing reasonably priced information."

In addition to publishing issues for meetings and conferences, ECST is always on the lookout for new and better ways to bring its content to members, scholars, researchers, and institutions. For 2009 and beyond, ECST will begin to offer content alerts, including RSS feeds and table of contents alerts for new publications. Soon, ECST will be offering print-on-demand services for previous e-only issues, thereby making a concerted effort to make all its published science perennially available, with no issues ever going out-of-print. Looking farther into the future, ECST will continue to publish not only ECS's meeting proceedings, but conference proceedings from around the globe including SOFC, EuroCVD, Fuel Cell Seminar, ISTC (China), the Mexican Electrochemical Society, and SBMicro (Brazil). In all, ECST is a valuable tool that furthers the ECS mission "to advance the theory and practice of electrochemistry, solid-state science, and allied subjects by research and dissemination of knowledge…."

ECS Transactions Editor and IE&EE Division Chair John Weidner takes pride in ECST saying, "In less than 5 years, *ECS Transactions* has achieved a major milestone. ECST has surpassed 50,000 pages and 5,000 papers as of March 2009; this impressive feat was achieved through the incredibly hard work of the ECST staff, the numerous symposium organizers, issue editors, and Division leaders throughout the Society. The rapid dissemination of the technical content from our meetings is extremely important for the advancement of solid-state and electrochemical science and technology. This achievement has truly been a group effort and we should all be very proud."

Ed. Note: *This article was prepared by Beth Anne Stuebe, ECST Production Assistant.*

generated electricity. Water is one of the most stable molecules on the planet! And using water as the source for hydrogen will only exacerbate the second of the top ten issues facing the world today, namely, water supply. Better to use the electrons generated by solar energy directly. And producing hydrogen from hydrocarbons maintains the status quo in terms of world reliance on the oil industry for energy supply with all the associated geopolitical agony and environmental mayhem.

As for energy applications suitable for developing nations, thermal solar could be deployed for several thousand kilometers on either side of the equator (certainly between the two tropics) and provide very inexpensive local energy for countless millions of people. The key being electrochemical energy storage for the evenings. Clean energy solutions produce electricity and the limited research and development resources available need to be focused on capturing and storing electricity from the sun, the wind, and the earth for use in stationary and mobile applications. Electrochemistry is the way to green energy security and The Electrochemical Society should be playing a key role in this endeavor.

Martin Gagné
mgagne@xstratazinc.ca

Dear Editor:

I have just read the Meng Tao article on solar cells in the current issue [Winter 2008] of *Interface*. While it serves a worthy purpose for ECS members, it contains an egregious omission of the seminal and most important non Si cell work ever concerning the development of high efficiency solar cells. Namely, the Fig. 3 chart does not show the high-efficiency, non-tandem AlGaAs/GaAs heteroface cell which Harry Hovel and I published in *Applied Physics Letters* (APL) in 1972 [J. M. Woodall and H. J. Hovel, "High- Efficiency GaAlAs-GaAs Solar Cells," *Appl. Phys. Lett.*, **21**, 379 (1972)]. At the time of this publication our cell was the most efficient cell in existence. … [T]he reason I received the ECS Solid State Science and Technology Award, was elected to NAE, and became a National Medal of Technology Laureate was my seminal work on heterojuctions which enabled the high efficiency GaAs cell.

Jerry M. Woodall
National Medal
of Technology Laureate
Barry M and Patricia L Epstein
Distinguished Prof. of ECE

Dr. Tao responded:
I apologize for omitting this seminal work on AlGaAs/GaAs single-junction solar cells in Figure 3 of my article. My experience has been largely with Si-based solar cells, and I have just read the 1972 APL article. Yes, the efficiency reported there (>16% without concentration) was most likely the record at the time! I have known some of Dr. Woodall's work for a long time, but not this solar cell work. His accomplishments have my fullest and deepest respect.

Meng Tao
Associate Professor
of Electrical Engineering
University of Texas at Arlington
mtao@uta.edu