Council of Section Officers

Venkat Srinivasan, chair of the Council, received his bachelor's degree in electrochemical engineering from the Central Electrochemical Research Institute (CECRI) in Karaikudi, India, in 1995 and his PhD from the University of South Carolina in chemical engineering in 2000. His thesis topic included various aspects in electrochemical capacitors and the nickel hydroxide electrode. He then worked as a research associate at the Department of Mechanical and Nuclear Engineering at Penn State University for 18 months where he was involved with projects in lead-acid, alkaline, Ni-MH, and Li-ion batteries. Subsequently he moved to the Lawrence Berkeley National Laboratory/University of California at Berkeley as a postdoc working on modeling iron phosphate-based Li-ion cells. Dr. Srinivasan is now a scientist at the Lawrence Berkeley National Laboratory where he contributes toward solving the multitude of problems that prevent Li-ion batteries from being used in hybrid electric vehicles.

Dr. Srinivasan's research interest is primarily in the field of energy storage devices (batteries and capacitors) where he uses both theoretical and experimental techniques to understand their behavior. His approach spans both fundamental and applied aspects of their operation. He also maintains an active interest in the electrochemical processes that are used in the semiconductor industry.

Dr. Srinivasan is a regular contributor to "Tech Highlights" (featured in *Interface*) and was author of the Industrial Electrolysis and Electrochemical Engineering report for 2002 and 2003. He can be reached at Vsrinivasan@lbl.gov.

Lawrence Bottomley, vice-chair of the Council, received his bachelor's degree in chemistry from California State University at Fullerton, in 1976 and his PhD in analytical chemistry from the University of Houston in 1980. He worked for Florida State University from 1980 to 1983. Subsequently he moved to Georgia Institute of Technology, where he is currently a professor of chemistry, Director of Undergraduate Studies, and the Director of Teaching Effectiveness in the School of Chemistry and Biochemistry. While at Georgia Tech Dr. Bottomley was also Director of Graduate Studies. His administrative experience also includes being Vice President for Research of Protiveris, Inc.

Dr. Bottomley's areas of interest include scanning probe microscopy, electroanalytical chemistry, mechanical properties of single molecules, microcantilever sensor arrays, drug-DNA interactions, and nitrogen atom transfer chemistry. To date he has had 125 papers published and has five patents pending.

An active member of ECS, Dr. Bottomley was the founding member of the Georgia Section. He is also a member of the American Chemical Society, as well as the Society of Electroanalytical Chemists, where he serves on the Board of Directors. When not working and researching, Dr. Bottomley enjoys spending time with his wife and four children. He can be reached at lawrence.bottomley@chemistry.gatech.edu.

Jamie Noel, secretary of the Council, earned his BSc and MSc degrees in chemistry from the University of Guelph, under the supervision of Jacek Lipkowski, and his PhD from the University of Manitoba, while employed by Atomic Energy of Canada, Ltd., under David Shoesmith. He has worked mainly on corrosion electrochemistry issues in the nuclear industry, first employed as a chemist by Ontario Hydro (1989-1991), then as a Research Officer by AECL (1991-1998). He is currently a Research Associate in the University of Western Ontario's Department of Chemistry, working with the Dave Shoesmith Group on nuclear waste container corrosion research since 1998 and also on radioiodine transport with the Clara Wren Group since 2004. Dr. Noel is also leading the establishment of a Canadian National Facility for Neutron Reflectometry at Chalk River, Ontario, and developing techniques for in situ electrochemistry/neutron reflectometry research. He has taught undergraduate and graduate level courses in chemistry at UWO, as well as Brandon University and York University. Dr. Noel was awarded the 2003 Lash Miller Award of the ECS Canadian Section. He has been an active member of the Canadian Section and is the current Section chair, as well as chair of the Short Course Subcommittee of the ECS Education Committee.

ANTHONY GIANNUZZI (right) presents the San Francisco Section's 2006 Daniel Cubicciotti Student Award to SARAH STEWART.

Sarah Stewart Receives the San Francisco Section's Daniel Cubiccoitti Student Award

The San Francisco Section's **DANIEL CUBICCIOTTI STUDENT AWARD** was established in 1994 to assist deserving students in Northern California to pursue a career in the physical sciences or engineering. The award comprises a $2,000 cash award to be used to further the winning student's academic pursuits and a commerative metal plaque. The award honors the memory of Daniel Cubicciotti, for his dedication and expertise in the application of electrochemical principles to the understanding and control of materials deterioration in nuclear power plants. The award is presented to a student selected for academic excellence, a demonstrated interest in the study or application of electrochemistry, and personal characteristics that reflect Dan Cubicciotti's integrity and joie de vivre.

Daniel Cubicciotti was born in Philadelphia in 1921 but spent most of his life in northern California. He graduated from the University of California with a BS in chemistry in 1942 and a PhD in physical-inorganic chemistry in 1946. In his 47-year professional career as a researcher, including 20 years at SRI International and 13 at the Electric Power Research Institute, Dan worked in all aspects of the nuclear fuel cycle, from nuclear fuel to cooling water systems for the removal of heat from power generation and auxiliary equipment. The spectrum of problems addressed by Cubicciotti's work included developing an understanding of the thermodynamics and kinetics of chemical processes in fuel pellets, the interaction of fission products with fuel cladding, prediction of stable phases in complex systems, stress corrosion cracking of reactor structural materials, and microbiologically-influenced corrosion of reactor materials. His expertise in the areas of high temperature chemistry and corrosion were well known, documented by more than 200 scientific papers. His scientific knowledge, experimental skills, and ability to grasp the overall importance of such problems were coupled with a remarkable ability to transfer his expertise and the technology developed by others to people in the field so that solutions could be applied to real life problems. Dr. Cubicciotti continued to delve into new and exciting technical areas until his death in 1993.

*San Francisco Section Student Night presenters (from left to right): **TAL SHOLKLAPPER** of UC Berkeley, Department of Materials Science and Engineering; **SARAH STEWART** of UC Berkeley, Department of Chemical Engineering; **BREE SHARRATT** of Stanford University, Department of Materials Science and Engineering and the Department of Aeronautics and Astronautics; and **CHRIS ROPER** of UC Berkeley, Department of Chemical Engineering.*

Dr. Cubicciotti left a legacy to the nuclear industry replete with innovation and usable information in the areas of fuel cladding materials, stress corrosion cracking, Pourbaix diagrams, and microbiologically influenced corrosion. He also helped numerous non-experts in corrosion to appreciate the importance of corrosion processes, and more importantly, provided them with valuable tools to predict where or how attack might occur, and how to mitigate or prevent such problems. In addition to his roles as high temperature electrochemist and corrosion expert, Dr. Cubicciotti served as a husband, father, grandfather, part-time musician, and friend; always with an obvious joy for life. He has shown many scientists and engineers the joy inherent in finding the truth. He has served as a mentor to many and an example of a gentleman of the highest integrity to all. Over the years, Dr. Cubicciotti's family and friends have contributed generously to the award fund, transforming the award itself from its initial concept as an immediate memorial to his legacy into one that can now be awarded perpetually.

This year, the award recipient was **SARAH STEWART** of UC Berkeley. In a meeting on April 18, the award was presented to Ms. Stewart by Dr. Anthony Giannuzzi of Structural Integrity Associates, the award sponsor. The award recipient and four

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HEINZ GERISCHER AWARD

The **HEINZ GERISCHER AWARD** of the European Section was established in 2001 to recognize an individual or a small group of individuals (no more than 3) who have made an outstanding contribution to the science of semiconductor electrochemistry and photoelectrochemistry, including the underlying areas of physical and materials chemistry of significance to this field. The award consists of a plaque and a prize of 2,000 Euros. The winner will be invited to deliver the "Gerischer Prize Lecture" during the international meeting at which the prize will be presented.

Nominations and supporting documents should be sent to Claude Levy-Clement, LCMTR, CNRS UPR 209, 2-8 rue Henri Dunant, Thiais 94320, France; tel: 33.149781331, fax: 33.149781203, e-mail: levy-clement@glvt-cnrs.fr. **Materials are due by September 30, 2006.**

Cubicciotti Award

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finalists provided presentations on their researches.

The first presentation, "Lithium-Ion Batteries: Property Measurement and Optimization," was given by the award recipient Sarah Stewart of UC Berkeley, Department of Chemical Engineering. Accurate transport properties of electrolytes are important for modeling of Li batteries. In the first part of the presentation, Ms. Stewart presented conductivity data of some salts for Li battery electrolytes in different solvents. The results indicate a large solvent effect. In the second part, the speaker described a simple and accurate method to measure the diffusion coefficients of salts in Li battery electrolytes. The UV-Vis absorption was measured at various time points at a fixed location relative to an initially formed sharp boundary. The diffusion equation is fitted to the data to determine the diffusion coefficient. In the last part, Ms. Stewart described a hybrid electrochemical device with a carbon double layer capacitor positive electrode and a nanostructure $Li_4Ti_5O_{12}$ Li ion intercalation negative electrode. This interesting device bridges the gap between a battery and a supercapacitor in terms of energy and power density.

The second presentation, "Anomalous Subcritical Debonding of Thin-Film Polymer/Inorganic Interfaces," was given by **Bree Sharratt** of Stanford University, Department of Materials Science and Engineering and the Department of Aeronautics and Astronautics. Polymer/inorganic interfaces play an important role in semiconductor industry. Subcritical debonding is often observed. It is believed that weak adhesion results in displacement of the polymer from the substrate surface by impinging water molecules leading to debonding. Ms. Sharratt, a true rocket scientist, presented a model that successfully explains the roles of interface chemistry, moisture diffusion, and stress in subcritical debonding. This model opens the door to a systematic study of interface chemistry effects through the incorporation of organosilanes, which inhibit the diffusion mechanism and suppress debonding.

The third presentation, "Single Step Nano-Catalyst Electrode Infiltration for Solid Oxide Fuel Cells," was given by **Tal Sholklapper** of UC Berkeley, Department of Materials Science and Engineering. A SOFC (solid oxide fuel cell) consists of an anode, a cathode, and a zirconia electrolyte layer. Mr. Sholklapper described a "nano-catalyst network" approach of SOFC. In the approach, the zirconia electrolyte surface is made porous. The pores are infiltrated with nanoparticle of the catalyst. This is a one-step process. The result was a monolayer of nanoparticles lining the pore surface. This approach yields exceptional performance and is compatible with a broad choice of catalyst material.

The final presentation, "LPCVD of Silicon Carbide Thin Films for MEMS Applications," was given by **Chris Roper** of UC Berkeley, Department of Chemical Engineering. Traditionally, silicon is the most common material for MEMS (micro-electro-mechanical systems). The ability of silicon carbide to tolerate harsh environments makes it a more desirable material. Mr. Roper described a process of chemical vapor deposition of SiC from a single precursor, 1,3-disilabutane, on Si wafers in a multiple wafer configuration within the CVD reactor. Films with high uniformity and low surface roughness are achieved in a closed boat configuration. Current film characteristics make these SiC films well-suited for chemically resistant and wear resistant MEMS applications.

A fourth finalist, **Thomas Smagala** of UC Davis, Department of Chemistry was unable to attend at the last minute. Mr. Smagala's research is focused on a novel empirical model for the diffuse double layer is found by generalizing the simple analytical equations of Gouy-Chapman theory. Two adjustable parameters are introduced into the Boltzmann equation for the exponential dependence of the ion-wall correlation functions on the diffuse layer potential. Optimal parameter values and model validation are provided by Monte Carlo simulations. Simple relationships are obtained between these empirical parameters and those commonly associated with the mean-spherical approximation. The new empiricism accurately models diffuse layer potential profiles and ion-wall correlation functions for a restricted 1:1 electrolyte in a primitive solvent. ■