

Division Officer Slates Announced

New officers for the 2005-2007 term have been nominated for the following Divisions, to be voted upon during the spring 2005 meeting in Québec City, Canada.

Electronics

Chair

Jerzy Ruzyllo

Vice-Chair

Albert Baca,

Junich Murota

Secretary

David Haramé

Treasurer

Rodney Ridley

Members-at-Large

Helmut Baumgaert, Noel Buckley, George Celler, Pablo Chang, Cor Claeys, Sorin Cristoloveanu, Jamal Deen, Manfred Engelhart, Laszlo Fabry, Petra Feichtinger, Robert Fitch, Ulrich Gösele, Fernando Gonzalez, Takeishi Hattori, Dennis Hess, Andrew Hoff, Howard Huff, Hiroshi Iwai, Chennupati Jagedish, Bernd Kolbesen, Yue Kuo, Durga Misra, Geald Oleszek, Carl Osburn, Fan Ren, Fred Roozeboom, George Rozgonyi, Kenji Shiojima, Ed Stokes, and Masaharu Watanabe



Energy Technology

Chair

Jai Prakash

Vice-Chair

Karim Zaghib

Secretary

S. Narayanan

Treasurer

Jean St-Pierre, Jeremy Meyers, Garry Rumbles, Scott Calabrese Barton



Organic and Biological Electrochemistry

Chair

James Rusling

Vice-Chair

Isao Taniguchi

Secretary-Treasurer

Albert Fry

Members-at-Large

Alain Bergel, James Burgess, Flavio Maran, Duane Mazur, Ikuzo Nishiguchi, Mark Workentin, and Andrei Yudin



Physcial Electrochemistry

Chair

Gessie Brisard

Vice-Chair

Hugh DeLong

Secretary-Treasurer

Paul Trulove

Members-at-Large

Daniel Belanger, Ingrid Fritsch, Hubert Gasteiger, Shelley Minteer, Greg Swain, and Tom Zawodzinski



Society News

Corporate Membership News

UTC FUEL CELLS, a unit of United Technologies Corporation, recently upgraded their corporate membership from the Sustaining level to the Sponsoring level. United Technologies Corporation is a \$31 billion company that provides high technology products to the aerospace and building systems industries throughout the world. UTC Fuel Cells partners with major automobile manufacturers including Nissan, Hyundai, and BMW, as well as the U.S. Department of Energy, in developing fuel cell technology for cars.

ECS Corporate members at the Sponsoring level and above receive online access to ECS technical content for their facility. Benefactor level members receive access to this valuable content for their entire company. If you, or your company, is interested in this access, or other valuable benefits of membership, please contact Troy Miller at troy.miller@electrochem.org. ■

Electronics Division Holds New Event

The ECS Electronics Division has scheduled a Divisional mixer at 1900h on Sunday, May 15, in Room 203 of the Québec City Conference Centre. Beer, soda, and pretzels will be available and everyone is welcome. Division members, prospective members, and students are particularly encouraged to attend. The mixer is intended to provide an opportunity for socializing and networking among meeting attendees who are interested in the symposia and activities of the

Electronics Division. It will also provide an opportunity for members who are interested in becoming involved in the organization of the Division as symposium organizers, members of the Executive Committee, and in other ways. The Division will hold its annual business meeting, which includes the election of Division officers, at this function. The Executive Committee Meeting of the Division will follow the mixer, beginning at 2000h. ■

Campaign to Create Uhlig Summer Fellowship



Beginning April 1, 2005, The Electrochemical Society will initiate a campaign to raise \$100,000 to endow an ECS summer fellowship in honor of Herbert H. Uhlig. The Herbert H. Uhlig

Summer Fellowship will provide \$5,000 of support to an exceptional graduate student during the summer months in the pursuit of work in a field of interest to ECS. The Society began awarding summer fellowships in 1930, and has awarded over 250 since that date. Past summer fellowship recipients went on to notable

careers, including Larry Faulkner (1969 Edward G. Weston Fellowship), a past president of ECS and current president of The University of Texas; and Vittorio de Nora (1938 Edward Weston Fellowship), instrumental in the manufacture of chlorine and the development of the dimensionally-stable anode.

Herbert H. Uhlig was president of The Electrochemical Society from 1955 to 1956. He was elected vice-president in 1952 and was active in society affairs beginning in 1937 and until his death in 1993. During that time, he helped found the current Corrosion and Physical Electrochemistry Divisions. (The latter was formerly known as the Theoretical Divisions.). He authored many papers, was the editor of the

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Annual Society Luncheon and Business Meeting

Tuesday, May 17, 2005 • Québec City, Canada

(See Program Section on page PS-3)

Panos Andricacos

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understanding of alloy plating. This was one of several memorable times when Panos's clear and elegant work focused the attention of the electrochemical research community on a compelling process, all the more interesting for its industrial significance, and wound up bringing new richness and vitality to the field. In 1993, ECS honored Panos with the Research Award of the Electrodeposition Division.

In Panos's twenty-year career at IBM he worked on many applications of electroplating for electronics, including magnetic recording heads, thin-film packaging, flip-chip solder joints, DRAM electrodes, stack capacitors, RF MEMS structures, and, most notably, plated-copper interconnect structures for integrated circuits. His numerous patents and publications cover such diverse aspects of electroplating as bath analysis, process control, plating-cell design, current-distribution modeling, alloy bath formulation, micromagnetics, process optimization, and alloy-plating processes that employ UPD effects. Panos was both an individual contributor and a manager. He led a group of electrochemical researchers at IBM whose members over the years included Vlasta Brusic, Jei-Wei Chang, Emanuel Cooper, Lili Deligianni, John Dukovic, Jerry Frankel, Jean Horkans, Keith Kwietniak, Shahram Mehdizadeh, Milan Paunovic, Alex Schrott, Philippe Vereecken, Keith Wong, and others.

Panos's most significant achievement was the invention of the plating process for making the copper wiring structures on silicon microchips³. In the early 1990s there was a growing interest in replacing aluminum wiring with copper, but no viable process for using copper. Few considered plating to be a workable possibility, and those who did were mainly concentrating on through-mask plating. Panos believed that a Damascene plating process could be made to work and he persistently conducted feasibility experiments in his laboratory. He eventually discovered conditions under which submicrometer cavities would fill superconformally (and he coined the term "superfilling" to describe the effect). This development, along with numerous associated inventions and engineering achievements on the part of many contributors, led to the emergence of the first copper chips in 1998. Today, virtually all high-performance logic chips manufactured worldwide contain copper interconnects made with Panos's process. IBM recognized Panos's contributions with an Outstanding Technical Achievement Award (1998), a Corporate Award (1999), and a Research Division Award (2000).

Panos was active in ECS throughout his career, publishing in the *Journal*, chairing the Metropolitan New York Section, and organizing symposia. Characteristically, Panos rallied ECS to the cause of hosting the scientific forum

on the new copper-chip-metallization technology, co-organizing the symposium series, "Electrochemical Processing in ULSI Fabrication." Scores of papers on the subject of superfilling alone have been presented at these symposia. Again, Panos was stirring up new excitement in the electroplating field. Not detracting in any way from these scientific exchanges were the restaurants Panos selected for the after-hours discussions!

Panos was an enthusiastic exponent of electrochemical microfabrication. He took pride in seeing electrochemical processes emerge and take hold in the electronics industry. One of his last activities was to serve as guest editor for an issue of the *IBM Journal of Research and Development*⁴ with a wide variety of contributions in electrochemical microfabrication.

Panos will be greatly missed by his mentors, co-workers and colleagues. Beyond having great intellectual depth and being full of insight and inventive ideas, he was a good friend with a unique sense of humor and a wise, inspiring presence. Panos's influence lives on, a little bit of it in every copper-plated microchip, and forever in the memories of his family, colleagues, and friends. ■

¹ H. Dhams and I. M. Croll, *J. Electrochem Soc.*, **112**, 771 (1965).

² P. C. Andricacos *et al.*, *J. Electrochem Soc.*, **135**, 1172 (1998).

³ P. C. Andricacos *et al.*, U.S. Pat. 6,709,562 (2004).

⁴ *IBM J. Res. & Dev.*, **49**, 1 (2005).

This notice was prepared by John Dukovic (john_dukovic@amat.com).

Uhlig Summer Fellowship

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Journal of The Electrochemical Society, and edited the very successful monograph, *Uhlig's Corrosion Handbook*. Dr. Uhlig received numerous Society awards and honors. He received the Palladium Medal Award in 1961; was made an Honorary Member in 1973; received the Outstanding Achievement Award of the Corrosion Division in 1985, and received the Society's Edward Goodrich Acheson Award in 1988.

Dr. Uhlig, a professor at the Massachusetts Institute of Technology, was most known as an educator. Over the years, Professor Uhlig taught, inspired, and graduated more than 100 MS students, over 20 PhD students, and an equal number of post-graduate fellows. He and his students published 175 papers.

While ECS will manage the campaign to support the fellowship, the campaign is being spearheaded by a group of former students, associates, and his wife, Greta Uhlig. This group includes Aziz Asphahani, Ronald Latanision, Florian Mansfeld, and R. Winston Revie. The campaign will run through July 2005, and the first fellowship will be awarded in the spring of 2006.

If you have any questions about this important new fellowship, or would like to donate to the Uhlig fellowship campaign, please contact Troy Miller at troy.miller@electrochem.org. ■

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