PEOPLE NEWS

Jerry M. Woodall and Dow Chemical Co. Named National Medal of Technology Laureates

On May 9, the White House announced the laureates of the 2001 National Medals of Science and National Medals of Technology, the nation's highest science and technology honors. Among those named were ECS member **JERRY M. WOODALL** and ECS Contributing Member **DOW CHEMICAL COMPANY.**

The White House press release said that the National Medal of Technology "recognizes men and women who embody the spirit of American innovation and have advanced the nation's global competitiveness. Their ground-breaking contributions commercialize technologies, create jobs, improve productivity, and stimulate the nation's growth and development. This award was established by Congress in 1980 and is administered by the Department of Commerce." (More information about the National Medal of Technology can be found at www.ta.doc.gov/Medal/.)

JERRY M. WOODALL was named a laureate "for the invention and development of technologically and commercially important compound semiconductor heterojunction materials, processes, and related devices, such as light-emitting diodes, lasers, ultra-fast transistors, and solar cells."

Woodall is the C. Baldwin Sawyer Professor of Electrical Engineering at Yale University, and has conducted pioneering research in compound semiconductor materials and devices over a career spanning four decades. He invented electronic and optoelectronic devices seen ubiquitously in modern life, including the red LEDs used in indicators and stoplights; the infrared LED used in CD players, TV remote controls, and computer networks; the high speed transistors used in cell phones and satellites; and the weight-efficient solar cell.

Woodall spent most of the early and mid parts of his career at the IBM Thomas J. Watson Research Center where he rose to the rank of IBM Fellow. He built the first high purity single crystals of gallium arsenide there, enabling the first definitive measurements of carrier velocity versus electric field relationships, as well as GaAs crystals used for the first non-super-cooled injection laser. He and Hans Ruprecht pioneered the liquid-phase epitaxial growth of both Si doped GaAs used for high efficiency IR LEDs, and gallium aluminum arsenide (GaAlAs), which led to his most important research contribu-

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tion so far: the first working heterojunction. They built it from gallium aluminum arsenide mated to gallium arsenide (GaAlAs/GaAs), and it remains the world's most important compound semiconductor heterojunction.

He then invented and patented many important commercial high-speed electronic and photonic devices that depend on the heterojunction, including bright red LEDs and the two classes of ultra-fast transistors, called the heterojunction bipolar transistor (HBT) and pseudomorphic high-electron-mobility transistor (pHEMT). Many new areas of solid-state physics have evolved and been realized as a result of his work, including the semiconductor superlattice, low-dimensional systems, mesoscopics, and resonant tunneling.

Woodall was elected to the National Academy of Engineering in 1989 and is a fellow of the American Physical Society (APS), IEEE, The Electrochemical Society (ECS), and the American Vacuum Society (AVS). He has served as president of ECS and AVS, and on the board and executive committee of the American Institute of Physics (AIP). He has published 315 publications in the open literature and been issued 67 U.S. patents. He received five major IBM Research Division Awards, 30 IBM Invention Achievement Awards, and an IBM Corporate Award in 1992 for the invention of the GaAlAs/GaAs heterojunction. Other recognition includes a 1975 Industrial Research 100 Award; the 1980 ECS Electronics Division Award; the 1984 IEEE Jack A. Morton Award; the 1985 ECS Solid State Science and Technology Award; the 1988 Heinrich Welker Gold Medal and International GaAs Symposium Award; the 1990 AVS Medard Welch Award; the 1997 Eta Kappa Nu Vladimir Karapetoff Eminent Members' Award; the 1998 American Society for Engineering Education's General Electric Senior Research Award; and the 1998 ECS Edward Goodrich Acheson Award.

Woodall co-founded LightSpin Technologies, Inc., a high technology startup company, and serves as its chief science officer. From 1993 through 1999, he held the Charles William Harrison Distinguished Professorship of Microelectronics at Purdue University. He earned a PhD in electrical engineering from Cornell University and a BS in metallurgy from MIT.

The **Dow Chemical Company** of Midland, Michigan, was named a leading science and technology company, "for the vision to create great science and innovative technology in the chemical industry and the positive impact that commercialization of this technology has had on society."

Dow provides innovative chemical, plastic, and agricultural products and services to many essential consumer markets. With annual sales of $28 billion, Dow serves customers in more than 170 countries and a wide range of markets that are vital to human progress, including food, transportation, health and medicine, personal and home care, and building and construction, among others. Committed to the principles of sustainable development, Dow and its approximately 50,000 employees seek to balance economic, environmental, and social responsibilities.

When an enabling technology is discovered, Dow can rapidly integrate it with its current capabilities to create new business options. A good example is Dow's metallocene catalysis platform. A metallocene catalysis discipline was established in corporate R&D in the mid-1980s when several new classes of metallocene catalysts for olefin polymerization were discovered. The metallocene catalysts allowed much improvement in the control of polymer chain microstructures. Dow's INSITE technology is the integration of a family of metallocene catalysts – the newly discovered constrained-geometry, single-site homogeneous catalysts – with its polyethylene solution process and a unique 1-octene comonomer position. The family of ELITE polyethylenes utilizes the latest advances in catalyst, process, and product know-how.

Dow is continuing to develop higher performance polymers by integrating new enabling technologies with Dow capabilities. For example, incorporation of metallocene homogeneous catalysts into a polyethylene solution process allows Dow to maintain its leadership position in the industry. Five new families of polyolefin products have been commercialized since 1993 based on INSITE technology using constrained-geometry catalysts. The new Dow polypropylene business includes polypropylene resins and the newest polypropylene polymers derived from technology advancements, such as high-melt-strength differentiated polypropylene and INSPIRE HMS, the latest commercial introduction, which launches another family of new product innovations, INSPIRE performance polymers.

The challenge to fully understand the future direction of an industry demands that Dow's senior technical leaders, who have a broad knowledge of Dow capabilities, be externally focused. Dow is applying its science and technology expertise to the development of advanced materials for the electronics industry. A new organic polymer, SiLK semiconductor dielectric, was invented, developed, and commercialized by Dow for the fabrication of high performance integrated circuits. The new material was invented specifically to meet a critical need of the microelectronics industry, enabling the electronics industry to build microchips that are faster, use less power, and integrate more complex functions. These examples illustrate Dow's resolve to be a premier sustainable growth company by delivering customer-driven solutions in high growth industries. ■

In Memoriam

Michael J. Weaver

1947-2002

MICHAEL J. WEAVER died suddenly on March 21, 2002. Surviving are his parents and a sister, all residing in London, England.

Mike, as he was known simply to many of us, was born March 30, 1947 in London. He completed his BSc degree from Birkbeck College, London University, in 1968 and his PhD degree from Imperial College, London University, in 1972. He was a postdoctoral research associate at the California Institute of Technology from 1972-1975, and began his academic career as an assistant professor at Michigan State University in 1975. He came to Purdue University as an associate professor in 1982 and was promoted to professor in 1985.

Originally, Mike pursued studies of adsorption and the structure of the electrical double layer, and heterogeneous and homogeneous redox. Explorations of chemical effects of solvent dynamics on electron transfer kinetics brought him widespread recognition in the condensed-phase as well as electrochemical communities. At Purdue, Mike championed the use of spectroscopic methods in conducting fundamental molecular-level studies of metal/solution interfaces. He extended the spectroscopic work to single crystals of platinum-group metals, and created templates for spectroscopic in situ characterization of electrochemical interfaces. He has contributed centrally to the use of scanning tunneling microscopy (STM) as a probe of atomic-level structure and dynamics. He demonstrated the tremendous possibilities for using vibrational methods, Fourier transform infrared (FTIR) spectroscopy and surface-enhanced Raman spectroscopy (SERS), for in situ surface characterization by combining new-generation spectrometers with novel new methods of single-crystal, SERS-active, and nanoparticle electrode surface preparations. His work also focused on exploring surface chemistry in gas-phase and ultra-high vacuum environments, including cryostatic measurements, thus leading to discovery of seminal correlations between small molecule adsorption in electrochemical cells and in ultra-high vacuum.

The productivity, originality, and creativity that characterized all of Mike's research endeavors were of the highest quality. His contributions appear in over 400 research articles (working with a group usually smaller than ten students), and his key publications are classic papers in electrochemistry. He educated many young scientists, who are both in academia and industry. He was indeed extremely dedicated to his students who will miss him immensely. He had a real joy in advising them, and most of all writing publications with them, displaying mastery in both discovery and style. Mike was a key member of the renowned Analytical Chemistry Division at Purdue, and was also associated with Purdue Physical Chemistry group. Among Mike Weaver's honors and awards, he was chairman of the Electrochemistry Gordon Conference in 1990, a Humboldt Senior Research Scientist in 1991-92, and was the recipient of the 1989 D. C. Grahame Award of The Electrochemical Society, the 1995 Faraday Electrochemistry Medal of the Royal Society of Chemistry, the 1997 Carl Wagner Award of The Electrochemical Society, and the 1999 Electrochemistry Award of the American Chemical Society. He was most recently nominated for Purdue's Most Distinguished Professor award. As the pivotal testimony of his accomplishments, Mike was among the twenty most cited chemists worldwide in 1984-1991, and was recognized as one of the U.S.'s top 100 chemists from 1981-2000, according to a yearly report issued by the International Science Institute.

With Mike's death, we lost an excellent truthful peer and an uncompromised reviewer who always rewarded creativity and freedom of scientific pursuit. Mike was not only an excellent scientist, but also a power broker between various interests, and an influential speaker for electrochemistry as a whole. While he focused on physical and surface aspects of electrochemistry, he was open to other ideas this creative field always generates, having a unique sensitivity to effort and value. His loss set the community a decade back, and major efforts will be needed to restore the equilibrium. This tragic event is a big loss to fundamental electrochemistry, which may never be fully restored, at least by this generation of American electrochemists.

More specifically, his absence may have grave consequences for physical electrochemistry, especially in the U.S. As Phil Ross from Lawrence Berkeley Laboratory, in Berkeley, California, recently wrote to me after Mike's death, "We are afraid that the role of physical electrochemistry in the U.S. will decline, and the effect of this decline will be felt in national laboratories and in U.S. industry." I concur with his concerns. It is particularly tragic in the situation where there is an increasing awareness of the need for clean (and green) energy technologies, to which fuel cells and other related electrochemical devices offer the most straightforward path. This type of anxiety among us demonstrates the mission Mike Weaver had fulfilled; he was not only an excellent scientist, but also a "bridge" between various interests, and an influential speaker for electrochemistry as a whole.

While science has lost one of its most prominent and dedicated players, for me, Mike was a dear friend. I will miss him very much. ■

This obituary notice was contributed by Andrzej Wieckowski, past chairman of the Physical Electrochemistry Division and Professor of Chemistry at the University of Illinois at Urbana-Champaign.

In Memoriam

Donald Tuomi 1920-2002

DONALD TUOMI, 81, died March 12, 2002. A member of ECS since 1957, Tuomi earned his BS degree in chemistry in 1943 at the Ohio State University and then his PhD in physical chemistry in 1953. Tuomi was a staff member of the Manhattan Project, a secret program begun in late 1941 to develop an atomic bomb. During World War II, he was involved in Columbia University's successful development of the barrier for the Oak Ridge diffusion plant, which then led to the first atomic bomb using uranium 235.

Dr. Tuomi worked for the Thomas A. Edison Laboratories determining the electrochemical capacity limiting mechanisms in the long-lived, Thomas A. Edison Ni/Fe Alkaline Storage Battery. From 1961 until his retirement in 1983, he worked at the Roy C. Ingersoll Research Center, Borg-Warner Corporation; he retired with the rank of senior scientist. He was involved in research on thermoelectric energy conservation alloys, the origins of high impact strength in ABS polymers and related materials, and the evolution of technology for the planting of polymers.

A past chairman of the ECS Chicago Section, Tuomi received the Research Award of the ECS Battery Division in 1968. In 1973, he received the Chicago Technical Societies' Award of Merit for outstanding technical achievements, service to science, to his fellow scientists, and to the community.

He is survived by his wife, Ruth Campbell Tuomi; daughters, Dr. Donna Jean Beck and the Rev. Mary Ellen Hammond; brother, Edward Pohjala; and six grandchildren. ■

Thank you to Sidney Gross for bringing this information to our attention.