

ECS Hall of Fame

The following is a list of ECS members who have received one of the U.S. National Medals. See the spring 2009 issue of *Interface* for a full story about the ECS Hall of Fame.

National Medal of Science

Alfred Cho (1993)

Norman Hackerman (1993)

Nick Holonyak (1990)

Rudolph Marcus (1989)

Fred Seitz (1973)

Peter Debye (1965)

National Medal of Technology and Innovation

Esther Takeuchi (2008)

Adam Heller (2007)

C. Grant Willson (2007)

Alfred Cho (2005)

Nick Holonyak (2002)

Jerry Woodall (2001)

Wilson Greatbatch (1990)

Gordon Moore (1990)

ECS Vice-President Esther Takeuchi
Named National Medal of Technology Recipient

A military aide prepares to hand a National Medal of Technology and Innovation to President **BARACK OBAMA**, who presented the award to **ESTHER TAKEUCHI** (far left). Photo by Ryan K. Morris, National Science & Technology Medals Foundation.

ESTHER S. TAKEUCHI, ECS Second Vice-President, has been awarded the highest technology award in the U.S., the National Medal of Technology and Innovation. Prof. Takeuchi is the Greatbatch Professor in Power Sources Research in the University at Buffalo School of Engineering and Applied Sciences. She received the medal from President Obama at a White House ceremony on October 7.

The National Medal of Technology and Innovation is administered for the White House by the U.S. Department of Commerce's U.S. Patent and Trademark Office. It recognizes individuals or companies for outstanding contributions to the promotion of technology for the improvement of the economic, environmental, or social well-being of the United States.

In a statement, Obama described the medal's four awardees—of whom Takeuchi is the only woman—as embodying “the very best of American ingenuity and inspiring a new generation of thinkers and innovators. Their extraordinary achievements strengthen our nation every day—not just intellectually and technologically

but also economically, by helping create new industries and opportunities that others before them could never have imagined.”

Prof. Takeuchi was previously chief scientist at Greatbatch, Inc., where she worked for 22 years. Her development of the lithium/silver vanadium oxide battery while at Greatbatch was a major factor in bringing implantable cardiac defibrillators (ICDs) into production in the late 1980s. More than 200,000 of these units are implanted every year, the majority of them are powered by the batteries developed and improved by Takeuchi and her team.

Dr. Takeuchi often is cited as the woman awarded the most patents in the U.S.—more than 140 at last count, most of them related to her pioneering development of sophisticated power sources for implantable devices, now a booming multibillion-dollar business. Named to the prestigious National Academy of Engineering in 2004, she is one of just 104 women elected to the organization, considered the highest distinction that an engineering professional can achieve. Less than five percent of the academy's 2,400 active members are women.

For more on Prof. Takeuchi, see the following articles.

1. University at Buffalo news release, <http://www.buffalo.edu/news/10476>
2. *Buffalo News*, October 8, 2009, <http://www.buffalonews.com/cityregion/story/821047.html>
3. *Chronicle of Higher Education*, October 20, 2009, <http://chronicle.com/article/ProfessorProlific-Inve/48815/>
4. *UB Today*, Spring/Summer 2008, <http://www.buffalo.edu/UBT/UBT-archives/volume26number3/features/powersource.html>

John Goodenough Receives 2009 Enrico Fermi Award

Prof. Takeuchi received her bachelor's degree from the University of Pennsylvania with a double major in chemistry and history. In 1981, she completed her PhD at The Ohio State University in organic chemistry. She subsequently conducted postdoctoral work at the University of North Carolina and at the State University of New York at Buffalo in electrochemistry. She is active in several professional organizations including the American Chemical Society (ACS), the American Association for Medical Instrumentation (AAMI), and most notably ECS where she has been a member since 1984. She is currently the Second Vice-President. She served as the Secretary, Treasurer, and then Chair of the Battery Division, and as Chair of the Battery Division Research Award Committee. She has organized several symposia and edited their proceedings volumes.

Dr. Takeuchi's work has been honored by several organizations. She received the 2008 Astellas USA Foundation Award, administered by the American Chemical Society. She also received the Jacob F. Schoellkopf Award given by the WNY American Chemical Society, the ECS Battery Division Technology Award (1995), and the Community Advisory Council of the State University of New York at Buffalo for outstanding achievement in science. Dr. Takeuchi was inducted into the Western NY Women's Hall of Fame and she is a Fellow of the American Institute for Medical and Biological Engineering (AIMBE). In 2000, she was selected for the Inventor of the Year Award, Physical Sciences, presented by The Technical Societies Council and the Niagara Frontier Intellectual Property Law Association. In 2003, she was presented the Achievement in Healthcare Award by D'Youville College and received the Woman of Distinction Award presented by the Buffalo Branch of the American Association of University Women. She also received the Pioneers of Science Award, presented by Hauptman-Woodward Medical Research Institute.

In 2005, she again received the Inventor of the Year Award, Physical Sciences. In 2006, the Lincoln Gries Distinguished Alumni Award was presented by Old Trail School, Bath, Ohio, in recognition of outstanding alumni. In 2007, Dr. Takeuchi was recognized by a Lifetime Achievement Award presented by The Technical Societies Council and the Niagara Frontier Intellectual Property Law Association for contributions to advancement of science through intellectual property. ■



ECS member **JOHN GOODENOUGH**, a professor of engineering at The University of Texas (UT) at Austin, has been awarded the Enrico Fermi Award, one of the most distinguished science and technology honors given by the White House. Prof. Goodenough developed materials critical to the development of lightweight and rechargeable lithium-ion batteries, ushering in the wireless revolution. Prof. Goodenough is also being honored at the IMLB conference to be held in June 27-July 2, 2010.

Prof. Goodenough will share the presidential honor with Stanford University's Siegfried S. Hecker. Each will receive a gold medal and share the \$375,000 honorarium. The award is administered on behalf of the White House by the U.S. Department of Energy. Goodenough, who holds the Virginia H. Cockrell Centennial Chair in Engineering at UT, is receiving the award in recognition of his lasting contributions to materials science and technology, especially the science underlying lithium-ion batteries. He said he had the privilege of taking two courses (quantum mechanics and nuclear physics) from Fermi while attending the University of Chicago.

"It is a special honor to receive a prize named after him," Goodenough said. "When I arrived at the University of Chicago at the end of World War II, the registration officer said to me, 'I don't understand you veterans. Don't you know that anyone who ever did anything significant in physics had already done so by the time he was your age, and you want to begin?' But I had the good fortune to have the opportunity to build a bridge between physics and both solid-state and electrochemistry to achieve some targeted technological goals, as well as to pursue fundamental studies in the field of solid transition-metal compounds." He credited the institutions where he has taught since 1952 for providing a supportive environment where "experimental colleagues" were vital for the realization of his work. "I salute every one of these silent partners who stand behind this award," Goodenough said.

Goodenough, a physicist and a mechanical engineer, identified and developed the cathode materials for the lithium-ion rechargeable battery that is ubiquitous in today's portable electronic devices. This cathode material for power batteries has proven to be inexpensive, environmentally friendly, safe, sustainable, and capable of thousands of charge cycles with a constant output voltage without a loss of capacity. Batteries incorporating his cathode materials are used worldwide for cell phones and other portable wireless devices, power tools, hybrid automobiles, small all-electric vehicles, as well as increasingly for electrical energy storage for alternative energy, such as wind and solar power. As this technology continues to develop, it can be expected to have an enormous impact on the U.S. economy and the environment by helping to reduce carbon dioxide greenhouse gas emissions.

Prof. Goodenough earned his PhD in physics in 1952 from the University of Chicago. He was a research engineer at Westinghouse before moving to the MIT Lincoln Laboratory as a research scientist and group leader from 1952 through 1976. He continued his career as professor and head of inorganic chemistry at Oxford University and, after retiring from Oxford, returned to the United States in 1986 to join The University of Texas at Austin.

"The 2009 Enrico Fermi Award will go to two scientists who have selflessly devoted themselves to our nation's energy and national security challenges," said U.S. Secretary of Energy Steven Chu. "These two individuals are pioneers in innovative research and I want to thank them for their work and congratulate them on this award." The Fermi Award (<http://www.sc.doe.gov/fermi/>) is one of the oldest and most prized science and technology awards given by the U.S. government, and honors the memory of Nobel Laureate Enrico Fermi. The most recent award was given to Arthur H. Rosenfeld in 2005. ■