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U. at Buffalo Professor, a Prolific Inventor, Is Honored by White House

By Libby Nelson

When Esther S. Takeuchi came to Washington this month so that President Obama could drape a medal around her neck, her hotel was around the corner from the U.S. Patent Office.

The location was a fortuitous choice for the University at Buffalo professor of chemical and biological engineering, who is said to hold the most patents of any woman in the world.

The inventor of the battery that powers cardiac defibrillators, she was one of four people honored with National Medals of Technology and Innovation at a White House ceremony. As Mr. Obama presented her medal, a military aide cited Ms. Takeuchi for inventions "that improve the health and quality of life of millions of people."

When she started work as a scientist with Greatbatch Inc., a Buffalo-based company that manufactures medical devices, Ms. Takeuchi had no way of knowing her career would lead to that medal, or to academe.

In 2007, after 22 years with Greatbatch, she accepted a faculty position as a professor of electrical engineering at the University at Buffalo, which was expanding its engineering school and trying to enhance its prestige.

The institution, part of the State University of New York system, spent two years persuading her to take the job, says Satish K. Tripathi, provost.

"It was worth the wait," he says. "She was making a major shift, from being in an industrial lab, doing research there, and coming to academia, which is a different sort of environment."

When Ms. Takeuchi, who holds an undergraduate degree from the University of Pennsylvania and a doctorate in chemistry from Ohio State University, began working at Greatbatch, the company—founded by one of the inventors of the first successful implantable pacemaker—employed fewer than 200 people.

Her first project: developing the battery for implantable cardiac defibrillators, a device that delivers a powerful electric shock to control irregular heartbeats that can cause heart attacks. The Food & Drug Administration approved the battery in 1988.

She worked on batteries for drug pumps and neurostimulators, accruing more than 140 patents—believed to be the most of any woman in the world, although when she visited the patent office this month to check, she was told it did not keep records by gender.

In 2004 she was named to the National Academy of Engineering, which at the time counted only about 100 women among its more than 2,300 members.

A speech at the induction ceremony, on the declining level of science education in the United States, struck a chord. The issue "concerned me at some level," she says. When the University at Buffalo offered her a faculty position, she saw it in part as a chance to affect those issues.

There were other motivations. Greatbatch had grown from a small, family-owned business to a larger corporation with more than 2,000 employees. Biomedical engineering had become less new and less exploratory. Companies faced more financial pressure than in the past.

"The ability to do higher-risk, more creative work was not what it used to be," she says.

Ms. Takeuchi now teaches an undergraduate class on energy-storage devices and is doing research on how to make medical-device batteries rechargeable, as well as working with the university's medical school on devices that can monitor cardiac-disease patients and provide therapy. She has been "extremely successful" at getting grant money for her projects, Mr. Tripathi says.

Ms. Takeuchi says she enjoys the freedom and flexibility of being a professor. But some things surprised her: Running a research lab is "almost like running a little business," she says, a change for a scientist who was used to having an information-technology department, a travel agent, and an administrative assistant at her disposal.

She is working longer hours than she ever worked at Greatbatch, as many as 80 per week.

She is developing some research projects with her husband, a chemistry professor at the university. And she has seen the challenges of science education up close.

The perception of what it means to be a scientist or engineer—"somebody who is some kind of genius, is incredibly driven, is geeky in some way"—needs to change, she says, and the culture needs to become more inclusive, to encompass people of diverse backgrounds and perspectives.

"It really is important," she says. "It's not just right. It's important."