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President Obama congratulates UB Professor Esther Sans Takeuchi after awarding her the National Medal of Technology and Innovation Wednesday, Oct. 7, 2009, in the East Room of the White House.

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## UB engineering professor honored at White House

### Daughter of Latvian refugees receives top technological award

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WASHINGTON -- Esther Sans, the daughter of political refugees from Latvia, went off to kindergarten five decades ago in Ohio barely knowing any English -- but now she knows better than anyone how to power the human heart when Mother Nature isn't quite up to it.

And that discovery led Sans -- now Esther Sans Takeuchi -- to the White House on Wednesday, where President Obama presented the University at Buffalo professor the nation's top award for technological achievement.

Obama honored Takeuchi for inventing the battery that powers many of the world's implanted medical devices, but he just as easily could have lauded her as living proof that the American dream still comes true.

As the daughter of immigrants, she once wore the patchwork dresses her mother made from the scraps of cloth her father brought home from the coffin factory where he worked.

And now she's the mother of one of medicine's great inventions and the third woman in 25 years to be named an individual recipient of the National Medal of Technology and Innovation.

Obama presented Takeuchi the medal as a Marine in dress uniform read a citation.

Takeuchi won the award "for her seminal development of the silver vanadium oxide battery that powers the majority of the world's lifesaving implantable cardiac defibrillators, and her innovations in other medical battery technologies that improve the health and quality of life of millions of people," the citation said.

Takeuchi's parents, Mary and Rudolf Sans, didn't live to see their daughter win that honor, which had previously gone to computer pioneers Bill Gates and Steve Jobs. Yet in a way, Takeuchi's honor was born of her parents' travails and their achievements.

As Takeuchi tells it, the Sansas were a prominent family in Riga, Latvia, when the Soviets occupied the Baltic state in the last years of World War II.

The Soviets purged Latvia of its elite, sending 120,000 people to prison, or the gulags, including Rudolf Sans' brothers. Worried about their own fate, Rudolf Sans, an electrical engineer, and his wife fled for Germany in 1945.

They spent several years in a refugee camp before moving to America in 1951 and settling in Kansas City, where their daughter Esther was born.

Rudolf Sans took a job at a coffin factory, where he started gathering those swatches of cloth that Esther and her sister would end up wearing.

Sans eventually found an engineering job in Akron, Ohio, but when Esther first went to kindergarten there, she spoke the Latvian she heard at home and not the English she suddenly heard all around her.

"You figure it out as you go," she said. "I don't remember it being particularly traumatic. I remember it being odd."

It might have seemed odd to some fathers, too, to have a daughter who followed you, wanting to see everything you did as you fixed things around the house. Yet that's just what young Esther wanted, and her father was happy to oblige.

"That was tremendously important, because it meant that I could do whatever I wanted to do," she said.

Young Esther wanted to do chemistry, and she went off to the University of Pennsylvania and then graduate school at Ohio State University, unintimidated by the fact that she was entering a male-dominated science.

She met her husband, Kenneth Takeuchi, while in graduate school, and then moved to Buffalo when he got a job as a chemistry professor at UB. Wanting to find a job in industry, in 1984, she found a great one: at Greatbatch Inc., the Buffalo-area company founded by Wilson Greatbatch, who won the National Medal of Technology himself in 1990 for inventing the pacemaker.

There she faced a tremendous challenge: developing a strong, durable yet safe battery to power implantable cardiac defibrillators, which jolt the heart so that it doesn't stop beating in a sudden, fatal cardiac arrest.

The new battery had to be a million times stronger than the typical pacemaker battery, which merely keeps the heart beating at a normal rhythm, Takeuchi said.

But within just a few years, she and her team had done it.

She has been refining the batteries ever since, accumulating at least 140 patents, which, UB says, may be the most held by any woman in the world.

And through it all, she has been left with a few lessons that go way beyond the realm of electrochemistry.

"You have to be prepared. You have to be educated," Takeuchi said, echoing something her father taught her decades ago. "If you are, the opportunities will come. It's then just a question of what you do when the opportunities come."

Women in the sciences may still not be accepted and respected as readily as men, Takeuchi said. "Don't give up. Stay in the game. A lot of success is just doing it, putting one foot in front of the other every day," she added.

That's what Takeuchi, who moved to UB as an engineering professor in 2007, has been doing for decades now.

And on Wednesday afternoon, she rose from her seat on the stage in the East Room of the White House, put one foot in front of the other and walked over to Obama.

"So, you've saved millions of lives, eh?" the president said.

"Yes, I think I have," Takeuchi replied, with a smile.

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