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Inventor with ties to Akron to join hall

Scientist develops a battery for implantable defibrillators

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Published on Thursday, Mar 03, 2011

Growing up in Akron in the 1950s and 1960s, Esther Sans Takeuchi felt a sense of energy in what then was the Rubber Capital of the World.

Today, Takeuchi, an inventor of a lifesaving battery used in the majority of implantable cardioverter defibrillators, known as ICDs, will be announced as an inductee into the National Inventors Hall of Fame.

Here, she speaks of her life as someone always interested in the spirit of invention.

Q: How did growing up in Akron affect your future career? Were your parents scientists?

A: My father [the late Rudolf Sans] was an electrical engineer. He was also an inventor and developed a new concept for an electric motor. My parents [mother Mary Sans also is deceased] were strongly supportive of education and believed that it was important. My father said: "You do not know what life holds; you can lose everything. If you get an education, you will have it forever." When I grew up in Akron, it was quite a dynamic town in terms of technology. The University of Akron was present, as now, but also many of the major tire companies had their research centers located in Akron.

Q: Did you want to be an inventor from your earliest days?

A: I was naturally curious and did want to know how things worked. I was interested in taking things apart to see the inside. As a child, I used to find old golf balls that were abandoned and collect them. The cover could be removed by rubbing it on the sidewalk for a long time. I could then unwrap the inside to find the core of the ball to see how the various brands were assembled.

Q: Can you talk about the Li/SVO (lithium/silver vanadium oxide) battery that you invented and why it was such an important breakthrough? Has anyone in your family used this battery for medical purposes?

A: The SVO battery enabled the widespread use of implantable cardiac defibrillators. The ICD interrupts ventricular fibrillation (a form of heart attack) and allows the heart to return to its normal beating pattern. Without the ICD or external defibrillator stopping the ventricular fibrillation, the condition is almost always fatal.

Q: Who were your main influences in the field of invention?

A: My father and my husband [Kenneth J. Takeuchi, SUNY Distinguished Teaching Professor at the University at Buffalo] are the inspiration and support system for pursuing a scientific career. It was my father's early encouragement into fields of math and science that moved me in that direction. It has been my husband's support and sage advice that have sustained me and kept me in the field.

Q: What are you working on currently in terms of new products?

A: We are actively pursuing new battery ideas. We are investigating new material concepts where the structure and molecular dimensions are carefully controlled. We are working with materials in the nano-scale to provide facile access of ions and electrons to the core of the materials. We have also incorporated silver ions in the active material. When the battery is activated, it forms silver metal within the matrix of the cathode. This enhances the conductivity by 15,000 times and allows the battery to deliver current faster.

Q: What is the key trait one needs to have to be an inventor?

A: I do think it is curiosity. I also think having a different perspective is important. Perspective may be an important aspect of problem solving and invention. Scientific problems often are revisited over time by a variety of scientists, with each individual making a small but unique contribution toward the solution. What is considered creativity on the part of an individual and leads to invention may be the result of having a different perspective. It is critical to involve people who are traditionally not

participants in the scientific process, including women, to increase inventiveness and problem solving.

Q: How do you feel about being inducted into the hall of fame?

A: It is a tremendous honor. The previous inductees have made profound contributions, which impact the way that we live every day. It is an honor to be counted among that group of impressive individuals.

Q: What is the most important new invention you can think of in terms of impacting future generations?

A: The impact of inventions is hard to predict. One of the biggest areas of concern for the nation and the world is a sufficient source of clean, renewable energy. It may be that inventions related to the generation and storage of energy will have profound impact on humanity in the coming years.

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