Longtime rebel first woman to be honored with mathematics award

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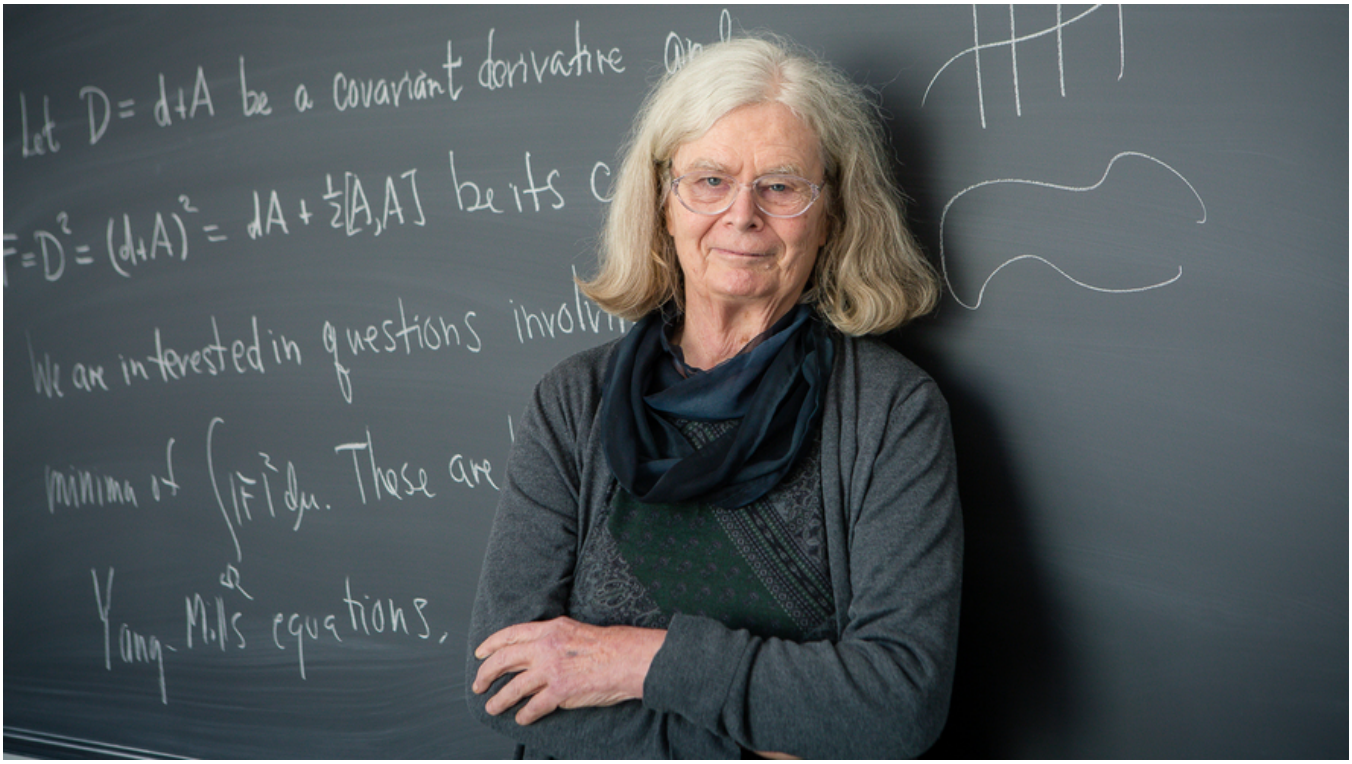

Karen Keskulla Uhlenbeck's work on minimal surfaces was instrumental in the foundation of the mathematical field of geometric analysis. Photo by: Andrea Kane/Institute for Advanced Study

Karen Keskulla Uhlenbeck is a math professor who taught at the University of Texas at Austin. She is well known for having important new mathematical ideas. She is the first woman to win the Abel Prize. It is an important math award.

The Abel Prize is modeled on the Nobel Prize. It is given out by the Norwegian Academy of Science and Letters. It is a group in Norway that honors great scientists. The Abel Prize is awarded each year to people who introduce big new ideas in math.

First Female Winner

Uhlenbeck was honored for her important work in geometry and mathematical physics. She is the first female award winner in the Abel's 16-year history.

One of Uhlenbeck's biggest discoveries revolves around a subject that might seem simple. She studied soap bubbles. These little bubbles are an example of something called "minimal surfaces." Soap bubbles force themselves into a special kind of shape. The soapy outside of the bubbles takes up the least amount of area possible.

Mathematician Arne B. Sletsjøe explains the idea. There is a fixed amount of air inside of a bubble, he says. That makes the soap on the outside minimize surface tension. The soap moves into the shape with the least surface area needed to wrap around the air. That shape is a perfect sphere.

Uhlenbeck studied soap bubbles during the late 1970s and early '80s. Her work on the math behind soap bubbles was important for many other kinds of scientists. For example, it helps scientists studying electrical fields.

Her discoveries also helped create a new branch of mathematics. It is known as "geometric analysis." This area of study combines geometry and difficult mathematical equations. Geometric analysis is used to study curved surfaces, like those of soap bubbles.

Bloomberg News notes that the new Abel winner has helped theoretical physicists. Unlike scientists who do experiments, theoretical physicists use math to understand the world and make predictions. Her work helped them develop new ideas of their own.

Uhlenbeck wrote an essay in 1996 about her life. She said when she was growing up she never saw herself becoming a mathematician. Instead, she was more interested in reading science books. After studying math at the University of Michigan, however, she changed her mind. In 1968, she earned a PhD in mathematics from Brandeis University in Massachusetts. A PhD is the highest academic degree one can earn. Earning a PhD is a great honor.

Unfair Treatment

Uhlenbeck was one of the few women in her PhD program. She experienced unfair treatment from male peers and professors as a result.

"We were told that we couldn't do math because we were women," she wrote in a 1996 essay. "I liked doing what I wasn't supposed to do." It made her a rebel, she wrote.

Uhlenbeck worked at several universities across the country but did not feel she was treated fairly. Her husband at the time was scientist Olke C. Uhlenbeck. He worked at the same universities. That often caused people to think less of her. She was sometimes seen as just a wife rather than a mathematician with her own ideas. She ended up at the University of Texas at Austin, where she remained until her retirement in 2014.

New Paths For Women In Math And Science

Winning the Abel Prize adds yet another honor for Uhlenbeck. She has already helped to create many new paths for women in math and science, though. She previously won a MacArthur Fellowship, a prize known as a "Genius Grant" given out to original thinkers. In 1990, she became only the second woman to give a highlighted talk at the International Congress of Mathematicians. Uhlenbeck has also led several outreach and teaching programs that support women in mathematics.

Jim Al-Khalili is a British scientist who spoke about Uhlenbeck in an Abel Prize statement. He says her work should have been honored even more than it was. "Her work has led to some of the most important advances in mathematics in the last 40 years," he said.

Quiz

1 How did Uhlenbeck become interested in mathematics ? How do you know?

(A) She discovered the field of geometric analysis: "This area of study combines geometry and difficult mathematical equations. Geometric analysis is used to study curved surfaces, like those of soap bubbles."

(B) She studied math after going to college for science: "Instead, she was more interested in reading science books. After studying math at the University of Michigan, however, she changed her mind."

(C) She had always wanted to be a mathematician: "In 1968, she earned a PhD in mathematics from Brandeis University in Massachusetts. A PhD is the highest academic degree one can earn."

(D) She learned about math from her husband: "Her husband at the time was scientist Olke C. Uhlenbeck. He worked at the same universities."

2 Read the section "New Paths For Women In Math And Science."

Which sentence from the section supports the conclusion that Uhlenbeck thinks there should be more women in math and science?

(A) Winning the Abel Prize adds yet another honor for Uhlenbeck.

(B) She previously won a MacArthur Fellowship, a prize known as a "Genius Grant" given out to original thinkers.

(C) Uhlenbeck has also led several outreach and teaching programs that support women in mathematics.

(D) "Her work has led to some of the most important advances in mathematics in the last 40 years," he said.

3 Why did Uhlenbeck feel like a rebel after getting her PhD?

(A) She was told that women could not do math.

(B) She was told that no women had PhDs.

(C) She was certain she would win an Abel Prize.

(D) She was certain she could study minimal surfaces.

4 What effect did Uhlenbeck's work on bubbles have on theoretical physicists?

(A) It brought them to the International Congress of Mathematicians.

(B) It caused them to discover the presence of electrical fields.

(C) It showed that their work was wrong based on geometric analysis.

(D) It helped them develop new ideas and make predictions of their own.

Answer Key

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