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Three share 2009 Nobel Prize in physics

Charles K. Kao was cited for a breakthrough involving fiber optics. Willard S. Boyle and George E. Smith were honored for an imaging semiconductor circuit known as the CCD sensor--the technology behind the digital camera.

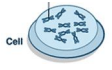


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STOCKHOLM - Three scientists who created the technology behind digital photography and helped link the world through fiber-optic networks shared the 2009 Nobel Prize in physics today.

Charles K. Kao was cited for his breakthrough involving the transmission of light in fiber optics while Willard S. Boyle and George E. Smith were honored for inventing an imaging semiconductor circuit known as the CCD sensor.

The Royal Swedish Academy of Sciences said all three have American citizenship. Kao also holds British citizenship while Boyle is also Canadian.

The award's \$1.4-million purse will be split, with Kao taking half and Boyle and Smith each getting a fourth. The three also receive a diploma and an invitation to the prize ceremonies in Stockholm on Dec. 10.

Kao, who was born in Shanghai and is a British citizen, was cited for his 1966 discovery that showed how to transmit light over long distances via fiber-optic cables, which became the backbone of modern communication networks that carry phone calls and high-speed Internet data around the world.

"With a fiber of purest glass it would be possible to transmit light signals over 100 kilometers (62.14 miles), compared to only 20 meters (65.62 feet) for the fibers available in the 1960s," the citation said.

Boyle and Smith worked together to invent the charged-coupled device, or CCD, the eye of the digital camera found in everything from the cheapest point-and-shoot to high-speed, delicate surgical instruments.

In its citation, the academy said that Boyle and Smith "invented the first successful imaging technology using a digital sensor, a CCD."

It said that technology builds on Albert Einstein's discovery of the photoelectric effect, for which he was awarded the Nobel physics prize in 1921.

The two men, working at Bell Labs in New Jersey, designed an image sensor that could transform light into a large number of image points, or pixels, in a short time.

"It revolutionized photography, as light could now be captured electronically instead of on film," the Academy said.

"Without the CCD, the development of digital cameras would have taken a slower course. Without CCD we would not have seen the astonishing images of space taken by the Hubble space telescope, or the images of the red desert on our neighboring planet Mars," it said.

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Boyle, in a phone call to the academy, said he is reminded of his work with Smith "when I go around these days and see everybody using our little digital cameras, everywhere. Although they don't use exactly our CCD, it started it all."

He added that the biggest achievement resulting from his work was when images of Mars were transmitted back to Earth using digital cameras.

"We saw for the first time the surface of Mars," Boyle said. "It wouldn't have been possible without our invention."

The academy said digital image sensors are usually involved when photo, video or television are used for medical applications, such as taking images inside the body.

"It can reveal fine details in very distant and in extremely small objects," the academy said.

The physics award is the second of the 2009 Nobel Prizes to be announced.

On Monday, three American scientists shared the Nobel Prize in medicine for discovering a key mechanism in the genetic operations of cells, an insight that has inspired new lines of research into cancer.

Elizabeth H. Blackburn, who also has Australian citizenship, Carol W. Greider and Jack W. Szostak were cited for their work in solving the mystery of how chromosomes, the rod-like structures that carry DNA, protect themselves from degrading when cells divide.

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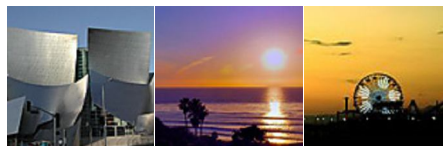
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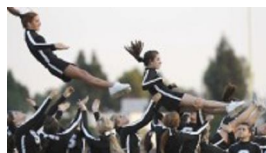
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