

Snapshot of a Nobel Laureate

By Victoria Lassonde



Photo Credit: Victoria Lassonde

Mr. Smith holds memorials to his achievements.

Life suddenly became very hectic for 79-year-old George Smith of Barnegat once the word got out that he had won this year's Nobel Prize in Physics for a device he developed with a colleague, Willard Boyle, at Bell Laboratories 40 years ago.

Their invention, the charge-coupled device (CCD), is a light-sensitive semiconductor chip that captures and stores images. Among many other uses, it has enabled astronomers to explore farther reaches of outer space than ever before possible. It is a key component in the main camera, or "eye," of the Hubble Telescope. With it, scientists were able to prove the existence of dark matter.

The call came from Stockholm in early October. Since then, Smith has been bombarded by journalists wanting to interview him about his accomplishment. ("That's an understatement," he said.) Luckily, Smith has more than a little experience in explaining complex science in simplified terms for laypeople.

How has life changed for the Nobel Laureate? For one thing, his to-do list has gotten longer. In addition to returning phone messages and emails, he is fielding invitations to give keynote speeches at major conferences in places like Beijing and Seoul. To formally accept the award, an honor he shares with three other scientists, including Boyle, he and his wife Janet Murphy will travel to Stockholm for Nobel Week in early December. He was also invited to the White House for Nobel Day on Dec. 1 but had to decline because it conflicted with their trip. He did receive, however, a hand-signed, personal letter of congratulations from President Barack Obama.

Smith was born in White Plains, N.Y., in 1930. He attended four different grade schools and five high schools, he said, because his father "kept flitting from one (occupation) to another." After graduating from high school, he spent four years in the U.S. Navy, working as a weather man. He would send up weather balloons and track them to collect upper atmosphere data. While stationed in Miami, Fla., he attended the University of Miami, where he got involved in research to detect hurricanes in the Caribbean using seismometers to measure microseisms, or tremors, in the ocean bed, transmitted by hurricane activity. At that time seismographs were used only in earthquake studies; using them to find hurricanes was a new idea.

As a reward for his groundbreaking work there, the school basically granted him his first full year of higher education, he said.

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When he got out of the Navy in '52, he transferred to the University of Pennsylvania, which he chose over the other schools that wanted him because his parents were living in Philadelphia at the time, and he preferred to live with them than in a dormitory. Math had been his first love in school – in fact, he tested out of freshman-level math courses at the University of Miami – but he decided against a career as a mathematician, which he felt would have been “a little too esoteric” and “not real-world” enough, so he switched over to physics and earned a four-year degree in just three years.

For his doctorate, he attended the University of Chicago, where he specialized in solid-state physics, the study of how electrons move around in solid matter, which is important in semiconductor devices, he explained.

It took him only four years to advance his degree from master's to Ph.D. His thesis, at only three pages in length, was (and remains) the shortest in the University of Chicago's history.

“I was able to say everything I needed to say in three pages,” he shrugged. His paper was published in a major physics journal called *The Physical Review*. He was also fortunate, he said, to have a thesis professor who gave him *carte blanche*, more or less, to do as he pleased.

Unrestricted imagination is a theme that runs throughout Smith's life; he strongly believes (and is living proof) that letting minds roam to new, far out places is essential to human progress. He was able to achieve great things in college thanks to a professor who fostered intellectual freedom, and he extended the same freedom to his staff of scientists in the department he headed at Bell Labs, the birthplace of the transistor.

His Device Concepts Department was “charged with inventing the wave of the future,” he said. His staff was comprised of 30-or-so “bright, imaginative people,” about half of them with Ph.Ds, whom “no one else wanted because they were so ornery.” He still proudly recalls the breakthroughs some of them made under his tutelage: One was a solid-state laser that operated at room temperature; another was the flash memory device, which is familiar to all computer users today and has overtaken random-access memory (RAM); yet another was the first metal-oxide semiconductor transistor.

Smith used to tell his staff: “If less than 50 percent of your ideas fail, you aren't being imaginative enough.”

He spent his first five years at Bell Labs working in the research area where, not surprisingly, “they let you do what you want.” There he formed a friendship with Boyle, with whom he co-invented the CCD.

“We had a penchant for getting together and knocking ideas around,” he said. When asked about the specifics of the device they invented, Smith joked, “This

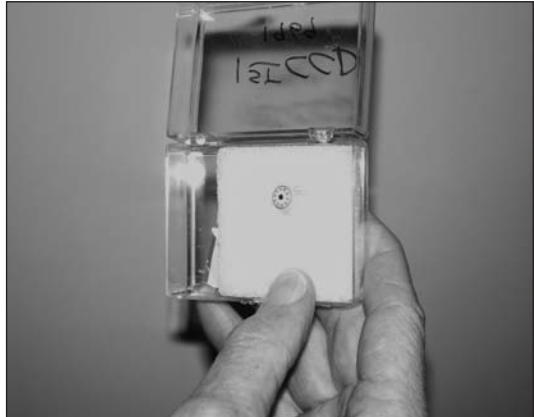


Photo Credit: Victoria Lassonde

Mr. Smith holds the original prototype of the device he invented, which is called a CCD.

is the place (in the story) where you pull the string in my back.”

CCD technology is similar to magnetic bubble memory but with semiconductors, he said; its first application was a television-camera tube, and soon after, RCA developed the first commercial TV camera. It was a solid-state replacement for the electron tube that had existed before that, which was “a real clunker,” he said. In a shadow box hanging in a hallway of his home is the original CCD prototype. Over the years, technology has made the device smaller in size, but “the basic mechanism is still the same,” he said, and “it is still the absolute best thing for taking pictures.”

Smith worked for Bell Labs from 1964 until he retired in 1986. With Janet Murphy, he spent the next 17 years sailing around the world in their yacht, Apogee, built expressly for that purpose. They “bounced around in the South Pacific” for several years, loving the Galapagos Islands in Ecuador; they also loved the Mediterranean in temperate climates but flew back to New Jersey for the winters between 1998 and 2002, all the while without a predetermined course, naturally.

“We’re retired – we just followed our noses.”

And right under Ocean County residents’ noses, perhaps unbeknownst even to some of their neighbors in the lagoon-front community of Pebble Beach, greatness resides. When the aches and pains associated with aging started take the wind out of their sailing adventure, they returned to Barnegat – where Murphy grew up, where their shared love of sailing first brought them together and where Apogee now docks, as their next adventure, this time in Sweden, begins.



Photo Credit: Victoria Lassonde

Mr. Smith explaining the route he and his wife took during the 17 years they spent sailing around the world.

