

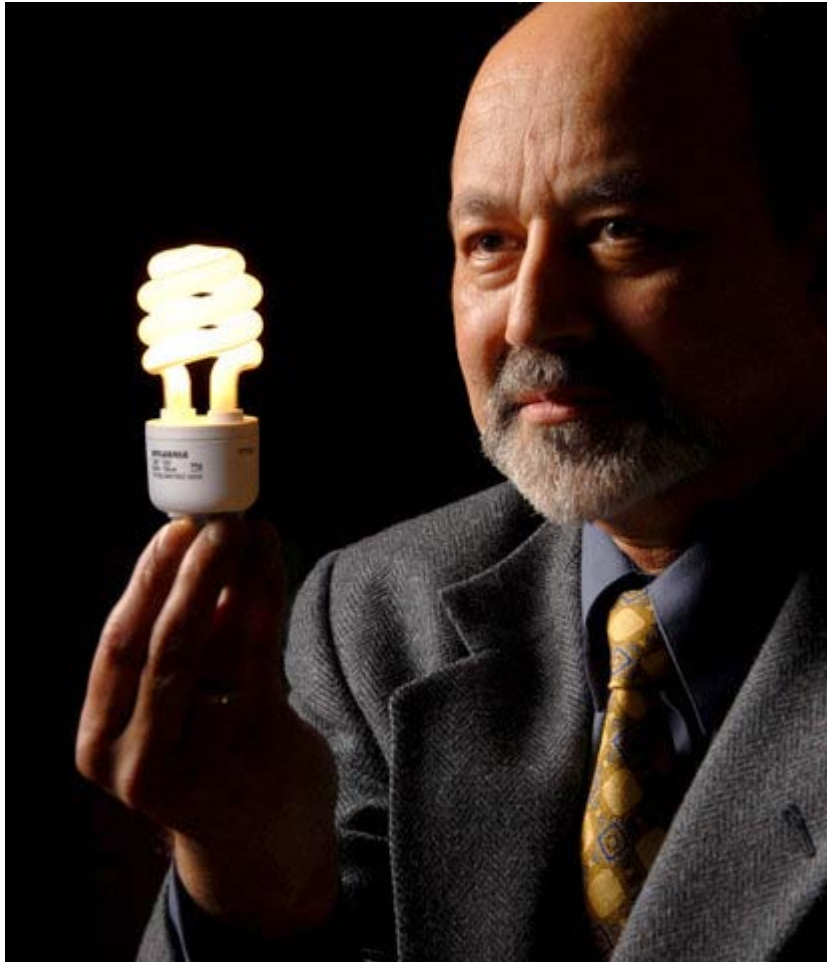
NCSU prof to receive medal for device

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Engineering researcher Jay Baliga in his EGRC lab.

RALEIGH B. Jayant Baliga's most important invention - a kind of switch for efficiently controlling the flow of electrical power - is obscure but nearly everywhere, and without it life would be really, really different.

The device, called an insulated gate bipolar transistor, can now be found in seemingly everything that uses or creates electricity, including household appliances, computers, cars, industrial and medical equipment, windmills and solar panels. It's particularly important in the construction of hybrid and electric vehicles, and is even used in the new compact fluorescent light bulbs and Boeing 787 Dreamliner.

It reduces energy use, and by some estimates has helped save trillions of dollars in electricity and kept vast amounts of climate-changing carbon out of the atmosphere.

President Barack Obama will recognize Baliga's achievements today in a ceremony at the White House when he presents the long-time N.C. State University professor with the nation's highest honor for technological advancements, the National Medal of Technology and Innovation. The medal has been called America's Nobel Prize for innovation, and past winners include Apple Computer founders Steve Jobs and Steve Wozniak and Microsoft founder Bill Gates.

It's no stretch that Baliga's name (pronounced Bal-IG'-uh) is joining theirs, said Tom Jahns, a professor in the electrical and computer engineering department at the University of Wisconsin who worked with Baliga at General Electric, where Baliga invented the IGBT.

"There are already huge amounts of energy savings because of this," Jahns said. "And if you imagine a world, as I do, with more and more hybrid and electric vehicles and ... alternative energy sources, the impact will become even greater."

An electrical background

Baliga, who holds more than 120 patents and has written 16 books and more than 500 scholarly articles, was born in Madras, India. Even as a child, he was steeped in electrical engineering because his father was one of India's pioneers in the field and played a key role in starting that nation's television and radio industries.

Baliga came to the United States for his graduate studies, and earned his master's and doctoral degrees in electrical engineering in the early 1970s from Rensselaer Polytechnic Institute in Troy, N.Y. He wrote his thesis on a process that's now widely used in the production of light emitting diodes and lasers.

He then took a job with General Electric's Research Laboratory in Schenectady, N.Y., where he worked for about 15 years, and in the late 1970s conceived the IGBT. He was not only smart enough to come up with the idea, but had the force of will required to champion it against skeptics who didn't think it would work, and lead a team that turned the invention into a practical device, Jahns said.

"He's a relatively mild-mannered man, not the kind to jump up and down and shout from the rooftops, but he's also self-confident and committed," Jahns said. "Despite the skepticism that reigned around him, he maintained a steady course, and just had the strength of will to move forward until the problems were solved."

Baliga came to NCSU in 1988 and is the founding director of the university's Power Semiconductor Research Center. Among other things, he is part of the NCSU team that's working with four other universities on a federally funded project to help develop a national "smart" power grid that can better handle alternative energy sources and electric vehicles, and use sophisticated equipment to predict energy needs and deliver power more efficiently.

He is working on a new type of IGBT that would be particularly useful for that grid.

Baliga has remained a prolific inventor, earning about 50 of his patents at NCSU, and started four spinoff companies in the Triangle to pursue commercial applications. One has more than 40 employees. All were snapped up by a large company in 2009 that he's not allowed to identify under terms of the deal.

Previous awards

Baliga has won a long list of awards, including the UNC system's O. Max Gardner Award for the faculty member who has made the "greatest contribution to the welfare of the human race," and was named one of the Eight Heroes of the Semiconductor Revolution by Scientific American Magazine. The national medal, though, is especially thrilling, he said, and particularly exciting because the president will present it.

Despite wide use of the IGBT, Baliga isn't getting rich from it: GE owns the rights. He's not bitter, though, and said GE treated him extremely well, giving him a year off to pursue whatever he wished.

"Oh, let's not go there," he joked when asked about royalties. "Really though, I tell people I have to take satisfaction with the benefits for society that have come from it. Money is great, but if you have an amount that's sufficient, it's not the most important thing."

Price: 919-829-4526