

IEEE Announces 2009 Andrew S. Grove Award

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Eric R. Fossum, an engineer who created the complementary metal-oxide semiconductor (CMOS) active pixel image sensor and pursued its commercialization, is being honored by The Institute of Electrical and Electronics Engineers (IEEE), the world's leading professional association for the advancement of technology, with the 2009 Andrew S. Grove Award.

The award, sponsored by the IEEE Electron Devices Society, recognizes Fossum for significant contributions to the invention, development and commercialization of CMOS image sensors. The award will be presented at the IEEE International Electron Devices Meeting scheduled to be held on December 8, 2009 in Washington, D.C.

Fossum's development of the CMOS image sensor, or "camera on a chip," in the early 1990s has had a profound effect on digital imaging technology, with uses ranging from Web cams, cell phone cameras, high-end digital single-lens-reflex cameras, and swallowable medical "pill-cameras" to automotive and space exploration applications. The image sensor converts optical images into electric signals. In the CMOS image sensor, extra circuitry converts the light energy to a voltage, which is then converted to digital data.

Prior to Fossum's work, the primary technology for image sensors was charge-coupled devices (CCDs), but high power consumption and an inability to integrate other electronics on chips, limited their utility in a mobile electronics market. Fossum's CMOS image sensor, an active pixel sensor, took advantage of shrinking design rules and adapted successful CCD signal processing techniques to put an amplifier on each pixel of the image sensor to yield a high-quality image using much less power. Other advantages of the CMOS image sensor include faster speed and reduced camera size, which make it favorable for use in consumer devices such as cell phones.

Initially greeted with skepticism by the image sensor community, the improved image quality and on-chip analog-to-digital conversion (ADC) capabilities of the CMOS sensor, combined with the increasing need for portable electronics with low power and high levels of integration, spurred acceptance of the technology. Fossum co-founded Photobit Corporation in 1995 to accelerate the technology's commercial use. Competition soon came from other start-up companies, but Photobit's sensors were seen to have the best image quality and were used by Logitech and Intel for Web cameras. The company also pioneered the use of digital color processing and column-parallel ADC for high-speed image processors. In 2001, Photobit was acquired by Micron Technology, which is one of the largest suppliers of image sensors in the world.

An IEEE Fellow, Fossum holds 119 U.S. patents. He received Yale University's Becton Prize in 1984, the IBM Faculty Development Award in 1984, the National Science Foundation Presidential Young Investigator Award in 1986, the Jet Propulsion Lab Lew Allen Award for Excellence in 1992, and the NASA Exceptional Achievement Medal in 1996. He was inducted into the U.S. Space Foundation Technology Hall of Fame in 1999. In 2003 he received the Photographic Society of America's Progress Medal, and in 2004 he received the Royal Photographic Society's Progress Medal. Fossum received his bachelor's degree from Trinity College, Hartford, Connecticut, and his master's and doctorate degrees from Yale University, New Haven, Connecticut. He is currently a consultant for the Samsung Electronics Semiconductor Research and Development Center, where he leads a team of researchers in advanced imaging sensors.