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OSA Members Honored for Development of 'camera-on-a-chip' Technology

WASHINGTON — The Optical Society (OSA), the leading global professional association in optics and photonics, today announced that OSA Fellow Eric Fossum and OSA Emeritus member George E. Smith, 2009 Nobel Laureate in Physics, will receive the Queen Elizabeth Prize for Engineering (QEPrize) for work on Complementary Metal Oxide Semiconductor (CMOS) image sensor technology, also called 'camera-on-a-chip', for high-speed charge coupled devices (CCDs).

"The Queen Elizabeth Prize for Engineering is one of the highest honors any researcher can receive, and recognizes those whose contributions have benefitted humanity on a global scale," said Elizabeth Rogan, CEO of The Optical Society. "On behalf of The Optical Society, I would like to congratulate Dr. Fossum and Dr. Smith and all of 2017's QEPrize winners. They pioneered engineering technologies that are now part of our culture and launched high-quality portable digital cameras into ubiquity."

"I am very honored to share this prestigious award," said Fossum. "We never set out with this invention to incorporate digital cameras in our smartphones yet this achievement has proven to be a game-changer in mobile phone technology. Receiving this award from Queen Elizabeth II at Buckingham Palace later this year will be a deeply humbling experience."

The QEPrize is awarded biannually for, "ground-breaking innovation in engineering which has been of global benefit to humanity." The 2017 QEPrize will be shared with Nobukazu Teranishi and Michael

Tompsett. Previous winners include the creators of the internet and Dr. Robert Langer for his work on controlled drug delivery. All four of the 2017 recipients contributed in different ways to the development of modern digital camera technology.

About Dr. Eric Fossum

Eric Fossum spent much of his career at the National Air and Space Administration's (NASA) Jet Propulsion Laboratory in Pasadena, California, USA, where he led the development of CMOS image sensors and worked on refining imaging technology for space travel. Both the CCD and Fossum's CMOS sensor used pixels to produce an electrical signal that could then be converted into a binary code and stored as digital information. However, the CMOS sensor uses several transistors at each pixel instead of transferring charges to the corner of the pixel array, amplifying the data and converting it much more efficiently than CCDs. Because of Fossum's innovation, CMOS sensors could be integrated with mainstream CMOS electronics and miniaturized, and consumed significantly less power, making digital photography technology more accessible.

Currently, Fossum is a professor of engineering at Dartmouth's Thayer School of Engineering in Hanover, New Hampshire, USA. The QEPrize is not Fossum's first prestigious award; his accolades include a NASA Exceptional Achievement Medal, the Royal Photographic Society Progress Medal, the Yale University Wilbur Cross Medal, the Society of Motion Picture and Television Engineers Camera Origination and Imaging Medal and induction into the National Inventors Hall of Fame.

About Dr. George E. Smith

While working at Bell Laboratories in 1969, George E. Smith developed the original concept for the charge-couple device or CCD. Though originally intended as a computer memory circuit, the CCD went on to form the basis of digital image sensors. Originally called 'charge bubble devices' (because small magnetized areas called bubbles or domains stored one bit of data), their CCD design transferred charge along the surface of a semiconductor instead. This meant it could be used for digital memory, like the magnetic bubble, or for imaging devices. Smith remained at Bell Labs until his retirement in 1986 working on a range of technologies, from lasers and the electronic structure of solids to electroluminescence.

Smith shares the 2009 Nobel Prize in physics with Willard Boyle for their work in electronic memory design. This concept was the basis for the light-sensitive charge coupled device (CCD).

About The Optical Society

Founded in 1916, The Optical Society (OSA) is the leading professional organization for scientists, engineers, students and entrepreneurs who fuel discoveries, shape real-life applications and accelerate achievements in the science of light. Through world-renowned publications, meetings and membership initiatives, OSA provides quality research, inspired interactions and dedicated resources for its extensive global network of optics and photonics experts. For more information, visit: osa.org/100.

Media Contacts:

mediarelations@osa.org

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