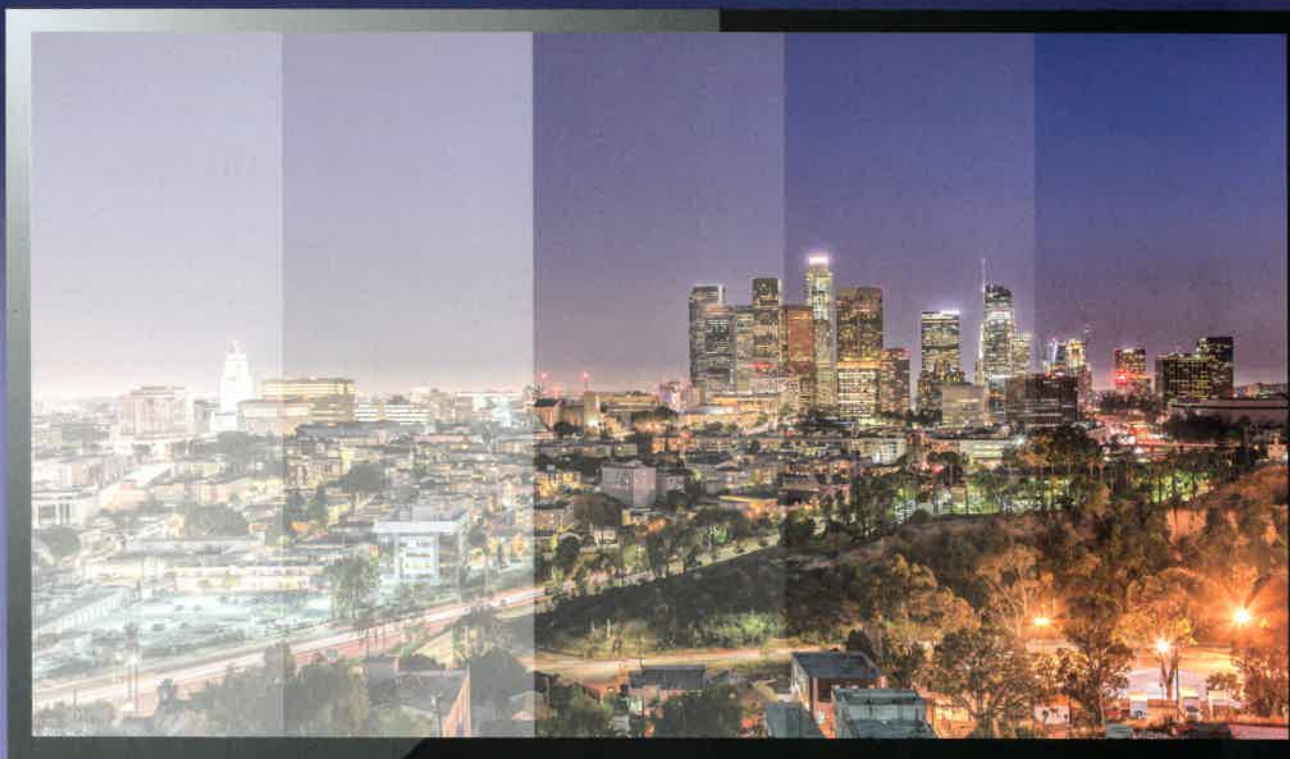




April 2018

# **SMPTE** **Motion** **Imaging** **Journal**

*Covering emerging technologies  
in film, broadcast, and  
the connected media ecosystem*



## **UHD/HDR/WCG**

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- ▶ **Access Services for UHD TV: An Initial Investigation of W3C TTML2 Subtitles (Closed-Captions)**
- ▶ **A Brightness Measure for High Dynamic Range Television**

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- ▶ **Characterization of Processing Artifacts in High Dynamic Range, Wide Color Gamut Video**
- ▶ **A Newly Developed 8K/HLG Broadcasting Camera System With Three CMOS Image Sensors**



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## Member Profile: Eric Fossum

**W**hen SMPTE Member Eric Fossum received the prestigious Queen Elizabeth Prize—the highest global honor for engineering—in 2017, he became part of a uniquely distinguished group of inventors. While earlier award winners are credited with achievements such as inventing the World Wide Web or engineering disease treatments that improved two billion lives worldwide, Fossum and the three other engineers who received the QEPrize along with him are credited with inventing the image sensor technology which is at the heart of every digital camera today and in billions of devices, including motion picture and television cameras, smartphones, medical devices, security systems, automobiles, and many other professional and consumer applications.

In other words, social media would not be what it is today without Eric Fossum. But the significance of his work goes well beyond the selfie and the funny cat video.

As a solid-state image sensor device physicist and engineer with a bachelor of science in physics and engineering from Trinity College and a PhD in engineering and applied science from Yale University, Fossum was recruited from Columbia University's electrical engineering faculty by the NASA Jet Propulsion Laboratory (JPL) in 1990 to explore miniaturization of cameras for use in space. While at JPL, he invented the intrapixel charge transfer complementary metal oxide semiconductor



Eric Fossum (right) receives his award from Prince Charles.

(CMOS) active-pixel-sensor—or “camera-on-a-chip”—technology.

A co-founder of Photobit Corporation, Fossum led further development and the subsequent transfer of this groundbreaking technology to the U.S. industry. (Like other experts of the electronics world, Fossum and his then-wife—Dr. Sabrina Kemeny, who was on maternity leave from her engineering work at JPL—launched that business from the basement of their home.)

Consuming less power and occupying less space than the previous generation charge-coupled device camera technology, and less susceptible to radiation damage as well, CMOS image sensor technology was ideal for aerospace applications as well as for compact mainstream mobile devices. It became the new industry standard.

After the sale of Photobit to Micron in 2001 and several years of retirement, Fossum led Siimpel

Corporation, a developer of auto-focus systems for cell phone cameras. He retired once more in 2007 and moved to New Hampshire, but shortly thereafter came out of retirement as a consultant for Samsung Electronics and then became a professor with the Thayer School of Engineering at Dartmouth College. Currently, he teaches, performs research on the new photon-counting Quanta Image Sensor (QIS), and directs the school's PhD Innovation Program. Fossum also serves as Dartmouth's associate provost for entrepreneurship and technology transfer. He and his students recently co-founded Gigajot Technology (Pasadena, CA) to commercialize the QIS technology.

For his pioneering work in the creation of digital imaging sensors, Fossum received the SMPTE Camera Origination and Imaging Medal in 2014. Earlier, he was inducted into the National Inventors Hall of Fame (NIHF), elected to the National Academy of Engineering, and selected as a Charter Fellow of the National Academy of Inventors. Other honors include the NASA Exceptional Achievement Medal, the IEEE Andrew Grove Award and Medal, and the Royal Photographic Society's Progress Medal, among other honors.

Fossum has published more than 300 technical papers and holds 165 U.S. patents. He co-founded the International Image Sensor Society (IISS) and was its first president. Fossum is a fellow of the Institute of Electrical and Electronic Engineers, a fellow of the Optical Society of America (OSA), and a member of the American Association for the Advancement of Science.