James Floyd Scott FREE

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James Floyd Scott

With the passing of James Floyd Scott, the international ferroelectrics community is mourning the loss of its father figure. Just as ferroelectric materials might be polarized up or down and stay that way, Jim was unfailingly decisive and possessed an encyclopedic knowledge of his subject. Combining those qualities with great creativity, he had a remarkable career that was productive, distinguished, and richly decorated by an incredible gift for storytelling, which can be appreciated from the transcript of his 2018 IEEE interview (https://ethw.org/Oral-History:James_F._Scott).

Jim's work led to the integration of ferroelectrics with semiconductors, a demonstration of fatigue-free ferroelectric switching, the canonical 2000 book *Ferroelectric Memories*, and an army of "fellow electricians" who now carry the torch. Jim was a warm, generous, and friendly person to the majority, but he did not gladly suffer most fools or political correctness, as reflected in his eloquent demonstration that electrically leaky materials cannot be identified as ferroelectric because their hysteresis loops resemble those of bananas.

Born, in his words, "on the wrong side of the tracks" in Beverly, New Jersey, on 4 May 1942, Jim went on missions to the USSR and China in the 1970s, when those countries were closed. While visiting Pyotr Kapitsa in the USSR, he met Galya, whom he married in 1982. Many in the ferroelectrics community know her well and will be moved to see her sketch of Jim reproduced here. It is one of her early works, and yet it captures something of his essence.

Jim's early work did not focus on ferroelectrics, but each stage was increasingly relevant: Physics formed only part of his 1963 BA from Harvard University; high-resolution molecular spectroscopy was the subject of his 1966 PhD from the Ohio State University, under K. Narahari Rao; and at Bell Labs he was then well placed to perform five years of Raman spectroscopy and explain the soft mode in strontium titanate. Ferroelectrics began for Jim in 1970 with William Cochran at the University of Edinburgh in Scotland. Shortly thereafter, Jim started a 20-year career at the University of Colorado Boulder, where he performed groundbreaking research on ferroelectrics, served as assistant vice chancellor for research, won a teaching prize, and twinned Boulder with the city of Dushanbe, Tajikistan. Somewhat like head-to-head domains, those twins faced the iron curtain in opposite directions.

James Floyd Scott

GALYA SCOTT

To integrate ferroelectrics with semiconductors for technological purposes, Jim cofounded Ramtron International Corp in 1984, and then in 1986 he cofounded Symetrix Corp, both in Colorado Springs. Within the next few years, Symetrix was working with the Matsushita Electric Corp in Japan to exploit Jim's clever idea that bismuth oxide planes can act as oxygen reservoirs for fatigue-free switching in strontium–bismuth tantalate. Jim subsequently exploited that material with Sony in Japan, but not before he had moved base to Australia in 1991. As the new millennium dawned, FeRAMs (ferroelectric random-access memories) began to enjoy commercial applications, first in Sony's Playstation 2 and later, notably, in Japanese railway fare cards.

Jim maintained his research output in Australia, first at RMIT University in Melbourne, where he started PhD programs in 14 departments and served as dean of applied science, and then at the University of New South Wales in Sydney, where he integrated the optometry research laboratory onto campus and was dean of science.

In 1999 Jim joined the department of Earth sciences at Cambridge University in England. With a loyal team, a small laboratory, and an ornate coffee table in the common room, he continued to make huge contributions to his core field of ferroelectrics while finding time to work with me on magnetoelectrics after what for him was a 30-year hiatus. As he told it, our serendipitous discovery of magnetoelectric effects in commercially manufactured multilayer capacitors arose from waterborne discussions while crossing the maritime city of Kiel, Germany. Our review article eventually garnered even more citations than Jim's paper on fatigue-free switching, and if anyone was keen on citation numbers, it was Jim. His prolific output was bolstered by working with a range of collaborators around the world, and he continued in that vein after moving in 2009 to the Cavendish Laboratory, where he worked with the locals on quantum criticality.

Jim's ferroelectric odyssey ended, as it began, in Scotland—the country from which his name is fittingly derived. He spent five productive years at the University of St Andrews before returning home to Cambridge in poor health at the dawn of 2020, and he passed away on 6 April. For decades he had referred to various medical problems while noting with gallows humor that none were trivial. This attitude lent him an aura of physical invincibility that nicely complemented his intellectual mettle. Jim lived through an amazing period in history and witnessed horse-drawn carriages dominating the streets of Beijing through to the advanced electronics in which he played a part.

I fondly recall the good times spent with Jim over coffee in the Earth sciences common room and how he was the most wonderful traveling companion and roommate on long-haul economy trips. Jim enabled all of my current research on electrocalorics and magnetoelectrics, and I didn't even work for him.

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