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Norman Abramson, Pioneer Behind Wireless Networks, Dies at 88

His ALOHAnet, designed a half-century ago in Hawaii, was a precursor to the technology used in today's smartphones and home WiFi networks.

Norman Abramson in the mid-1970s, when he headed a group that developed the ALOHAnet, an early wireless data network.via Rose de Heer

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By Steve Lohr Dec. 11, 2020

Norman Abramson, the leader of a group of scientists and engineers who pioneered the development of wireless computer networks, died on Dec. 1 at his home in San Francisco. He was 88.

The cause was skin cancer that had metastasized to his lungs, his son, Mark, said.

Professor Abramson's project at the University of Hawaii was originally designed to transmit data to schools on the far-flung Hawaiian islands by means of a radio channel. But the solution he and his group devised in the late 1960s and early '70s would prove widely applicable; some of their technology is still in use in today's smartphones, satellites and home WiFi networks.

The technology they created allowed many digital devices to send and receive data over that shared radio channel. It was a simple approach that did not require complex scheduling of when each packet of data would be sent. If a data packet was not received, it was simply sent again. The approach was a departure from telecommunications practices at the time, but it worked.

"It was an incredibly audacious idea, real out-of-the box engineering," said Vinton Cerf, a computer scientist at Google and the co-author, with Robert Kahn, of the technical standards for linking computer networks on the internet.

The wireless network in Hawaii, which began operating in 1971, was called ALOHAnet, embracing the Hawaiian salutation for greeting or parting. It was a smaller, wireless version of the better known ARPAnet, the precursor to the internet, which allowed researchers at universities to share a network and send messages over landlines. The ARPAnet was led by the Pentagon's Advanced Research Projects Agency, which also funded the ALOHAnet.

"The early wireless work in Hawaii is vastly underappreciated," said Marc Weber, an internet historian at the Computer History Museum in Mountain View, Calif. "Every modern form of wireless data networking, from WiFi to your cellphone, goes back to the ALOHAnet."

Professor Abramson has been called the father of wireless networking. But it was a shared paternity. The project included graduate students and several faculty members, notably Frank Kuo, a former Bell Labs scientist who came to the University of Hawaii in 1966, the same year Professor Abramson arrived.

His deepest expertise was in communication theory, the subject of his Ph.D. thesis at Stanford University. The fundamental design ideas behind ALOHAnet were his. In a 2018 oral history interview for the Computer History Museum, Professor Kuo recalled, “Norm was the theory and I was the implementer, and so we worked together pretty well.”

ALOHAnet owed a lot to surfing. Professor Abramson was presenting a paper at an academic conference in Tokyo in the days when flights from San Francisco to Tokyo had to stop midway in Honolulu. Professor Abramson, who was raised in Boston, had not been to Hawaii before and decided to spend a few days there on the way home.

He rented a surfboard. “I got on, I learned how to surf, and I said, Boy, I could stand some of this,” he recalled in 2013 in an oral history interview with the Computer History Museum.

Within a year, after the University of Hawaii offered him a tenured professorship, he and his family moved to Hawaii. “My father was really wrapped up in his work, but he surfed nearly every day,” Mark Abramson said.

That the ALOHAnet technology became so widely used was partly because Professor Abramson and his team had shared it freely and welcomed other scientists to Hawaii.

Professor Abramson majored in physics at Harvard, then earned a master’s degree in physics from the University of California, Los Angeles, and his doctorate in electrical engineering from Stanford, in 1958. He briefly worked in industry and had postdoctoral teaching stints before he went to Hawaii. He retired from the University of Hawaii in 1994.

In addition to his son, Mark, he is survived by his wife, Joan Abramson; his sister, Harriet Schannon; and three grandchildren. His daughter, Carin Wethington, died in 2014.

Some of the data-networking techniques developed by Professor Abramson and his Hawaii team proved valuable not only in wireless communications but also in wired networks. One heir to his work was Robert Metcalfe, who in 1973 was a young computer scientist working at Xerox PARC, a Silicon Valley research laboratory that had become a fount of personal computer innovations.

Mr. Metcalfe was working on how to enable personal computers to share data over wired office networks. He had read a 1970 paper, written by Professor Abramson, describing ALOHAnet’s method for transmitting and resending data over a network.

“Norm kindly invited me to spend a month with him at the University of Hawaii to study ALOHAnet,” Mr. Metcalfe recalled in an email.

Mr. Metcalfe and his colleagues at Xerox PARC adopted and tweaked the ALOHAnet technology in creating Ethernet office networking. Later, Mr. Metcalfe founded an Ethernet company, 3Com, which thrived as the personal computer industry grew.

“Norm, thank you,” Mr. Metcalfe concluded in his email. “Aloha!”