

September 10, 2018 | By Ioana Patringenaru

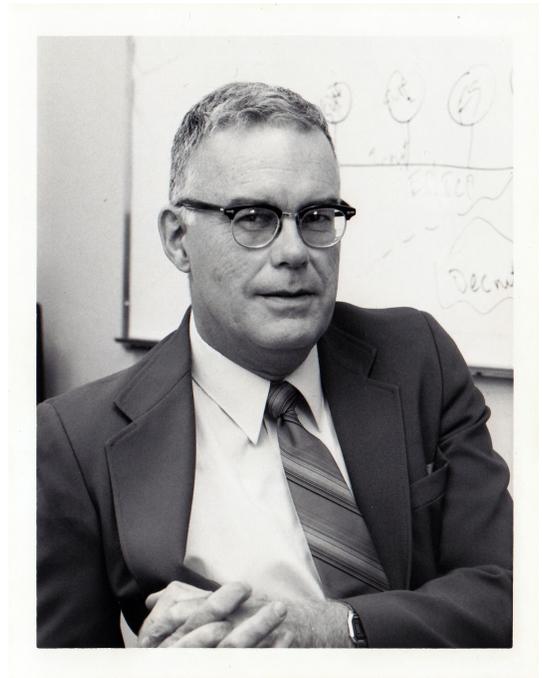
Remembering Kenneth Bowles, Creator of UCSD Pascal

Kenneth (Ken) Bowles, a computer science pioneer and professor emeritus at the University of California San Diego, passed away on Aug. 15, 2018 in Solana Beach, Calif. He was 89.

Bowles gained world renown for initiating and leading a largely student-driven project that culminated in the creation of the UCSD Pascal programming system in the late 1970s, which included a programming language, an operating system and a whole suite of other tools. UCSD Pascal influenced many aspects of computing that are now ubiquitous, including modern PCs and Macs as well as Sun Microsystem's Java language.

"The development of UCSD Pascal was a transformative event not just for UCSD but for all of computer science. It was arguably the first high-level programming system that both worked on small systems that schools, most businesses, and eventually individuals could afford, and was portable across many systems," said Dean Tullsen, professor and chair of the Department of Computer Science and Engineering at the UC San Diego Jacobs School of Engineering.

Bowles was on the UC San Diego faculty from 1965 to 1984. During his 19-year tenure on campus, he helped nurture many students and researchers, who went on to make breakthroughs of their own.



Kenneth Bowles, a computer scientist who served on the UC San Diego faculty for 19 years and was the driving force behind the UCSD Pascal system, passed away Aug. 15. He was 89.

“Ken Bowles is part of the DNA of computer science and engineering here at UC San Diego,” Tullsen said.

Computer science was his second career, taken up because he came to recognize the importance of computing power early on as a theorist and practical engineer in radar physics. He helped to engineer and directed the Jicamarca Radio Observatory in the desert outside Lima, Peru, which is still in existence and has made many astrophysics discoveries possible.

UCSD Pascal

Though the 1970s was the age of mainframe computers, Bowles set out to give students at UC San Diego opportunities to practice writing and rewriting code on the new microcomputers of the day, powered by Intel’s 8080 and Zilog’s Z80 microprocessors. These were the first personal computers that allowed programmers to skip mainframes entirely. Bowles and his team modified the Pascal programming language, which was created for mainframe computers so that it could run on microcomputers, although his students had to become experts at packing operating system instructions into tiny amounts of memory (64 kbytes) to make the systems work. UCSD Pascal ensured that if a programmer wrote code for one type of microcomputer, that same code could be run on a different type of microcomputer without having to be heavily modified.

More than 70 UC San Diego students participated in UCSD Pascal during the 1970s and early 1980s. The team eventually began sharing UCSD Pascal with schools around the world that also wanted to give students opportunities to write and rewrite programming code on personal computers.

Bowles’s students remember most how he encouraged them, according to “[UCSD Pascal and the PC Revolution](#)” a feature article in a 2004 issue of the UC San Diego alumni publication Triton. “Because of [Bowles], they believed that they could write industry-changing software—and they did. They talk about how he taught them to think ‘outside the box’ before industry made it a cliché. And they remember how much he actually cared.”

Beyond improved educational tools, UCSD Pascal had a lasting impact on computer programming. The connections between Ken Bowles, the UCSD Pascal team and the widespread programming language Java are documented in an *IEEE Spectrum* article from 2009, “[Java’s Forgotten Forbear](#),” by William W. McMillan.

The *IEEE Spectrum* article outlines how the “wonderful, write-once, run-anywhere capability of Java” – Java’s lauded software portability – ties back to UCSD Pascal by way of computer science students from Carnegie Mellon who spent time on workstations designed to run UCSD Pascal pseudo code directly on hardware.

In the late 1970s, Apple developed the Apple Pascal programming language and operating system based on UCSD Pascal. The system ran on the Apple II family of computers, giving them a power boost.

UCSD Pascal eventually spun out of academia through SofTech Microsystems. While the UCSD Pascal system did not lead to commercial success on the scale of Bill Gates’ Microsoft or Steve Jobs’ Apple rebirth, its impact is large and continues today.

Kenneth Bowles

Prior to coming to UC San Diego, Bowles worked for the Central Radio Propagation Lab, at the National Bureau of Standards, where he directed the construction and research use of the Jicamarca Radio Observatory in the desert outside Lima Peru. That work involved heavy use of computers for signal analysis to study the earth's ionosphere and magnetosphere, giving him his first experiences in computer science.

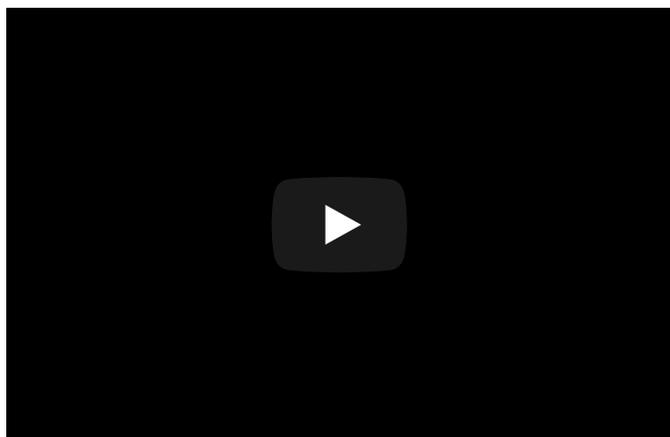
He gained recognition for developing the incoherent-scatter technique for radar, which he used to measure electron-density and temperature profiles in the high ionosphere at a time when little was known about the physical processes resulting in weather, in 1963. Bowles was recruited to UC San Diego by Henry Booker, his former PhD advisor from Cornell University. The two helped to create the Applied ElectroPhysics Department at UC San Diego, a predecessor of the Department of Computer Science and Engineering.

Bowles served as director of the UCSD Computer Center from 1968 to 1974, then returned to his faculty position at UC San Diego until his retirement in 1984. In retirement, he took part in a committee of the International Organization for Standardization which created the standards for the Pascal-based Ada programming language.

After his second retirement in the late 1990s, Bowles returned to one of his earliest passions, photography. He developed techniques for photographing wildflowers at close range and in exquisite detail, focusing particularly on the diverse flora of San Diego County. This effort included development of multiple-entry key software that made it easier for non-experts to correctly identify plants. His work is now integrated into the San Diego County Plant Atlas (sdplantatlas.org) at the San Diego Natural History Museum. As part of this effort, he helped to develop *Earth, Wind & WILDFIRE*, an award winning exhibit at the museum in 2005.

Bowles is survived by his wife and three daughters. The Kenneth Bowles Undergraduate Scholarship in Computer Science Engineering was established in 2004 in honor of Ken's legacy at UC San Diego. This honor was one of the most important of his life because the fund was inaugurated by UCSD Pascal students. In lieu of flowers, the family has asked that gifts in Ken Bowles' honor be made to the scholarship established in his name. To give a gift in memory of Ken Bowles, [click here](#).

Checks can also be mailed to the UC San Diego Foundation, with "Kenneth Bowles Undergraduate Scholarship in Computer Science Engineering" in the memo, to 9500 Gilman Dr. #0940 La Jolla CA 92093-0940.



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