



April 23, 2011

# Max Mathews, Pioneer in Making Computer Music, Dies at 84

By WILLIAM GRIMES

Max Mathews, often called the father of computer music, died on Thursday in San Francisco. He was 84.

The cause was pneumonia, his son Vernon said.

Mr. Mathews wrote the first program to make it possible for a computer to synthesize sound and play it back. He also developed several generations of computer-music software and electronic instruments and devices.

He was an engineer at Bell Laboratories in Murray Hill, N.J., in 1957 when he wrote the first version of Music, a program that allowed an IBM 704 mainframe computer to play a 17-second composition of his own devising.

Because computers at the time were so slow, it would have taken an hour to synthesize the piece, so it had to be transferred to tape and then speeded up to the proper tempo. But the experiment proved that sound could be digitized, stored and retrieved.

“The timbres and notes were not inspiring,” Mr. Mathews told a conference on computer music at Indiana University in 1997, “but the technical breakthrough is still reverberating.”

At Bell, Mr. Mathews developed new generations of Music as well as Groove, the first computer system for live performance. Music V led to such current programs as Csound, Cmix and MAX, a visual-programming language for music and multimedia originally written in the 1980s and named for Mr. Mathews.

The implications of Mr. Mathews’s early research reached popular audiences through the 1968 film “2001: A Space Odyssey,” in which the HAL 9000 computer sings “Daisy Bell (A Bicycle Built for Two)” as its cognitive functions are dismantled.

The science fiction writer Arthur C. Clarke had visited Bell Laboratories in the early 1960s and listened as a vocoder, or voice recorder synthesizer, developed by John L. Kelly, sang “Daisy Bell” to a musical accompaniment programmed by Mr. Mathews. He incorporated the innovation into the novel on which the film was based.

Mr. Mathews later developed the [Radio Baton](#), a forerunner of the gestural controllers developed by Nintendo, [Sony](#) and [Microsoft](#). The device consists of two wands, similar in appearance to timpani sticks, equipped with antennas that allow the user, waving the sticks like a conductor's baton, to spatially manipulate the tempo, dynamics and balance of digitized orchestral music stored on MIDI files and broadcast on a computer.

"He gave us a whole new way to imagine and create music," said John M. Chowning, a composer and the founder of the Center for Computer Research in Music and Acoustics at [Stanford University](#). "He has had an enormous effect on how music has evolved in the past 50 years."

Max Vernon Mathews was born on Nov. 13, 1926, in Columbus, Neb. His parents taught at the state teachers' college in Peru, Neb.

After graduating from high school, he entered the Navy, which trained him as a radio technician and set him on his future course. He went on to study electrical engineering at the [California Institute of Technology](#), where he received a bachelor's degree in 1950, and the [Massachusetts Institute of Technology](#), where he earned a doctorate in 1954.

At Bell Labs, where his mentor was John R. Pierce, Mr. Mathews collaborated with several scientists, as well as the composer James Tenney, working on voice synthesis and computer music. Early on, he saw the musical implications of Claude Shannon's work on converting analog information into digital form. His optimism about the musical possibilities of digitized sound was reflected in the title of an early paper, "The Digital Computer as a Musical Instrument," published in *Science* in 1963.

His research and ideas led to collaborations with the avant-garde composers Edgard Varèse and [John Cage](#). In the 1970s, with the composer and conductor [Pierre Boulez](#), he helped create the Institut de Recherche et Coordination Acoustique/Musique in Paris, a center devoted to research into the science of music and sound and to avant-garde electroacoustical art music.

An enthusiastic amateur violinist, Mr. Mathews invented several electronic violins. The first, called the Crossbow because of its appearance, relied on a voltage-control filter to generate nonviolin sounds. A later violin, made of sheet metal, transmitted sound from a pickup under each string to an electronic work station, where a collaborator could transform the music emanating from the violin.

After serving as the director of the Acoustical and Behavioral Research Center at Bell from 1962 to 1985, Mr. Mathews continued his research as a professor of music at the Center for Computer Research in Music and Acoustics at Stanford.

In addition to his son Vernon, of San Francisco, Mr. Mathews, who also lived in San

Francisco, is survived by his wife, Marjorie; two other sons, Guy, of Palo Alto, Calif., and Boyd, of Berkeley Heights, N.J., and six grandchildren.

“What we have to learn is what the human brain and ear thinks is beautiful,” Mr. Mathews told Wired magazine in January. “What do we love about music? What about the acoustic sounds, rhythms and harmony do we love? When we find that out it will be easy to make music with a computer.”

*This article has been revised to reflect the following correction:*

***Correction: May 1, 2011***

*An obituary last Sunday about the computer-music pioneer Max Mathews omitted the name of a survivor. In addition to his three sons and six grandchildren, Mr. Mathews is survived by his wife, Marjorie. A picture credit misidentified the photographer who took the picture of Mr. Mathews in 1988 at Stanford’s Center for Computer Research in Music and Acoustics, where he taught. It was Patte Wood, not Terrence McCarthy.*