# Robert H. Dennard, Inventor of DRAM and Pioneer in Microelectronics, Dies at 91



Robert H. Dennard, the engineer credited with inventing dynamic random-access memory (DRAM), died on April 23 in Sleepy Hollow, New York, at the age of 91. Dennard’s daughter, Holly Dennard, confirmed the cause of death was a bacterial infection.

Dennard's work revolutionized the field of microelectronics while working at IBM in the 1960s. He discovered a method to store one digital bit of data on a single transistor, a technology known as DRAM, which necessitates periodic refreshing to maintain the data. This breakthrough significantly increased data capacity and processing speeds while reducing costs, ultimately laying the groundwork for modern computing in devices like smartphones, laptops, and tablets.

DRAM remains integral to various applications, including streaming services and artificial intelligence chatbots. John Hennessy, the chair of Alphabet (Google's parent company), noted the fundamental role of DRAM in contemporary computing.

Dennard also introduced a concept known as Dennard scaling, complementing Moore's Law—Gordon Moore's hypothesis that the number of transistors on a silicon chip could double every two years. Dennard's scaling predicted that shrinking transistors would lead to more powerful and cost-efficient chips without a significant increase in energy consumption. However, by 2005, the miniaturization of transistors faced limitations, leading to increased heat and energy consumption.

Born on September 5, 1932, in Terrell, Texas, Dennard pursued an education that led to degrees in electrical engineering from Southern Methodist University and a doctorate from the Carnegie Institute of Technology (now Carnegie Mellon University). He joined IBM in 1958 and spent his entire career there until retiring in 2014.

Robert Dennard held 75 patents and received numerous prestigious awards, including the National Medal of Technology in 1988 and the Kyoto Prize in 2019. He is survived by his wife Frances Jane Bridges, daughters Holly and Amy Dennard, and four grandchildren. His son, Robert H. Dennard Jr., passed away in 1998.