



## ***Seymour Cray – A Man Whose Vision Changed the World***

Recognized as “the father of supercomputing” and credited with single-handedly creating and leading the high performance computer industry for decades, Seymour R. Cray was a single minded computer engineer, regarded by some as a true maverick and “serial” pioneer. Jokingly, he would refer to himself as “an overpaid plumber.”

### ***The Beginnings***

Born September 28, 1925 in Chippewa Falls, Wisconsin, Seymour had a fascination with electronics and electrical devices from boyhood; his father was a civil engineer. In high school the young Cray preferred to be in the electrical engineering laboratory as much as possible. Following graduation from high school in 1943, he joined the US Army serving in an infantry communications platoon. He arrived in Europe the day after D-Day and saw action in the Battle of the Bulge campaign. Later he served in the Pacific Theater in the Philippine Islands.

After returning from the war, Seymour earned a Bachelor of Science degree in Electrical Engineering from the University of Minnesota in 1950, followed by a Masters degree in Applied Mathematics in 1951. Shortly thereafter, he joined a new local company called Engineering Research Associates (ERA). Housed in an old glider factory in St. Paul, Minnesota, ERA built specialized cryptographic equipment for the US Navy. While there he worked the gamut of computer technologies, ranging from vacuum tubes and magnetic amplifiers to transistors. It was also here that he had the opportunity to design his first computer, the 1103.

*“Anyone can build a fast CPU. The trick is to build a fast system.” – Seymour Cray*

Seymour’s passion for building scientific computers led him to help start Control Data Corporation (CDC) in 1957. There he met his goal of building the fastest scientific computer ever, resulting in the CDC 1604, the first fully-transistorized commercial computer (no more vacuum tubes). Release of the CDC 6600 -- considered the world’s first actual supercomputer, capable of nine Mflops (million floating-point operations per second) of processing power and cooled by Freon -- followed in 1963. The CDC 7600 was next, running at 40 Mflops, again the world’s fastest supercomputer. In 1968 he began work on the CDC 8600 designed for greater parallelism using four processors all sharing one memory.

In 1968, Seymour was awarded the W.W. McDowell Award by the American Foundation of Information Processing Societies for his work in the computer field.

Seymour served as a director for CDC from 1957 to 1965 and was senior vice president at the time of his departure in 1972 when CDC decided to phase out development of large-scale scientific computers. That year he founded Cray Research Inc. in Chippewa Falls, Wisconsin.

In 1972 Seymour was also presented with the Harry H. Good Memorial Award for his contributions to large-scale computer design and the development of multiprocessing systems.

### ***Vector Processing is Born***

The signature Cray-1™ vector supercomputer established a world standard in supercomputing with its introduction in 1976. Integrated circuits replaced transistors, and the Cray-1 delivered 170 Mflops.



Seymour Cray standing next to the core unit of the Cray-1 computer, circa 1974

Photograph courtesy of the Charles Babbage Institute, University of Minnesota, Minneapolis

“By 1970, Cray had been directly responsible for the design and development of the systems that were to shape the high performance computer industry for years to come...

“All of Seymour’s systems were masterpieces of technology and esthetic design. To Seymour, elegance of physical design was as important as reaching the performance goals. In this area also he was unmatched by anyone.”

*Charles W. Breckenridge, Keynote Session at SC1996, 11/19/96*

In the years following CDC's founding, Seymour relinquished the company's management reins to devote more time to computer development. From 1972 to 1977 he served as director, chief executive officer, and president of the company. In October 1977, he left the presidency of Cray Research, but remained chief executive officer and became chairman of the board. In 1980, he resigned as chief executive officer, and in 1981, Cray stepped aside as chairman of the board and, as a full-time independent contractor, devoted himself to the Cray-2™ project. With the Cray-3™, his attention returned to the possibilities of gallium arsenide processing chips and reduced packaging.

In 1985 the Cray-2 computer system moved supercomputing forward yet again, breaking the gigaflop (one thousand Mflops) barrier. Having first experimented with gallium arsenide as an ultrafast semiconductor material, Seymour returned to the use of silicon chips and introduced Flourinert, an inert fluorocarbon liquid, as a coolant.

In 1989 he left Cray Research to form Cray Computer Corporation (CCC), based in Colorado Springs, Colorado. Here he began work on the Cray-4. CCC closed its doors in 1995 due to financial pressures.

In 1996 Seymour started SRC Computers, Inc. and started the design of his own massively parallel supercomputer, concentrating on the communications and memory performance. Tragically, on October 5, 1996 at the age of 71, Seymour Cray passed away in Colorado Springs, Colorado due to injuries suffered in an automobile accident that occurred two weeks earlier.

### ***Tribute***

“It seems impossible to exaggerate the effect he had on the industry; many of the things that high performance computers now do routinely were at the furthest edge of credibility when Seymour envisioned them.

“I have had the opportunity to work with several of his very talented protégés who went on to other companies, and his considerable legacy as a teacher and mentor has also had a far-reaching effect.

“Seymour combined modesty, dedication, and brilliance with vision and an entrepreneurial spirit in a way that places him high in the pantheon of great inventors in any field. He ranks up there with Edison and Bell of creating an industry.”

*Joel Birnbaum, CTO, Hewlett-Packard*

Throughout his 45-year career, Cray's guiding principle in designing computers was "simplicity." Seymour Cray is the inventor of a number of technologies that were patented by the companies he worked for. Among the most significant are the Cray-1 vector register technology, the cooling technologies for the Cray-2 computer, the CDC 6600 Freon-cooling system, and a magnetic amplifier for ERA. He also contributed to the Cray-1 cooling technology design.

#### **Further Seymour Cray References:**

[Seymour Cray](#) - Wikipedia

[An Imaginary Tour of a Biological Computer \(Why Computer Professionals and Molecular Biologists Should Start Collaborating\)](#) - Smithsonian National Museum of American History

[Seymour Cray Interview](#) - Smithsonian National Museum of American History

[A Seymour Cray Perspective](#) - Gordon Bell

[A Tribute to Seymour Cray](#) - Charles Breckenridge, SRC Computers, Inc.

[Obituary - Seymour Cray, Father of Supercomputing](#) - Chris Lazou