

Profiles in Leadership #9

John Hennessy: The Godfather of Silicon Valley

John L. Hennessy III, Ph.D., Pennsylvania Theta '73, president, Stanford University, 2000-16

by Alan S. Brown

fEW UNIVERSITY presidents receive such accolades as John Hennessy when he retired from Stanford University this past August. During his 16 years as president, his school rose to become one of the world's top universities, and its undergraduate program supplanted Harvard's as the nation's most selective. Thanks to generous financial aid, most students graduate debt-free.

Equally important, Hennessy embedded Stanford—and its faculty and alumni—into the innovation economy in ways that few other schools could match. There, he worked closely with such future Silicon Valley icons as Google's Sergey Brin and Larry Page and Yahoo's Jerry Yang. Renowned venture capitalist Marc Andreessen called him “the godfather of Silicon Valley.” When President Barack Obama toured the Valley in 2011, Hennessy was the only non-industry leader to meet with him. With ties like that, no wonder Hennessy was able to double Stanford's endowment.

Perilous Test

Yet in 2008, eight years into his tenure, Hennessy faced a perilous test. In a matter of weeks, the Great Recession erased \$5 billion of Stanford's \$18 billion endowment. That left a budget gap of hundreds of millions of dollars. Hennessy had been in a similar position before. In 1984, he had co-founded MIPS Computer Systems to develop high-speed computer processors. The company attracted venture capital and grew to 120 employees. Then hard times hit.

What does it mean to be a leader? In this series “Profiles in Leadership,” Tau Beta Pi is exploring that essential question through the lives of member engineers who attained leadership positions in their fields.

“Sometimes, you have to just get up and lead,” Hennessy said. “We brought in a new CEO and we decided that we had to lay off one-third of the company to survive. After the pink slips went out, I had to get up at the local TGIF and inspire everyone that was left. We had shed some people, but not our stars. But we worried that the stars might conclude it was time

to leave ship. We didn't want to lose any of them.”

Hennessy stood up and laid out the facts. MIPS's technology outperformed conventional microprocessors. Several large companies were interested. The layoffs were painful, but they ensured MIPS would have the resources to grow. It apparently worked because MIPS thrived.

Stanford was much larger. It had a multi-billion-dollar budget, 2,000 faculty members, and more than 15,000 students. Yet Hennessy believed the same principles applied.

“If you have to go through a dark time, the faster you act, the better,” Hennessy said. “We could either cut student aid or lay off staff and faculty. We decided to do a layoff, and do it fast. This is counter-intuitive to university culture, which likes to plan for months or years. We did it in six months.”

Stanford bounced back. Its endowment has grown to more than \$22 billion and its influence is greater than ever. It was another achievement for John Hennessy, who started out as a bookish child and never thought much about leadership. “I was probably what you would call a nerd today,” he recalled. “I was a big reader and I

liked science, especially blowing things up with chemistry sets—they used to have lots of chemicals kids can't get today.”

Hennessy grew up in Huntington, a suburban Long Island town 40 miles outside New York City. His father, an engineer, worked graveyard shifts on Cold War electronics projects at Sperry Rand. His



Hennessy, center, with President Obama and Apple CEO Tim Cook at the 2015 White House Summit on Cybersecurity and Consumer Protection at Stanford.

mother, with whom he was close, instilled in him a love of reading.

Hennessey liked building things as well as blowing them up and gravitated towards engineering. In fact, he and a friend won a local science prize with a computer he built from spare relays and other parts.

“It played tic-tac-toe. If you know the game, you can never lose. So we built a machine that could play the game and it turned out to be rather successful,” Hennessey said.

He liked his first taste of computing. Since there were no computer science majors in 1969, he entered Villanova University as an electrical engineering major. The school had a good engineering program, and it also promised to provide the young Hennessey with a broader liberal arts background, something his father thought was important. Hennessey liked the campus, and its suburban Philadelphia location was just far enough for him to feel independent and still visit home easily.

Hennessey excelled in his first semester and loaded up on classes for the second semester. Then, in February, his father asked him to come home. When he arrived, his mother was on her deathbed. “I knew she had been ill, but never thought it was that serious,” he said. “Clearly, they wanted to shelter me from what was happening.”

It was a difficult time. Hennessey returned to school, but stumbled through his classes. He attended summer school to get his studies back on track. While there, he landed a job at the computer center helping students debug their programs.

Love of Teaching

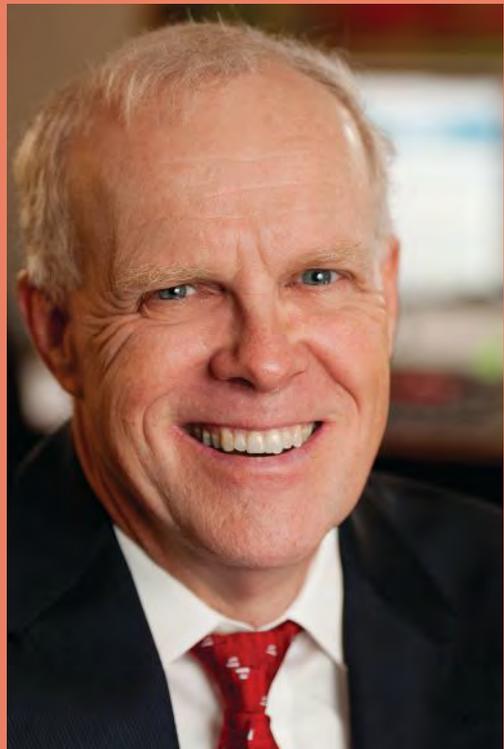
“That’s where I discovered my love of teaching. Then I got involved in a computer research project in my junior year and resolved to get my Ph.D.,” Hennessey said.

He also discovered Tau Beta Pi. “I like to be around other people who are intellectually curious and have different experiences and they can share.”

After graduating in three-and-one-half years, he applied to State University of New York, Stony Brook. It was the only graduate school that would admit him in January and provide financial aid. This allowed him to marry Andrea Berti, whom he had dated since his high school prom, even though their colleges were more than 300 miles apart.

Hennessey describes himself as “really blessed” as a graduate student: “I was handed a research topic in my first year that turned into my Ph.D. thesis—software for real-time systems. This involved creating control systems for microprocessors, which in 1974 was an area that was just exploding,” he said. Even though Stony Brook had not yet achieved a national reputation, Hennessey’s research turned heads. It earned him interviews at 16 universities when he graduated in 1977.

He chose Stanford and moved to Palo Alto just as the barest outlines of Silicon Valley were beginning to emerge. Hewlett-Packard was building minicomputers. Intel was starting to make microprocessors. Apple was just emerging. And there was little traffic.



This Leader In Brief

Full professional name: John L. Hennessey.

Most recent position: President, Stanford University, 2000-retired September 2016.

Birthplace: Huntington, NY, 1952.

Highest degree: Ph.D., Electrical Engineering, State University of New York, Stony Brook, 1977.

Major career highlights: Stanford University, rising from assistant to full professor of electrical engineering, 1977-1986, director, Computer Systems Laboratory, 1983-93; founder, MIPS Computer Systems, 1984; chair, Computer Science at Stanford, 1994-96, dean, School of Engineering, 1996-99; co-Founder and chairman, Atheros Communications, 1998-2010; provost, Stanford University, 1999-2000; president, Stanford University, 2000-16.

Board memberships: Alphabet (formerly Google, lead independent director), 2004-current; Cisco Systems, 2002-current, Daniel Pearl Foundation, 2002-current, Gordon and Betty Moore Foundation, 2012-current.

Honors: IEEE John von Neumann Medal, 2000; American Society for Engineering Education Benjamin Garver Lamme Award, 2000; Association for Computing Machinery Eckert-Mauchly Award, 2001; IEEE Seymour Cray Computer Engineering Award, 2001; NEC C&C Prize for lifetime achievement in computer science and engineering, 2004; American Academy of Arts and Sciences Founders Award, 2005; and IEEE Medal of Honor, 2012. Hennessey is a Fellow of the American Academy of Arts and Sciences, Association for Computing Machinery, and IEEE, and a member of the National Academy of Engineering and National Academy of Sciences.

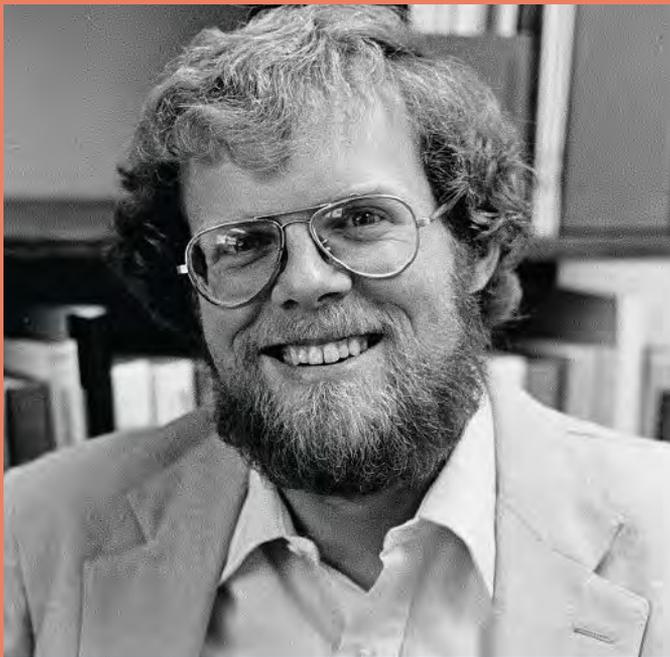
Greatest accomplishment: Making Stanford affordable to everyone, regardless of family income.

Family: Married to Andrea Berti, 1974. They have two grown sons.

Hobbies: Golf, bicycling, gardening.

Favorite books: Histories and biographies.

If you could do one thing over: I would have really liked to have created a satellite campus in New York City.

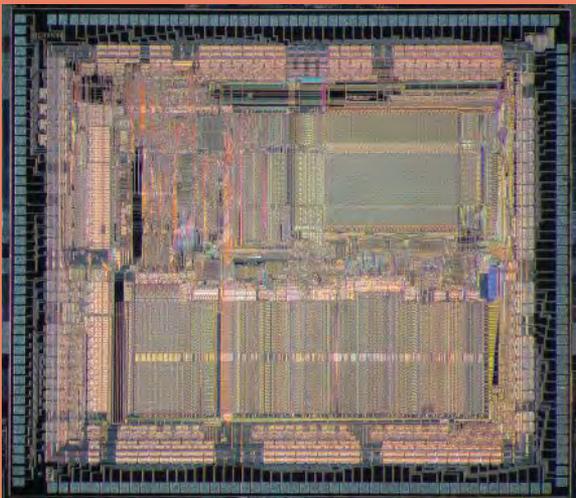


Above: Hennessey as an assistant professor of computer science in 1981.

Photo: Ed Souza/Stanford News Service. **Center:**

Hennessey, center, with fellow Stanford computer scientists John Shott, left, James D. Meindl, brainstorm in 1984 about the MIPS project, which simplified computer with RISC architecture. Photo: Chuck Painter/Stanford News Service.

Below: Die shot of MIPS R3000A microprocessor on a wafer. Photo: Pauli Rautakorpi/Wiki-media



Within a handful of years, that had changed. “It was driven largely by microprocessors and the miniaturization of everything, and it was faster than anyone thought it might happen,” he said.

Stanford researchers were developing larger and more powerful microprocessors. Hennessey signed on to write the software for specialized chip being developed by a colleague, Jim Clark, to process three-dimensional graphics very rapidly. The project led Hennessey to speculate about redesigning microprocessors. Was it possible to redesign both processor hardware and software to run calculations faster, he wondered.

At the time, all microprocessors used a clock to determine when to run the instructions in a software program. Think of it as a traffic light on a road filled with instructions. Some instructions might bundle two, three, four, or more commands together. Each time the clock ticked, the light turned green and the device processed one of the bundled commands. It might take several ticks for the entire instruction to move past the light.

Hennessey envisioned using simpler instructions that did only one task at a time. Every time the light turned green, a new instruction would pass through and execute. This made it much easier to break up his long line of instructions into segments and divide them among multiple traffic lights. He then built a processor that had the multiple execution units needed to do that. While his chips did not run faster than conventional chips, they could process many more instructions per second.

The result was the reduced instruction set computer (RISC). In 1984, Hennessey was ready. He took a sabbatical from Stanford and founded MIPS Computer Systems to begin commercializing RISC technology.

MIPS was an education.

“I was learning on the job. I didn’t know how to read a balance sheet or what a gross margin was,” he said.

“I learned the hardest thing for a young technology entrepreneur, which was to find the right people to lead sales and marketing. Because if they are not the best, the company was going to make a lot of mistakes.

“And I had to learn that time is money, and to get comfortable making decisions even though I didn’t have all the facts. Nothing was ever black and white,” he said.

Hennessey found technology leadership differed from other management. First, technology moved quickly. Companies had to keep reexamining their assumptions and execute before the ground changed under their feet.

Second, technology leaders required a deep knowledge of a company’s technology. “You need to understand its strengths and weaknesses and the trade-offs of each decision,” he said.

MIPS Computer Systems released its first RISC processor 30 years ago in 1986. Clark, who left Stanford to found tech giant Silicon Graphics, became Hennessey’s first customer in 1988. MIPS went public one year later, and Silicon Graphics eventually acquired the company in 1992 for \$333 million.

Having made a mark on the industry, Hennessey returned to Stanford. He rose rapidly. He led the computer

systems laboratory, a research and teaching center. He chaired the computer science department from 1994 to 1996, when he was named dean of the school of engineering. In 1999, he succeeded Condoleezza Rice as provost. One year later, Stanford chose him as president.

“When I was considering the dean of engineering job,” Hennessy said, “the current dean told me, ‘This is a service job. You’re serving the faculty and the students.’ That sunk in deeply. I’ve always felt that I’m here to help them thrive.”

One of the ways he did that was through fundraising, raising a record \$6.2 billion through the Stanford Challenge. But it was fundraising with a purpose. His own experience had taught him that Stanford faculty and students could have an impact on the world. He inspired the faculty to play a larger role in such global issues as the environment and sustainability, globalization and development, and engineering and medicine. He built new centers focused on these issues to bring together faculty from different departments and encourage multidisciplinary research.

Hennessy strengthened Stanford’s humanities, which he called “good but not great,” and built studios and performance spaces. He also continued to nurture the school’s symbiotic relationship with Silicon Valley.

He leaves behind not only one of the world’s best universities, but a wealthier campus poised to invest in the future. Yet, when asked about his proudest accomplishment, Hennessy talks about making Stanford accessible to everyone. Students from families earning \$65,000 or less receive free tuition, room, and board. Those whose families earn less than \$125,000 receive free tuition. Two out of three students receive financial aid, and most graduate debt-free.

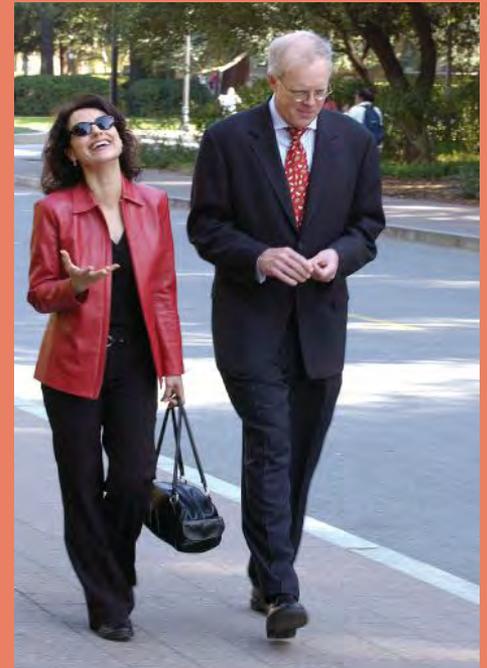
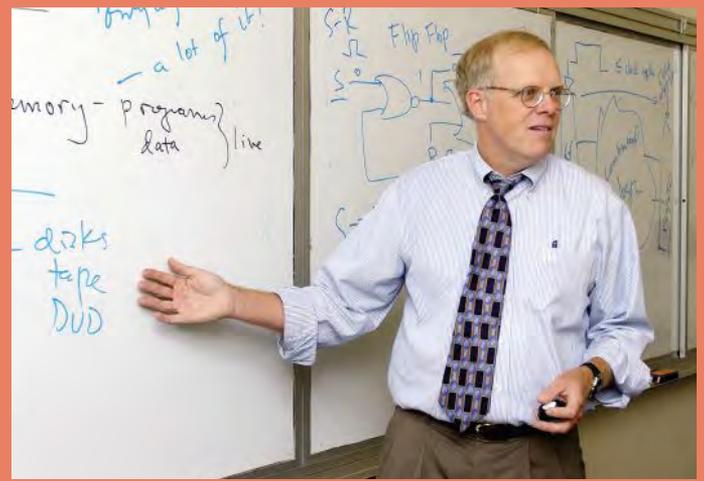
“We attract students from more modest means, and we were able to hold the course even through the recession,” Hennessy said.

At 64, John Hennessy is still young. After he leaves, he plans to spend time on Stanford’s new Knight-Hennessy Scholarships, funded by Nike founder and Stanford MBA Philip Knight, which will give 100 civic leaders from around the world a Stanford graduate education.

He says he misses the excitement of growing a business and may re-enter industry.

Yet there is one thing of which Hennessy is sure: “Engineering is the place to be. It gets back to the skills I brought to business and to Stanford. Engineers are using those skills to solve problems, to invent things, to change the world—and it’s intellectually exciting and challenging,” he said.

Alan S. Brown has been an editor and freelance writer for more than 30 years and lives in Dayton, NJ (insight01@verizon.net). A member of the National Association of Science Writers and former co-chair of the Science Writers in New York, he graduated magna cum laude from New College at Hofstra University in 1974. He is an associate editor of *Mechanical Engineering* and contributes to a wide range of engineering and scientific publications.



Above: President Hennessy teaches a Sophomore College seminar, “The Intellectual Excitement of Computer Science” in 2002. **Center:** Hennessy and his wife Andrea arrive at parents’ day on campus in 2006. **Below:** Hennessy speaks at the 2015 convocation.

