



The Great Brain

Paul Allen's Institute for Brain Science is as visionary today as his idea of Microsoft was in the 1970s.

BY GINA SHAW

After you've built one of the world's largest and most successful software companies, becoming a billionaire along the way, what do you do for an encore? If you're Paul G. Allen, you try to solve the mysteries of the human brain.

If you haven't heard of Paul Allen, you're not alone. Let's try another name: Bill Gates. Heard of that guy? Well it was Allen, a classmate of his at Seattle's Lakewood School, who co-founded Microsoft with Gates and helped build it into the software behemoth it is today.

Like Gates, Allen was fascinated with computers back in the 1960s, when the new machines weighed thousands of pounds each and the idea that one day people would carry them around in briefcases would have gotten you laughed out of the room. The two friends started a business generating data for traffic engineers while still in high school. Later on, Allen convinced Gates to drop out of Harvard to create Microsoft.

Unlike Gates, Allen is no longer involved with the company that revolutionized personal computing. In 1983, at

the age of 30, Allen was diagnosed with Hodgkin's disease and successfully treated with a bone marrow transplant. He never returned to full-time work with Microsoft, and slowly began moving away from the company. In 2000, Allen officially resigned from his position on Microsoft's board, selling 68 million shares of stock.

With a net worth of more than \$16 billion (*Forbes* magazine ranked him as the 12th richest person in the U.S. in September 2008), the 56-year-old Allen could buy islands, towns—maybe even small countries. He has, in fact, bought three major sports teams: the NFL's Seattle Seahawks, the NBA's Portland Trail Blazers, and most recently, the Seattle Sounders, a new Major League Soccer franchise.

UNLOCKING THE BRAIN

Like his old partner Bill Gates, Allen has a passion for medicine and medical research. While Gates' foundation focuses in large part on global health, particularly vaccines, one of Allen's top priorities is the human brain. His Allen Institute

“How can we realize our potential?” Paul Allen asks.

“What should exist, and **how might we create it**—right now?”

for Brain Science, founded in 2003, is as visionary today as the idea of Microsoft was in the 1970s.

The Institute came together after Allen convened a series of think-tank-style meetings with leading neuroscientists, including Arthur Toga, Ph.D., a professor of neurology and the director of neuroimaging at the University of California-Los Angeles School of Medicine. “He was cognizant of the fact that there were other mechanisms that would support research and usher it along, and he wanted to do something different from what was already being done,” Dr. Toga says.

But why neuroscience? Given his bout with Hodgkin’s disease, you might expect that Allen would choose to focus his support, and his scientific curiosity, on cancer research. Dr. Toga thinks he understands Allen’s choice. “I think it’s the intellectual curiosity. Paul comes from an engineering background, where logic, design, and decision-making are done *in silico*,” he says. “He had to come up with ways in which operating systems make decisions, logically and efficiently. That’s what the brain does. Although he’s never said this out loud, it’s clear to me that the parallels between the biological responsibilities of the nervous system and the operating system of a computer fascinate him.”

In 2006, the Institute announced the completion of its inaugural project, funded with \$100 million in seed money from Allen: a comprehensive “atlas” of the mouse brain, a three-dimensional map showing where each of more than 21,000 genes is activated in the mouse brain. What’s more, all of the images and data are available to scientists around the world online—for free.

“There are lots of studies where gene expression patterns are studied in animal models,” says Dr. Toga. “But Allen wanted to do something very different, something that would have a significant impact and allow follow-on science that couldn’t be done otherwise. That’s why he chose this project.”

The mouse brain and human brain are similar enough—mice and humans share 90 percent of their genes—that the Allen Brain Atlas offers remarkable insights into the human brain in health and disease. *Time* magazine, which ranked Allen in their list of top 100 scientists and thinkers for 2008, called it “a

free neural GPS” system. Today, scientists use the Atlas for research into Alzheimer’s and Parkinson’s disease, epilepsy, bipolar disorders, Down syndrome, and other conditions—as well as for information about sleep, hearing, and memory.

Susan Swedo, M.D., an autism researcher at the National Institutes of Mental Health, told PBS, “To be able to go online and just map various areas of the brain and what genes are being expressed in that area is phenomenal... I think that

we have reason to hope that, within our lifetime, we’re going to know what causes autism, and we’re going to have meaningful treatments and prevention strategies. The value of the Brain Atlas is it has just leapfrogged us to the next level of understanding.”

But the mouse brain atlas was just the beginning. In July 2008, the Institute unveiled the Mouse Spinal Cord Atlas. Like the Brain Atlas, its data is all accessible online for free. It initially included information on some 2,000 genes; and data

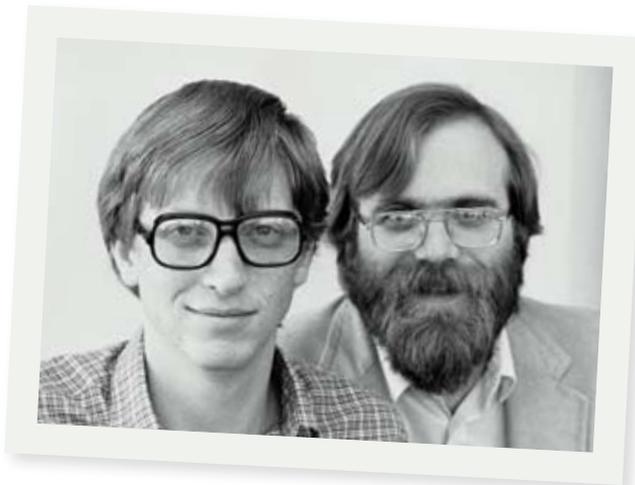
on more than 20,000 genes along the full length of the spinal cord, including both youth and developmental stages, are expected to be available this year.

“The Allen Spinal Cord Atlas offers profound potential for researchers to unlock the mysteries of the spinal cord and how it is altered during disease or injury,” says Allan Jones, chief scientific officer at the Allen Institute. “Our hope is that it will become a valuable resource for scientists, fueling breakthrough discoveries and benefiting the tens of millions of people suffering from spinal cord diseases and disorders worldwide.”

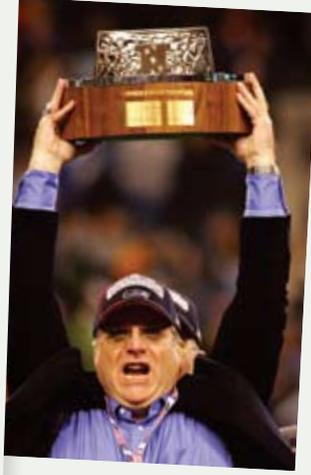
Next up: the Allen Human Brain Atlas, designed to provide insight into gene expression in the human brain; and the Allen Developing Mouse Brain Atlas, designed to illustrate and enhance understanding of gene activity across multiple stages of development from birth to adulthood. The human brain atlas is scheduled to be completed in four years, and the developing mouse brain atlas in two years.

A MARVELOUS MIND

Awe and curiosity lie at the heart of all of Allen’s business and philanthropic decisions. On his Web site, Allen explains his philosophy with a simple question: “What should exist?” Or,



THE MINDS BEHIND MICROSOFT Paul Allen (right) and Bill Gates in 1983.



ALLEN'S PASSIONS

Left to right: Allen at the opening of the Experience Music Project; in front of SpaceShipOne with Burt Rutan; and raising the NFC trophy after the Seahawks beat the Carolina Panthers in 2006.

as he elaborates, “What do we need that we don’t have? How can we realize our potential? What will it take to solve important problems and improve people’s lives? What should exist, and how might we create it—right now?”

His enormous investment in the Allen Institute for Brain Science is just one example of how Allen is answering that question. Allen’s philanthropy has also helped to launch everything from a spaceship to theaters and museums.

In 2004, Allen—along with his partner, Burt Rutan—won the Ansari X PRIZE, a competition aimed to spur the development of low-cost spaceflight. It offered a \$10 million prize to the first non-government organization to launch a reusable manned spacecraft into space twice within two weeks.

Their *SpaceShipOne* craft, funded by Allen and designed and built by renowned aerospace engineer Rutan, was the first privately built spacecraft to enter sub-orbital space. They didn’t do it for the money; *SpaceShipOne* cost far more to build and launch than the prize was worth. “I backed the development of *SpaceShipOne* because I saw this as a great opportunity to demonstrate that space exploration could someday be within the reach of private citizens,” Allen says.

He and Rutan have since licensed their technology to Richard Branson’s Virgin Group, which has formed Virgin Galactic with an eye toward operating the world’s first space tourism ventures.

Science isn’t Allen’s only passion. “He’s an incredibly inquisitive guy,” says Dr. Toga. “He’s got his fingers in everything.”

Quite literally, when it comes to his love for music. Allen has been a music buff since his youth. In 2000, he waxed lyrical to the *Seattle Post-Intelligencer* about seeing Jimi Hendrix play at Seattle’s Sick Stadium in 1970 just months before the guitarist’s death. Allen plays guitar (a Fender Strat, like his idol) in his own band, the Grown Men.

But as you’d expect from a man with Allen’s means, this isn’t your typical Seattle garage band. Allen has jammed onstage with stars such as Robbie Robertson (of The Band) and Usher. For the Super Bowl in 2006, he hosted two star-studded parties in Detroit, jamming onstage with Robertson, Elvis Costello, and Dan Aykroyd.

His Hendrix obsession also led Allen to create the Experience Music Project, a unique interactive museum in Seattle. It was

often been compared to a smashed electric guitar. (Whether you love it or hate it depends on your point of view: *New York Times* architecture critic Herbert Muschamp described it as “something that crawled out of the sea, rolled over, and died.”) It includes unusual hands-on experiences like the “Sound Lab” studio, which allows visitors of all skill levels (and none) to create their own music, and “On Stage,” where you can find out what it’s like to be a rock star.

But the Experience Music Project isn’t just to look at and play with. Each year it hosts a large pop music conference, provides a full scholarship music education program (called Experience: the Band), and offers a wide range of lessons, camps, and workshops—like the spring break rock band workshop for teens.

Within the same complex in the Seattle Center is another of Allen’s babies: the Science Fiction Museum and Hall of Fame, perhaps not a surprising investment coming from a man who named his investment company “Vulcan” (although he claims it’s a reference to the Roman god, not the home planet of Mr. Spock). The museum collection includes Captain Kirk’s command chair from *Star Trek*, the B9 robot from *Lost in Space*, Darth Vader’s lightsaber and the Death Star model from *Star Wars*, and the T800 Terminator (from the movie *Terminator*). The newest temporary exhibition, “Jim Henson’s Fantastic World,” opens in May.

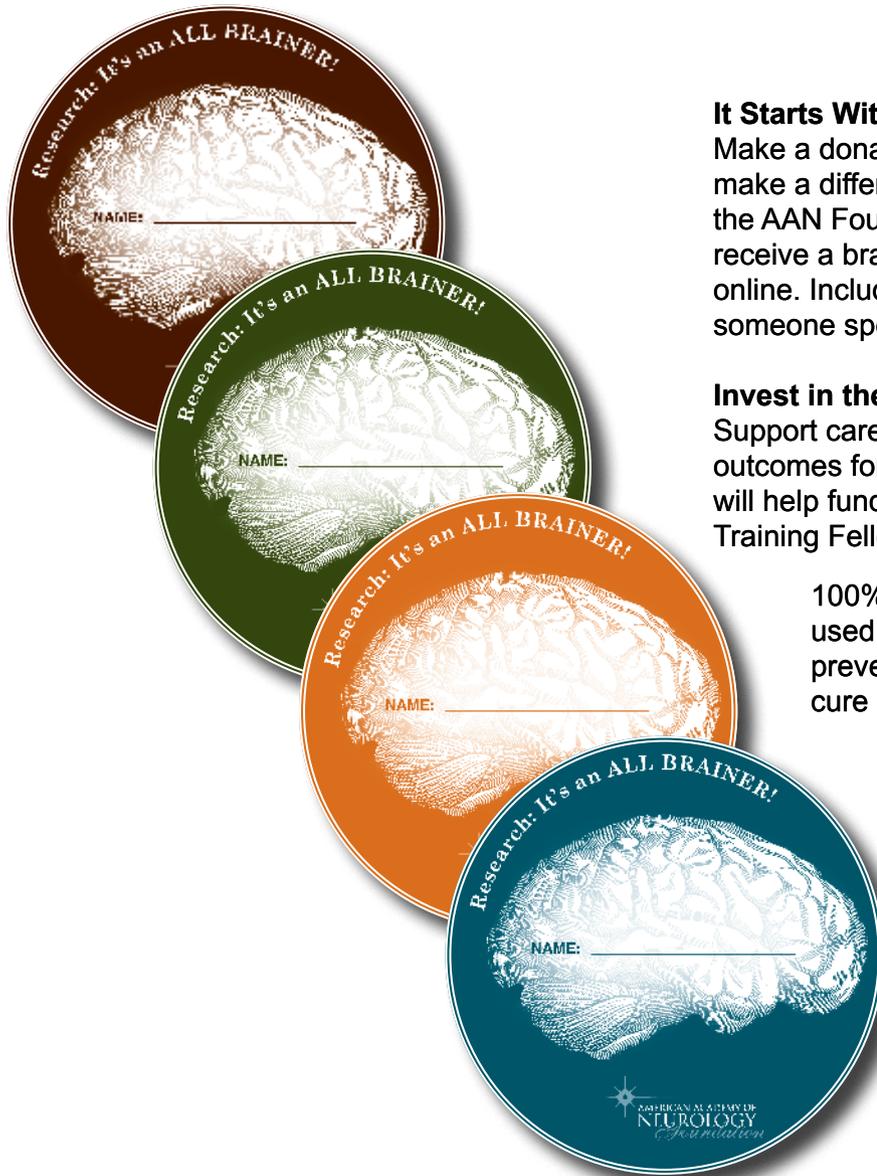
Combine these projects with Allen’s many other charitable investments—such as early childhood education; community development in Seattle; tuberculosis research at the Seattle Biomedical Research Institute; and \$25 million to SETI, the Search for Extraterrestrial Intelligence project, which reportedly would have ground to a halt years ago without Allen’s largesse—and his total lifetime giving has already neared the billion-dollar mark.

Little wonder, then, that the American Academy of Neurology chose Allen as the 2009 recipient of its Public Leadership in Neurology award, an honor that in the past has gone to such advocates as Michael J. Fox and Dame Julie Andrews.

“In terms of the contributions that he’s made to neuroscience, I’d put Allen’s accomplishments near the top for someone not in the field,” says Dr. Toga. “I think it’s extraordinarily unique. Here’s a guy who’s done something without a direct personal interest, like a family member with brain disease—just out of scientific curiosity and a commitment to the betterment of our understanding of the brain.”

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