



IN MEMORIAM

Donald Arthur Glaser
Professor of Physics and Molecular and Cell Biology, Emeritus
UC Berkeley
1926-2013

Donald Arthur Glaser, a Nobel-prize winning physicist who reinvented himself as a biotech pioneer and later dove into the field of neurobiology, died in his sleep on the morning of February 28, 2013, at his home in Berkeley. He was 86.

Glaser, a professor emeritus of physics and of molecular and cell biology at the University of California, Berkeley, won the 1960 Nobel Prize in Physics for inventing the bubble chamber, a device that allowed scientists to track the paths of electrons, protons and other charged particles after collisions, which led to the discovery of whole families of new particles. Initially Glaser made a minute demonstration device, a small glass phial containing a mere 3cl of diethyl ether. This delicate apparatus was able to show the trails left when cosmic rays or particles emitted by a radioactive source passed through. Both the US Atomic Energy Commission and the National Science Foundation refused financial support, regarding his scheme as too speculative. At the meeting of the American Physical Society in Washington in April 1953 he happened to meet Luis Alvarez and was able to describe his research. Alvarez recognizing the importance of Glaser's idea, helped to bring him to UC Berkeley in 1959. Alvarez's team developed large versions of Glaser's device, eventually two meters long, filled with liquid hydrogen, constructed of metal and with glass windows through which trails of subatomic particles could be photographed. The discoveries of particles using this device led Alvarez himself to a Nobel Prize.

In 1961 Glaser began to explore the new field of molecular biology. As with the bubble chamber, he used his experience designing equipment to improve the experimental process, automating and accelerating essential phases of the work, leading to new discoveries in the field. In 1971 he joined two friends, Ronald E. Cape and Peter Farley, to found the first biotechnology company, Cetus Corp., to exploit these new discoveries for the benefit of medicine and agriculture. The company developed interleukin and interferon as cancer therapies, and was also known for producing a powerful genetic tool, the polymerase chain reaction, to amplify DNA. In 1991, Cetus was sold to Chiron Corp., now part of Novartis.

In the 1980s, Glaser turned his attention to the field of neurobiology and spent a semester at The Roland Institute for Science in Cambridge, Mass., where he began psychophysics experiments in human vision, investigating the way that the brain processes what it sees. Based on these experiments, he developed mathematical models that he simulated on a computer, said neurobiologist Tomaso Poggio, a professor in the McGovern Institute for Brain Research at the Massachusetts Institute of Technology, who first met Glaser as he was changing fields in the 1980s. "He was a great human being and a close friend who was incredibly kind," Poggio said. "He was always able to see the world in a different way, and make remarks that were refreshing, original and very often witty."

Glaser was born in Cleveland, Ohio, on Sept. 21, 1926, the son of Russian immigrant parents William J. Glaser, a businessman, and his wife Lena. He received his early education in the public schools of Cleveland Heights, and completed his B.Sc. degree in physics and mathematics at the Case Institute of Technology in 1946. During this time he also pursued his lifelong passion for music, playing viola with the Cleveland Philharmonic Orchestra. After serving as a teacher of mathematics at the Institute, he began his graduate studies at the California Institute of Technology in fall 1946. He obtained his Ph.D. in physics and mathematics from Cal Tech in 1950 with a thesis on the momentum spectrum of high energy cosmic ray and mesons at sea level.

In 1949, Glaser began teaching in the physics department of the University of Michigan, where he examined various experimental techniques, including diffusion cloud chambers and parallel-plate spark counters, for visualizing elementary particles. He finally hit on the idea of a bubble chamber – “a pressure cooker with windows,” in his words – and built the first one-inch prototype in 1952. The device worked by superheating a liquid – for example, xenon-- above its boiling point so that a particle moving through it left a trail of boiling bubbles that could be tracked and photographed. “The bubble chamber was a major breakthrough and led to the discovery of a zoo of new particles,” said particle physicist Herbert Steiner, UC Berkeley professor emeritus of physics. “It was the dominant particle detector in the 1960s and ‘70s, and had an enormous impact on the field of particle physics.”

Among Glaser’s associates in research were J. Brown, H. Bryant, R. Burnstein, J. Cronin, C. Graves, R. Hartung, J. Kadyk, D. Meyer, M. Perl, D. Rahm, B. Roe, L. Roellig, D. Sinclair, G. Trilling, J. van der Velde, J. van Putten and T. Zipf.

Glaser came from an accomplished academic lineage. His advisor, Carl Anderson, was the student of Robert Millikan, both Nobel Laureates from Cal Tech. According to Glaser, his students used to wonder who might continue this distinguished tradition. In 1993, Kary Mullis, one of Glaser’s colleagues at Cetus Corp., received the Nobel Prize in Chemistry for his invention of the polymerase chain reaction (PCR) method. Just two years later in 1995, Martin Perl, another colleague, also received the Nobel Prize in Physics for the discovery of the tau lepton.

Glaser received many honors for his work, including the 1953 Henry Russell Award at the University of Michigan for distinction and promise in teaching and research; the 1958 Charles Vernon Boys Prize of the Physical Society, London, for distinction in experimental physics; the 1959 American Physical Society Prize for his contributions to experimental physics; the honorary degree of Doctor of Science by the Case Institute of Technology, and in 1966 the Caltech Distinguished Alumni Award.

Glaser was also a consultant and adviser to many governmental organizations, industrial boards of directors, non-profit groups, and a member of the editorial boards of several scientific publications. He also was a member of the Life Sciences Division at Lawrence Berkeley National Laboratory.

Glaser is survived by his wife, Lynn Glaser (née Bercovitz), a musician, painter and Cal alumna; two children from his first marriage to Ruth Bonnie Thompson, pediatrician Louise Ferris Glaser of Sacramento and high-tech leader William Thompson Glaser of Berkeley; and four granddaughters.

In September 2013, the Donald A. Glaser Advanced Lab, an undergraduate experimental teaching lab in Physics, was dedicated in his memory. A required course for all Physics majors, Physics 111 is a notoriously difficult class, but it is where students experience the basics — the pitfalls and the triumphs — of experimental research which was at the heart of Glaser’s entire career. “He was a man of wide-ranging interests, very inventive, always thinking outside the box,” his colleague Herbert Steiner said. “I think all his life he had the mind, the curiosity, the freshness of a kid,” Tomaso Poggio said. “He was fun. That is something I will really miss a lot.”

Lynn
Glaser
2013
Maria Hjelm
Tomaso Poggio
Bob Sanders
Margaret Thow
George Trilling

Herbert Steiner