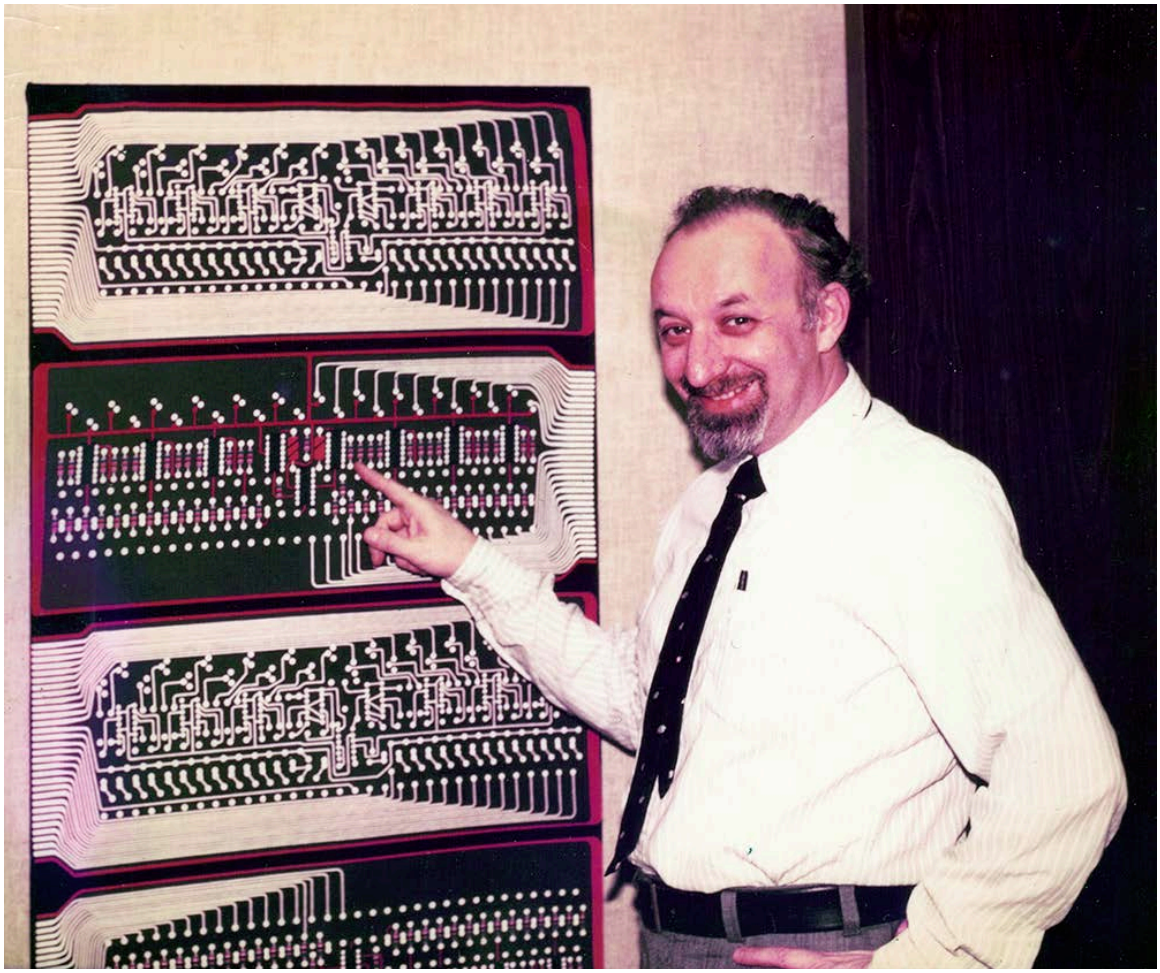
Merwin Kliman, maker of Voyager computers, Dies at 86

Among his many accomplishments, Merwin Kliman was most proud of his work with NASA, where he worked on many missions such as Viking, Voyager, and Galileo.



The electrical engineer Merwin Kliman with a fabric computer board in his office at Algorex Corporation, the company he helped found in 1968.

By Harvey J. Kliman, MD, PhD

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Merwin Kliman, the electrical engineer who created the circuit boards for the Voyager computer system, died on September 15 in Manhasset, NY. He was 86.

The most notable achievement of Mr. Kliman, a Master of Electrical Engineering, was pioneering the use of computers to design computers.

Kliman's first job as a freshly minted Bachelor of Electrical Engineering from the University of Buffalo in June 1954 was with Sperry Corporation in Lake Success, NY, part of what at the time was the large aerospace industrial complex in Long Island. One of his first charges was to help the Navy create a way that submarines could communicate with other submarines, ships, and the land while deep in the ocean. He knew that codes could be broken, so he designed a computer-based method that was so secret and successful that it was never detected by US adversaries in the twenty plus years it was used by the US Navy.

As computers became more and more sophisticated Kliman realized that the job of making a small-size computer, that is connecting all the components together in the smallest space possible, was becoming so complex that it demanded many engineers working in design departments for weeks and months to solve these wiring puzzles. A master at solving problems, he had a vision of using computers to design computers. At first he simply programmed computers to generate the wiring lists that the engineers would use to lay out the designs of the early computer boards. He became fascinated with the possibility of using computers, rather than people, to both solve these increasingly complex wiring jobs, but to also have the computer lay out the designs without the need for human intervention. His fellow engineers at Sperry told him this was not possible for a computer to perform "such an obviously human task."

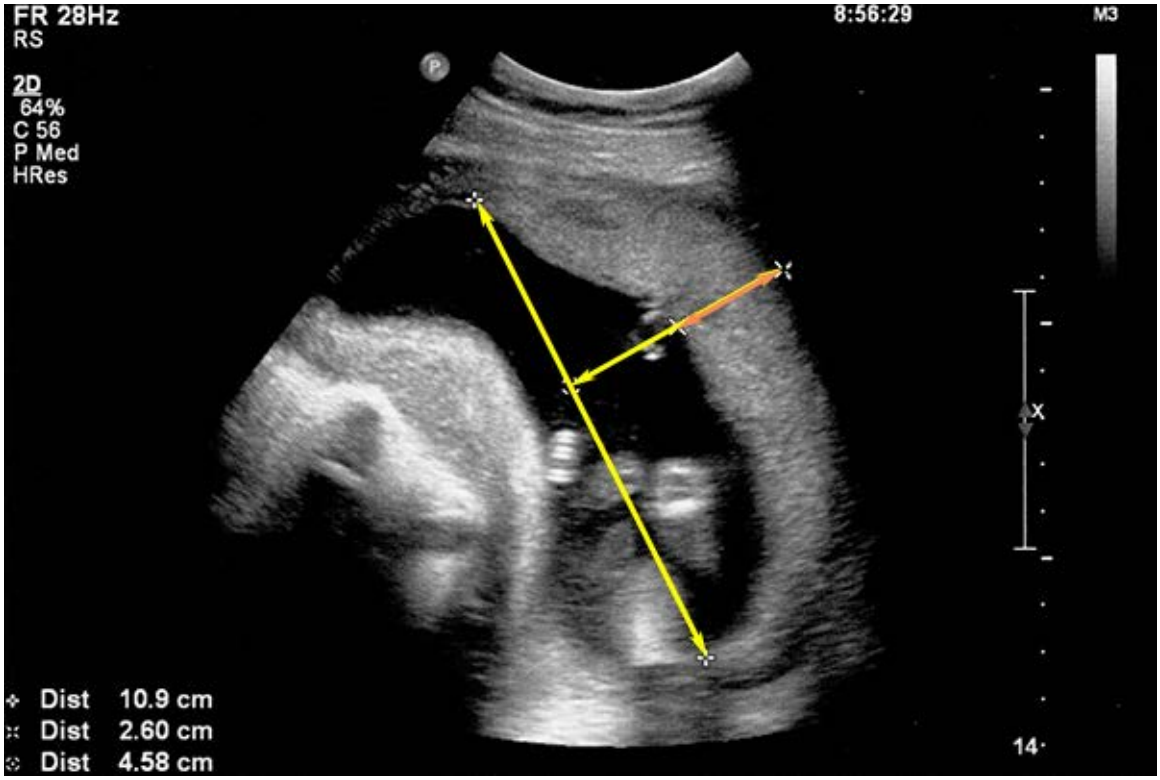
"A computer cannot think," he was told, "and this requires deep thinking." In spite of all these objections, his computer programs gained capability and were successfully creating computer designs in a few hours compared to weeks when done manually. He would always have to tell people that, strictly speaking, it wasn't the "computer" creating the design, but rather the computer *program* that was created by the programmer. By 1968 Kliman's Research and Development team at Sperry-had created a large software system that automated many design tasks. In spite of his successes, the union at Sperry threatened to strike if computers were going to replace manual engineering tasks. This discouraging reaction led him in 1968—when he was 35—to form the Algorex Corporation which used computers to design the smallest computers in the world.

The ability to create computers with very compressed dimensions attracted the attention of a number of cutting-edge companies, including NASA and JPL (Jet Propulsion Labs). Every mission that NASA launched strained the limits of weight and size for their payload satellites and space probes. Nowhere was this more critical than the Voyager missions. When Pioneer 11 flew by Jupiter it recorded radiation levels far higher than had been anticipated. This had a direct impact on the Voyager missions because JPL realized that the current Voyager computer design would have been destroyed when it flew by Jupiter. The mission was in jeopardy because JPL needed to significantly increase the shielding around the computer, drastically reducing its size. Kliman proposed a novel solution: put components on both sides of the mother board. "Can that be done?" the engineers at JPL asked. Kliman said, "yes," and his idea saved the Voyager missions.

Before the internet and email, JPL would send Voyager pictures to team members. This is one of the pictures JPL sent Kliman that the Voyager 1 spacecraft took of Jupiter and two of its satellites (Io at left and Europa at right) on February 13, 1979.

In addition to working with NASA and JPL, Kliman and his team at Algorex worked on other notable projects, including the first whole-body CT Scanner made by Ohio Nuclear and the first DirecTV satellite.

Although Algorex closed its doors in 1995, Kliman's passion for math led him to a second career as a math teacher, first at Nassau Community College and then Hofstra University. While he remained passionate about the planets and outer space for the remainder of his life, his attentions were redirected to inner space. After being peppered with math problems by his father his whole life, his oldest son Harvey—a physician scientist at the Yale School of Medicine—asked Kliman to solve a math problem for him concerning placental volume: generate an equation to calculate the volume of a placenta from a 2-dimensional ultrasound cross section. This equation forms the basis of the Estimated Placental Volume (EPV) method—which father and son coauthored—to detect very small placentas, the number one cause of stillbirth.



Ultrasound of placenta with demarcated width, height and thickness lengths. These are then entered into Kliman's EPV equation to calculate the 3-dimensional volume of the placenta. An iPhone and iPad app called "Merwin's Calculator" calculates the EPV from the measured lengths and plots the result, along with the percentile, as a function of gestational age.

Merwin Kliman was born on December 25, 1932 (the same day his father was born), in Buffalo, NY, the oldest of two children. His father worked in the steel mill rail yards of Buffalo and died of pneumonia when Merwin was 4. His mother started working for Kodak in a photography store when she was 15, but learned the field of radiology beginning in 1918 when she was 18, eventually becoming one of the founding members of the Radiological Society of America. His early love was butterflies, but when he learned algebra in high school he found his life-long passion for mathematics and problem solving.

Mr. Kliman is survived by three of his four sons and five grandchildren. His wife Bernice, a Shakespearean scholar, and son Lincoln, also an electrical engineer, died before him.

Kliman started working on the computer system for the Voyager project in 1973, culminating in the launch of Voyager 1 on September 5, 1977. His signature is on each of the computer boards in the Voyagers, two computers that will likely outlive our solar system.