

Women's Software: Six women programmed the technology known today as software for the empty computing machine that men built. His hardware with her software became the world's first computer known as ENIAC (Electronic Numerical Integrator and Computer).

It measured 8 by 3 by 100 ft., covered 1,800 sq. ft. of floor space, weighed 30 tons, contained about 18,000 vacuum tubes, 70,000 resistors, 10,000 capacitors, 6,000 manual switches and 5 million soldered joints. It completed the same computations the women "computers" did using the slide rule, differential analyzer and electronic calculators, but in a fraction of the time, after the women had transformed their computations into software.

During World War II the U.S. Army wanted a computing machine that could calculate artillery-firing tables to be used to deploy weapons with target accuracy. The military sponsored research began in 1943. At a 1946 press event, ENIAC was presented to the public. The men who built the machine were acknowledged and lauded in newspaper headlines across the nation. The men, the machine, and the women's program became famous, but not the women. The women were not even introduced. Allow me to introduce:

Jean Jennings Bartik born in 1924, the sixth of seven children in a Missouri farm family that valued education. She majored in math at what is now Northwest Missouri State University, often the only girl in her classes. She did not want to teach but to see the world and have adventures. She was 20. Her faculty adviser noticed in a 1945 math journal that the Army was recruiting math graduates for a wartime project in Philadelphia. She applied, was accepted, and told to come quickly. She got on the next train available Her high school principal said Betty made the highest marks in math than anyone who had ever attended the school. At the Moore School of Computing in Philadelphia she was a "computer" who hand-computed ballistics trajectories and became one of the original six ENIAC programmers (programming the enormous machine to perform the ballistics differential calculus equations the women had calculated by hand). She and fellow programmer Betty Holberton led the programming.

Betty Snyder Holberton was born in 1917 and attended Quaker primary schools. She graduated from the University of Pennsylvania with a degree in journalism, one of the few colleges at Penn open to women in 1939, but it provided her the opportunity to take undergraduate courses in other Penn colleges not open to women. She joined the Moore School in 1942. She and Jean devised the trajectory program that controlled the operation of the ENIAC during its presentation demonstration in 1946. Betty also developed the first sort-merge generator for UNIVAC I for Dr. Grace Murray Hopper, who it is said, developed her ideas about compilation from Betty Holberton. Dr. Hopper credited Betty with being the best computer programmer she had known.

Kathleen McNulty was born in Donegal, Ireland in 1921 and came to America when she was 3. She spoke Gaelic, attended parochial grade school in Chestnut Hill, and Hallahan Catholic Girls High School where her math studies included 2 years of algebra, plane and solid geometry, and trigonometry. She graduated Chestnut Hill College for Women in 1942, 1 of 3 math majors in a class of 92, where she studied college algebra, math history, integral calculus, spherical trigonometry, differential calculus, and partial differential equations. As a junior, she knew she did not want to teach and began scouting employment where she could use her math only to learn most actuarial companies did not hire women. So as a senior she took business classes, i.e., accounting, money and banking, business law, economics and statistics. After graduation, she noticed in the newspaper that the Army was looking for women with a degree in mathematics-right there in Philadelphia. Kay contacted Frances Bilas a fellow math major and together they went to interview. Both were accepted as human computers and were notified to report to the Moore School where they were introduced to a differential analyzer for the first time.

Frances Bialis Spence was born in 1922 Philadelphia, the second of 5 girls. She graduated from South Philadelphia High School for Girls and attended Temple University. She received a full scholarship to Chestnut Hill College in Philadelphia, where she majored in mathematics and minored in physics. She graduated in 1942 and planned to teach until fellow math major Kathleen McNulty told her the Army was recruiting math majors. After they applied and were accepted, as already mentioned, they were happy to know they would be contributing to the war effort.

Mary Wescoff Meltzer graduated from the Secondary Education Department at Temple University in 1942 with a degree in social studies where jobs were scarce. A friend told her they were hiring at the Moore School. Her knowledge of how to run a calculator and operate an adding machine landed her a job to work on program computing. She was immediately shown how to run a Marchant calculator and took classes in calculus and trigonometry.

Ruth Lichterman Teitelbaum whose father was a Hebrew scholar graduated from Hunter College with a BS in mathematics and was recruited to the ENIAC group as one of the original six. She was the last of the original six to leave the ENIAC because she stayed on two years to train the next generation of programmers.

The ENIAC women whose software programming converted math analysis into electrical impulses that made sense to a machine that a calculation could travel through its circuitry to completion and create a functioning computer, and who established the foundation for the software of today, were effectively written out of, or not written into, history at the time. But times change and 51 years later, they were inducted into the Women in Technology International Hall of Fame.

Sources: <http://www.eniacprogrammers.org/>, The Women of ENIAC, W. Barkley Fritz.