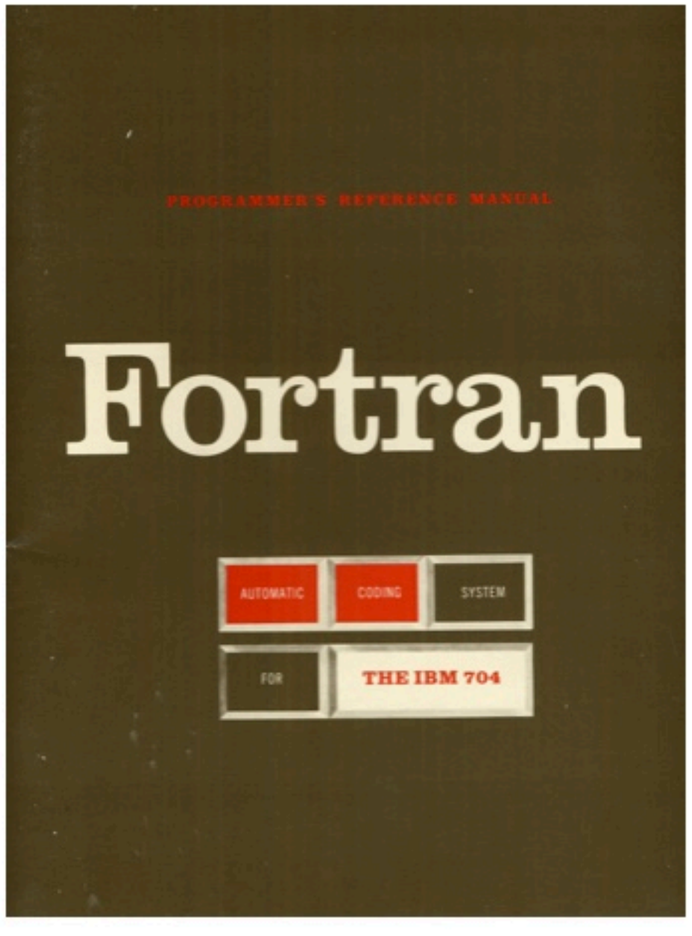
Frances *'Fran'* Allen

A Pioneer in the World of Computing

Biography

Frances Elizabeth Allen (August 4, 1932 – August 4, 2020) was a computer scientist and pioneer in the field of optimizing compilers. In 1989, Fran was the first woman to become an IBM Fellow, and in 2006 became the first woman to win the Turing Award. Her achievements include seminal work in compilers, program optimization, and parallelization. She worked for IBM from 1957 to 2002 and subsequently, was a Fellow Emerita, providing technical guidance in her retirement.

“All the things I do are of a piece. I’m exploring the edges, finding new ways of doing things. It keeps me very, very engaged.”

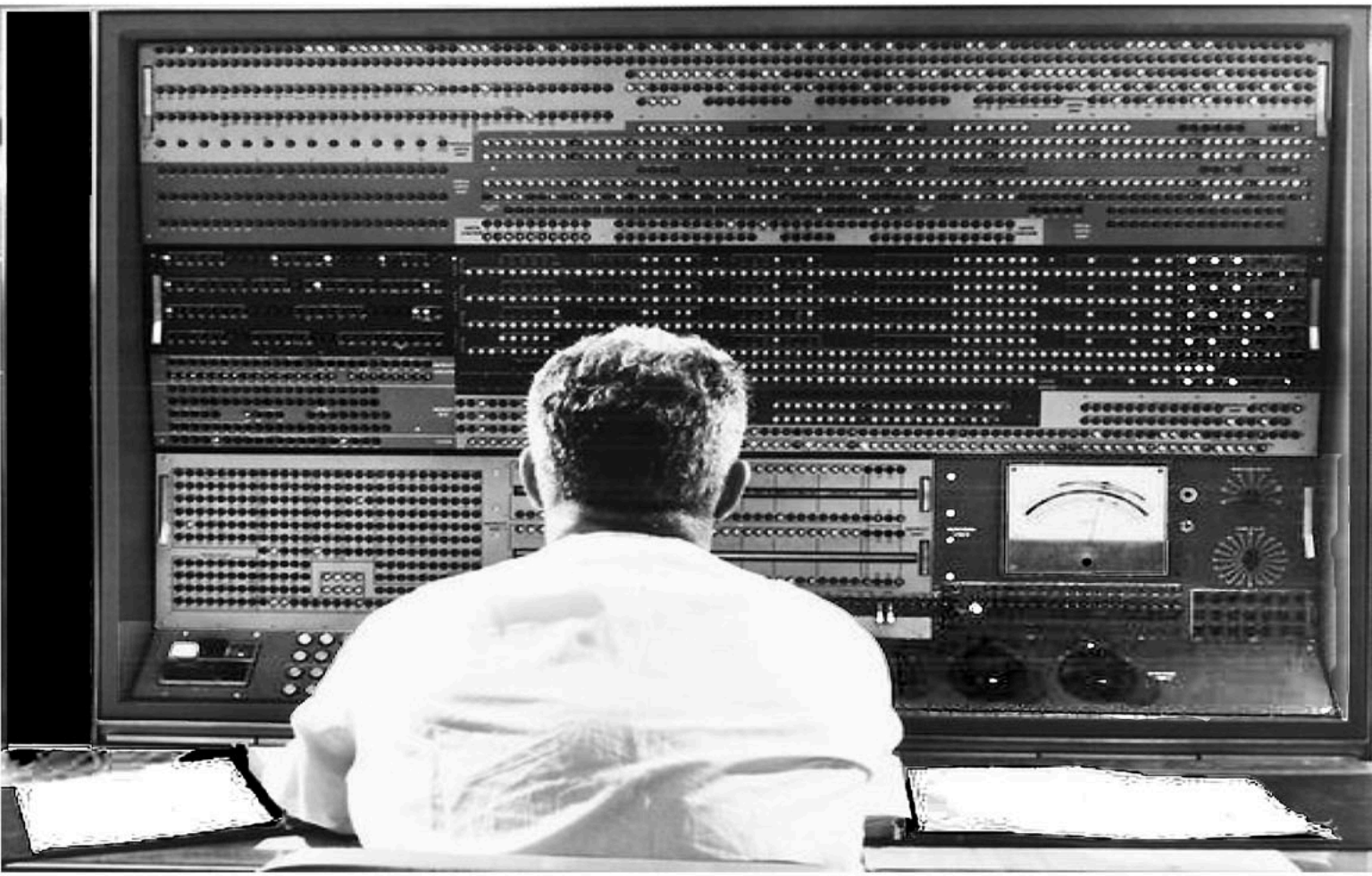


The Fortran Automatic Coding System for the IBM 704 (15 October 1956), the first programmer's reference manual for Fortran

After two years of teaching, Fran decided to continue her education and pursued her Master's degree in mathematics at the University of Michigan. During her tenure at the university, one of the few institutions teaching computer science in the 1950s, Fran took a handful of basic computing classes. Fran learned that IBM was interviewing potential candidates on campus and signed up for an interview. When offered a position, she envisioned herself working for IBM for just a year, mainly to help pay off her loans from her Master’s degree program and planned to return to teaching—a job that she loved. Fran's first day at IBM Research was on July 15, 1957, just three months prior to IBM’s introduction of FORTRAN (FORmula TRANslation), the first high-level programming language.

Given Fran’s background in teaching and the need to rapidly train Research division scientists in this new, rather complex language, Fran’s first job at IBM was to teach FORTRAN. Although she initially planned to return to teaching after paying off her student loans, Fran ultimately remained at IBM for the duration of her career.

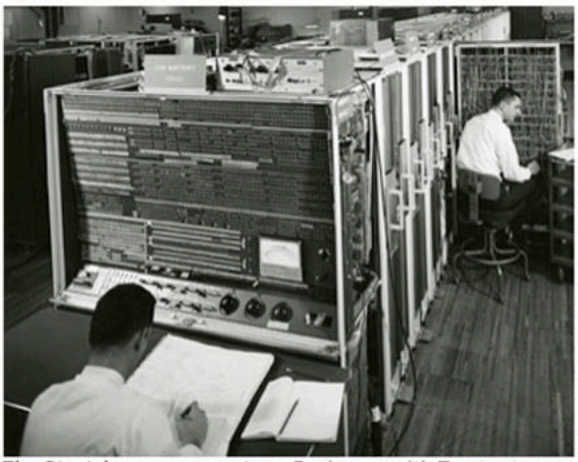
The Stretch supercomputer



1960s

Throughout Fran's storied career, she developed a number of breakthrough programming-language compilers In the early 1960s, Fran led a team of researchers that designed one of the first supercomputers, the Stretch Harvest—for the U.S. National Security Agency. The machine could decrypt messages using three different programming languages: FORTRAN, Autocoder, and Alpha.

She also designed and built the machine-independent, language-independent optimizing component of the Experimental Compiler for IBM's Advanced Computing System. The code helped drive technological improvements of hardware design, and it created a new way to analyze and transform programs. Allen wrote a seminal paper, "Program Optimization," first published internally at IBM in 1966. It describes a robust new framework for implementing program analysis and optimization as well as a powerful set of new algorithms.



The Stretch supercomputer —Engineers with Tractor tapes for Harvest

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1932-2020