**Edith Clarke**

(February 10, 1883 – October 29, 1959)

Edith Clarke was the first woman to be professionally employed as an [electrical engineer](https://en.wikipedia.org/wiki/Electrical_engineering) in the [United States](https://en.wikipedia.org/wiki/United_States), and the first female professor of electrical engineering in the country. She was the first woman to deliver a paper at the [American Institute of Electrical Engineers](https://en.wikipedia.org/wiki/American_Institute_of_Electrical_Engineers), the first female engineer whose professional standing was recognized by [Tau Beta Pi](https://en.wikipedia.org/wiki/Tau_Beta_Pi), and the first woman named as a Fellow of the [American Institute of Electrical Engineers](https://en.wikipedia.org/wiki/American_Institute_of_Electrical_Engineers). She specialized in electrical power system analysis and wrote *Circuit Analysis of A-C Power Systems*.

**Background**

One of nine children, Edith Clarke was born to lawyer John Ridgely Clarke and Susan Dorsey Owings on February 10, 1883, in [Howard County](https://en.wikipedia.org/wiki/Howard_County,_Maryland), Maryland. After being orphaned at age 12, she was raised by an older sister.

She used her inheritance to study [mathematics](https://en.wikipedia.org/wiki/Mathematics) and [astronomy](https://en.wikipedia.org/wiki/Astronomy) at [Vassar College](https://en.wikipedia.org/wiki/Vassar_College), where she graduated in 1908.

After college, Clarke taught mathematics and physics at a private school in [San Francisco](https://en.wikipedia.org/wiki/San_Francisco) and at [Marshall College](https://en.wikipedia.org/wiki/Marshall_University). She then spent some time studying [civil engineering](https://en.wikipedia.org/wiki/Civil_engineering) at the [University of Wisconsin–Madison](https://en.wikipedia.org/wiki/University_of_Wisconsin%E2%80%93Madison), but left to become a "[computer](https://en.wikipedia.org/wiki/Human_computer)" at [AT&T](https://en.wikipedia.org/wiki/AT%26T_(1885-2005)) in 1912. She computed for [George Campbell](https://en.wikipedia.org/wiki/George_Ashley_Campbell), who applied mathematical methods to the problems of long-distance electrical transmissions. While at AT&T, she studied electrical engineering at [Columbia University](https://en.wikipedia.org/wiki/Columbia_University) by night.

In 1918, Clarke enrolled at the [Massachusetts Institute of Technology](https://en.wikipedia.org/wiki/Massachusetts_Institute_of_Technology), and the following year she became the first woman to earn an M.S. in electrical engineering from MIT. Clarke's thesis at MIT was supervised by [Arthur E. Kennelly](https://en.wikipedia.org/wiki/Arthur_E._Kennelly) and was titled "Behavior of a lumpy artificial transmission line as the frequency is indefinitely increased."

**Work**

Unable to find work as an engineer, Clarke went to work for [General Electric](https://en.wikipedia.org/wiki/General_Electric) as a supervisor of computers in the [Turbine](https://en.wikipedia.org/wiki/Turbine) Engineering Department. During this time, she invented the Clarke calculator, an early [graphing calculator](https://en.wikipedia.org/wiki/Graphing_calculator), this simple graphical device solved equations involving [electric current](https://en.wikipedia.org/wiki/Electric_current), [voltage](https://en.wikipedia.org/wiki/Voltage) and [impedance](https://en.wikipedia.org/wiki/Electrical_impedance) in [power transmission](https://en.wikipedia.org/wiki/Power_transmission) lines.

The device could solve line equations involving [hyperbolic functions](https://en.wikipedia.org/wiki/Hyperbolic_function) ten times faster than previous methods. She filed a patent for the calculator in 1921 and it was granted in 1925.

In 1921, Clarke took a leave of absence from GE to teach physics at the [Constantinople Women's College](https://en.wikipedia.org/w/index.php?title=Constantinople_Women%27s_College&action=edit&redlink=1) in Turkey. The next year, she returned to GE in the Central Station Engineering Department – the first professional female electrical engineer in the United States. She retired from General Electric in 1945.

Her background in mathematics helped her achieve fame in her field. On February 8, 1926, as the first woman to deliver a paper at the American Institute of Electrical Engineers' (AIEE) annual meeting, she showed the use of hyperbolic functions for calculating the maximum power that a line could carry without instability. The paper was of importance due to the fact that the transmission lines were getting longer, leading to greater loads and more chances for system instability and Clarke's paper provided a model that applied to large systems. Two of her later papers won awards from the AIEE: the Best Regional Paper Prize in 1932 and the Best National Paper Prize in 1941.

In 1943, Edith Clarke wrote an influential textbook in the field of [power engineering](https://en.wikipedia.org/wiki/Power_engineering), *Circuit Analysis of A-C Power Systems*, based on her notes for lectures to GE engineers.

In 1947, she joined the faculty of the Electrical Engineering Department at the [University of Texas at Austin](https://en.wikipedia.org/wiki/University_of_Texas_at_Austin), making her the first female professor of electrical engineering in the country. She taught for 10 years and retired in 1957.

In an interview with [*The Daily Texan*](https://en.wikipedia.org/wiki/The_Daily_Texan) on March 14, 1948, Clarke observed: "There is no demand for women engineers, as such, as there are for women doctors; but there's always a demand for anyone who can do a good piece of work."