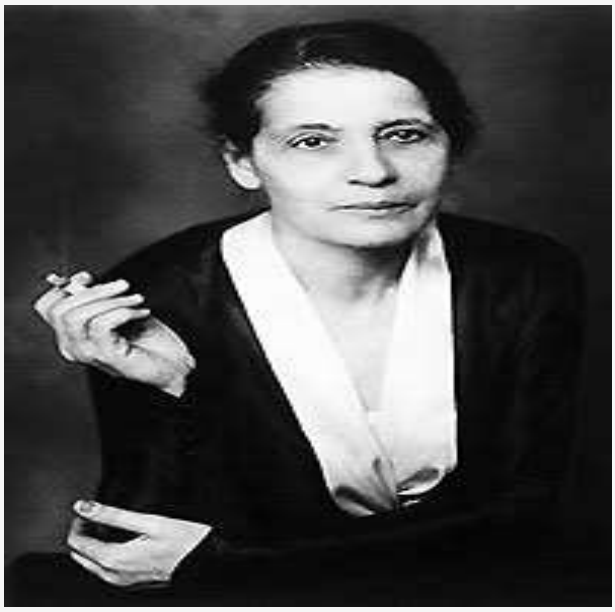
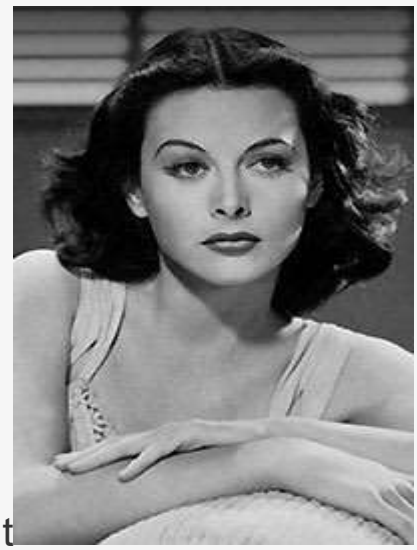
Lise Meitner: Nuclear Fission



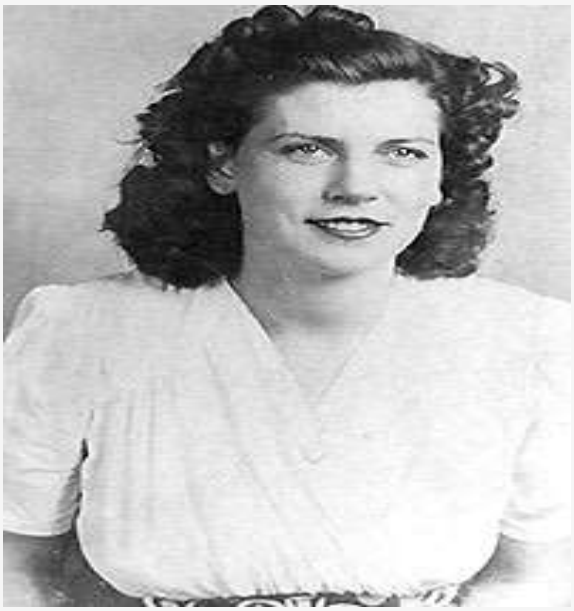
As long as we're on the subject of scientific genius, there's the story of Lise Meitner. It's hard to say whether Meitner is better or worse off for having been slighted by a greedy man. Meitner was a student under the legendary physicist Max Plank, and the first German woman to hold a professorship at a German University. As the Nazis rose to power, the young Jewish scientist was forced to flee her home country. She continued to correspond with her research partner, Otto Hahn, from her new location in Scandinavia. In 1938, Hahn and Meitner joined forces to outline the concept of nuclear fission. This was the groundbreaking moment that would, in just five years, give rise to the awesome destructive capacity of the atomic bomb. Anybody looking to send angry letters to those responsible would find only Hahn's name on the landmark paper revealing the discovery. Hahn chose to omit his partner's name and was thus the sole recipient of the 1944 prize in chemistry from the Royal Swedish Academy of Sciences.

Hedy Lamarr: Radio Guidance System



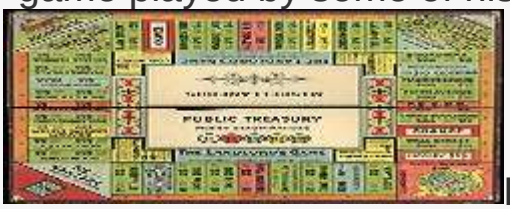
Meitner wasn't the only woman working to build military might during World War II. She is joined by Austrian-born, American actress Hedy Lamarr, who in addition to becoming a star of the Silver Screen during the Golden Age of Hollywood, collaborated with composer George Antheil to create a radio guidance system for Allied torpedoes. The Navy pretended it wasn't interested in the technology, but of course it was. They stole Lamarr and Antheil's idea, classified the patent and, by the 1960s, had begun to incorporate the technology into a host of new weapons systems. Perhaps even more importantly, Lamarr and Antheil's work would be nothing less than the basis for the omnipresent Wi-Fi, CDMA, and Bluetooth wireless technologies.

Margaret Knight: Paper Bag Machine



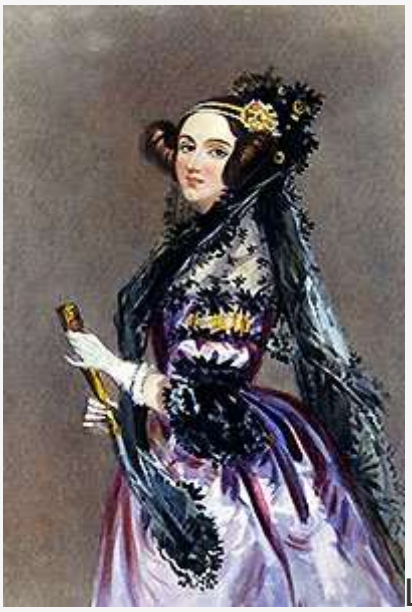
Not all of history's greatest female inventors worked in the military. Margaret Knight made her greatest contributions to production in an era where industry ruled. Often referred to as Lady Edison, Knight was a well-known inventor, mostly because she had the wherewithal to stand up for her rights. In 1868, Knight was working for the Columbia Paper Bag Company when she invented a machine that automatically folded and glued paper bags into the formation familiar to shoppers today. As Knight worked toward the completion of a metal prototype, a machinist named Charles Anan visited her plant. Unbeknownst to Knight, the random machinist filed for a patent for her invention. She only learned of his deception when she applied for her own patent. Fortunately for Knight, many witnesses were on hand as she worked through her invention. This proved more than compelling in a judgment that ultimately awarded the patent—and all future royalties—to Knight.

Elizabeth Magie: *Monopoly*

In the 1930s, Parker Brothers introduced the game *Monopoly* to American families. The game made a millionaire out of an unemployed heater salesman named Charles Darrow. He became the first board-game millionaire, and a symbol of the quirky unpredictability of the American Dream. The only problem: he didn't invent the game. Some thirty years prior, a woman named Elizabeth Magie created "The Landlord's Game." It's intent was progressive in nature, designed to illustrate the evil of business monopolies. The game was prophetic, coming well in advance of the Great Depression. Ironically, it was this catastrophic era that led to Darrow's unemployment and his subsequent fascination with a game played by some of his Quaker friends in Atlantic City. 

Darrow would develop this exact variation of the Landlord's Game into his pitch for Parker Brothers, including Atlantic City street names and places. Perversely, Darrow transformed *Monopoly* into a game that seems to celebrates dishonest business practices. On its way to retailing one of the most popular board games in history, Parker Brothers purchased Magie's patent. The game's original inventor would net a rough total of about $500 for her stroke of gaming genius.

Ada Lovelace: Computer Programming



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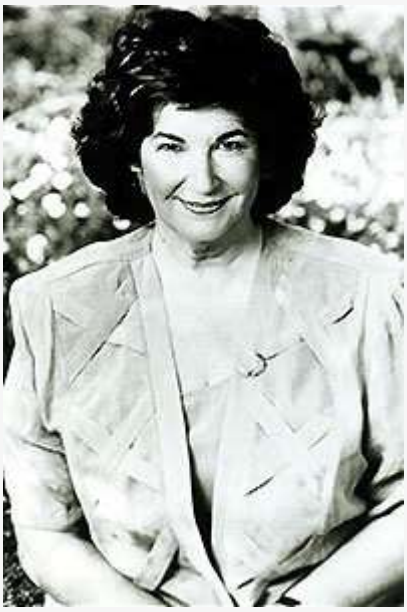
Lord Byron's daughter, Ada Lovelace, was one of the world's first computer geniuses, though her role is often minimized by male historians. In 1843, the mathematically erudite Lovelace collaborated with inventor Charles Babbage at the University of London. Babbage was working on something called an Analytical Engine, an early prototype of the computer. Lovelace contributed detailed and extensive notes to Babbage's work, particularly by articulating the way Babbage's machine could be fed data to complete complicated math problems, or even compose complex music. These ideas may mark the earliest recorded proposition for what would eventually become computer programming and algorithms. Today, Lovelace's contributions are obscured by debate, and most often by the dismissive and unmistakably misogynistic characterizations of her role.

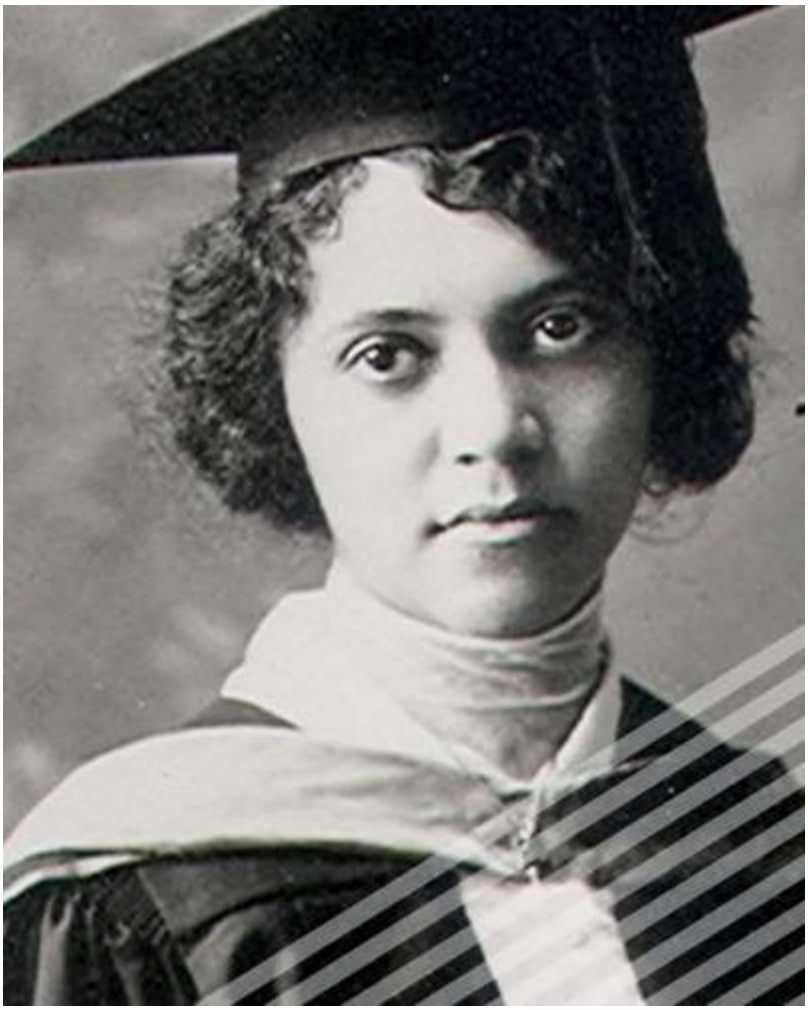
Candace Pert: Neuroscience Findings



While still a graduate student at Johns Hopkins University, Candace Pert discovered the receptor that allows opiates to lock into the brain. This game-changing neuroscience revelation was so important that it led to an award—for her professor. Dr. Solomon Snyder was recognized for his student's achievement. When Pert wrote a letter of protest to the award committee underscoring her determinant contributions, Dr. Snyder mansplained in response, "That's how the game is played."

Of course, men like Dr. Snyder have been playing this game for centuries. But we have an obligation to call them on it. It starts with history. But it continues in modern academia and today's workplace. Let's ensure all the brilliant women in our midst get their due credit.

Alice Ball (1892-1916)



A pioneering Black chemist, Alice Ball revolutionized the treatment for leprosy in the early 20th century. After earning graduate degrees from the University of Washington and the University of Hawaii, Ball became one of the first female chemistry professors in the U.S.

In the laboratory, Ball researched treatments for leprosy. In her early 20s, she developed the first injectable leprosy treatment made from the oil of the chaulmoogra tree. The "Ball Method" was eventually used to treat thousands of leprosy patients until the development of sulfone drugs decades later.

Ball died at just 24 years old after being exposed to chlorine gas in a lab accident. After her death, another professor claimed Ball's work as his own, denying her credit. Today, Ball stands as a trailblazing woman in chemistry.

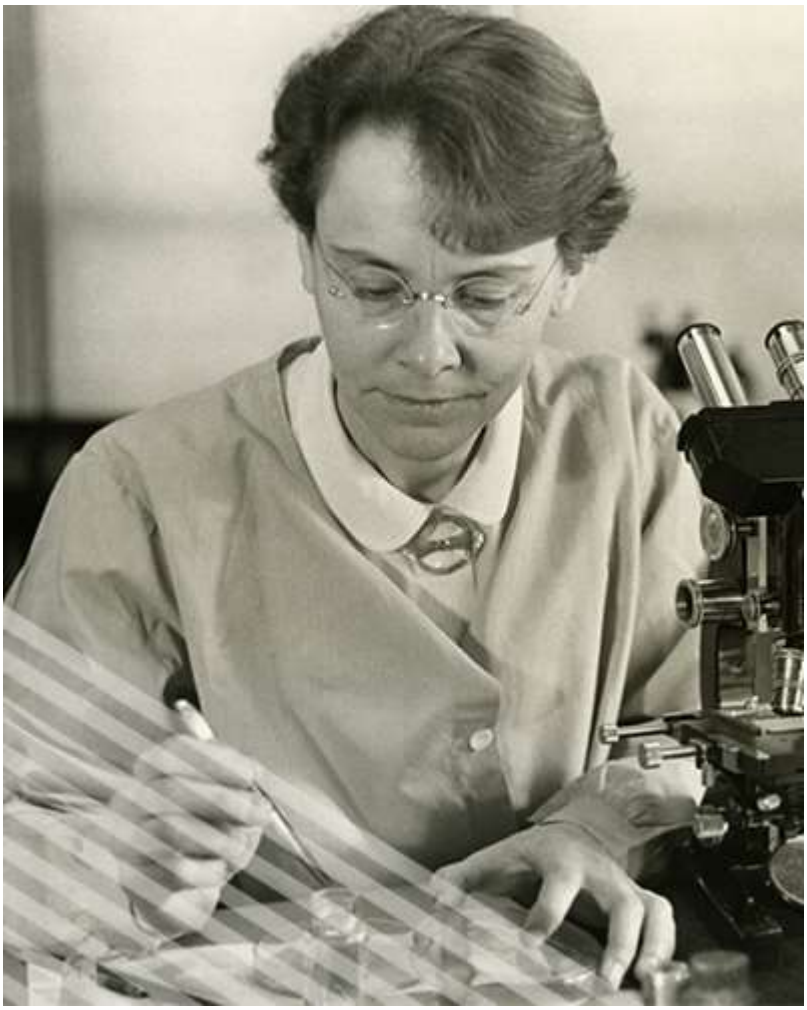
Chien-Shiung Wu (1912-1997)

A pioneer in physics, Chien-Shiung Wu was the first person to prove that the principle of parity conservation does not apply during beta decay.

Born and raised in a small town north of Shanghai, Wu was fortunate enough to receive a formal education, which was uncommon for girls at the time. In 1934, Wu graduated from the National Central University in Nanking (now called Nanjing University) with a degree in physics. At the urging of a female mentor, she decided to continue her studies in the U.S. and later earned a Ph.D. in physics from the University of California, Berkeley.

Wu remained in the U.S. to teach university-level physics courses at Smith College and Princeton University, where she was the first woman professor in the physics department. She also joined the Manhattan Project through which she helped advance knowledge of atomic science.

Barbara McClintock (1902-1992)

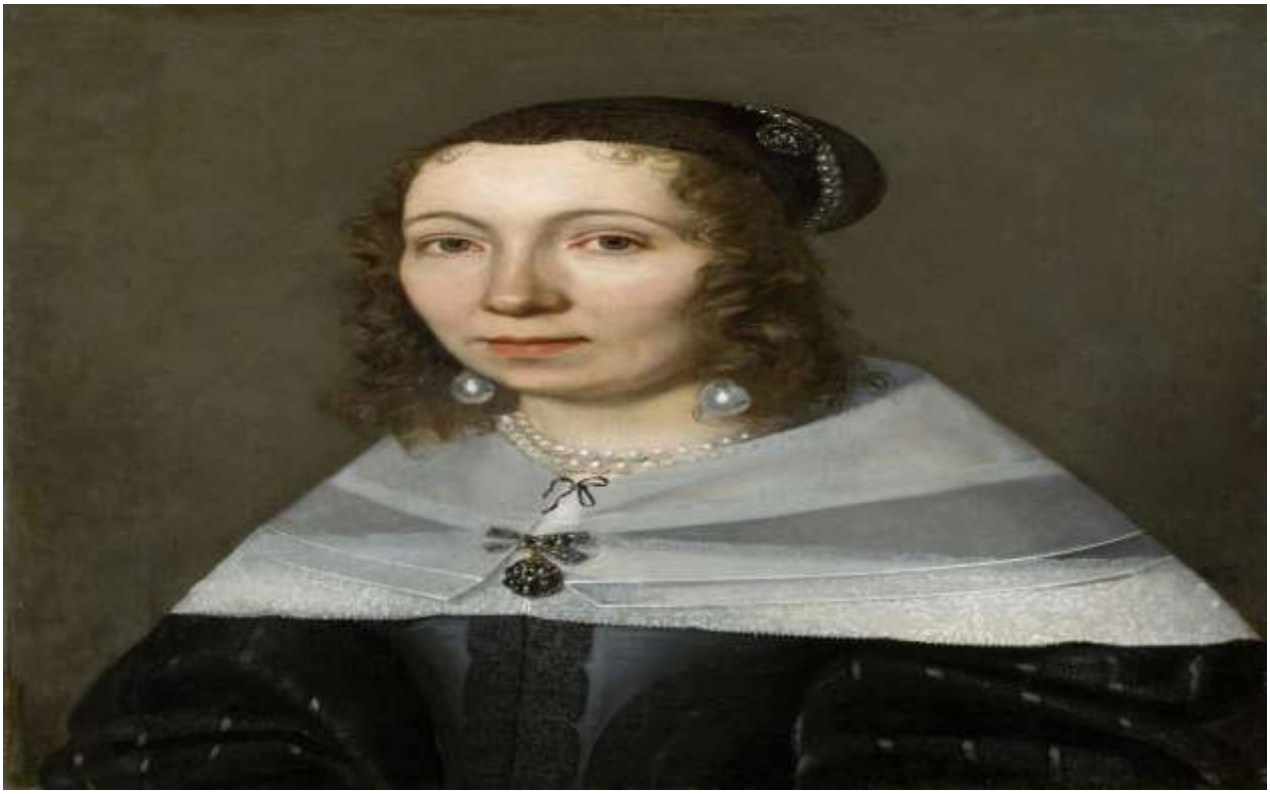


In the mid-20th century, geneticists agreed that genes were fixed in place and did not move. Barbara McClintock, however, upended that theory through her research on maize.

Starting in the late 1920s, McClintock researched genetic transposition, a groundbreaking concept. Then in the 1940s and '50s, she built upon her work to prove that genes could turn on or off physical characteristics. McClintock faced skepticism for challenging current ideas of molecular biology, which pushed her to refrain from publishing some of her work.

In 1983, McClintock won the Nobel Prize for her work on the ability of genes to move positions on a chromosome. "Over the many years, I truly enjoyed not being required to defend my interpretations," McClintock said. "I never felt the need nor the desire to defend my views."

Maria Sibylla Merian (1647-1717)

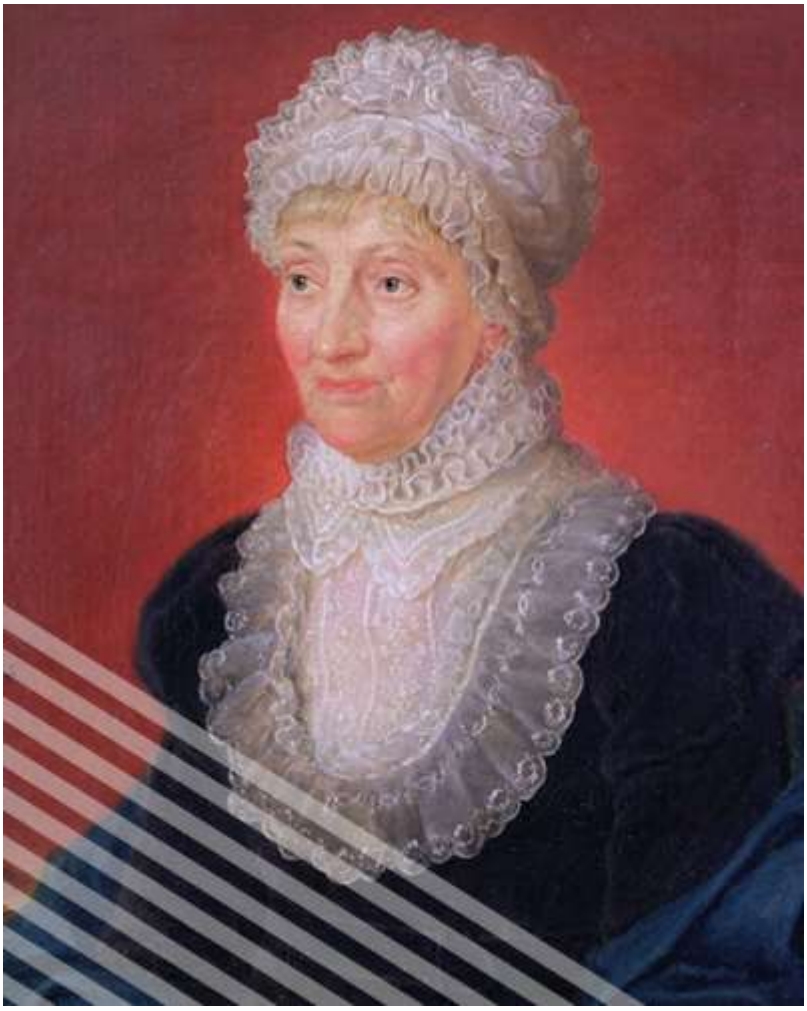


Maria Sibylla Merian transformed the fields of botany and zoology. In the 1670s, she collected and observed living moths, butterflies, and other insects to create an illustrated catalogue of European insects. By working from life rather than with preserved specimens, Merian added vibrancy to the understanding of zoology.

After publishing several illustrated books, Merian traveled to South America with her daughter to continue her research. In the Dutch colony of Suriname, Merian studied indigenous animals and plants in their natural habitats. By traveling without a male companion and conducting scientific research from life, Merian challenged the social conventions of her time.

Once she returned to the Netherlands, Merian published her naturalist study of Suriname, helping to shape modern zoology and botany.

Caroline Herschel (1750-1848)



Caroline Herschel was not only the first woman to discover a comet and the first woman to receive a salary for her scientific work, but she was also the first woman to be granted honorary membership in the Royal Society before the prestigious society admitted women.

In the 1780s, Herschel worked with her brother, William, to catalogue the night sky. The siblings recorded 2,500 nebulae and star clusters, with Herschel alone discovering 14 nebulae and eight comets. In 1787, King George III offered Herschel a salary for her astronomical research. She meticulously swept the skies to chart over 500 stars that the previous star catalogue did not list.

The tombstone of Herschel, who died in 1848 at the ripe age of 97, contains an inscription in her own words: "The eyes of her who is glorified here below turned to the starry heavens."

Katherine Johnson (1918-2020)

Born in West Virginia, Katherine Johnson is best known for her work as a "computer" at NASA. Specifically, it was her mathematical calculations that helped the U.S. send people into orbit around Earth and, later, to the moon.

In her youth, Johnson had a penchant for numbers and counting. She learned quickly, too, and started high school at just 10 years old and college at 15.

Over a decade after earning her degree in mathematics, Johnson learned that NASA was hiring Black "computers" — highly skilled mathematicians who could perform and solve difficult math problems. In the 1960s, NASA used Johnson's calculations to successfully send astronauts into orbit.

Upon her death in 2020, NASA administrator James Bridenstine remarked, "She was an American hero, and her pioneering legacy will never be forgotten."

Marie Curie (1867-1934)

Marie Curie remains the only scientist to win Nobel Prizes in two scientific fields. After studying at the Sorbonne, Curie became a professor of physics and opened a laboratory to study radiation.

After the discovery of radioactivity in 1896, Curie isolated the new elements polonium and radium for the first time. She also developed a method to isolate radium for observation. In 1903, Curie won the Nobel Prize in physics for her work on spontaneous radiation. Curie's work on radioactivity earned her a second Nobel Prize, this time in chemistry, in 1911.

Curie's work on X-rays and uranium helped establish the field of atomic physics. After years of working with radioactive materials, Curie died in 1934 from radiation exposure.