

Historic STEM Women/Science:***Sor Juana Inez de la Cruz (1651-1695)**

Born in Mexico of a creole mother, Sor Juana is considered to be the first North American feminist. A first magnitude poet in Hispanic literature, her poetry expresses her passion in science, mathematics, physics, astronomy, philosophy, and in all, gender equity. She wrote in defense of women's intellectual rights, most notably in her *Respuesta*. Obsessive with want to study that was denied her as a female, she did so on her own and privately. She had learned to read at age three, to write at age five, and learned Latin in less than twenty lessons. At age seventeen, she was questioned by forty members of the University of Mexico on topics such as mathematics, philosophy, literature and history. They were astounded by her genius. She begged her mother to dress her as a boy that she could attend the university. But this was Impossible. A female intellectual, passionate to study the sciences, she was a rare phenomenon woman in seventeenth-century Hispanic society.

<http://www.historytoday.com/amy-fuller/mexican-martyr>

***Nettie Stevens, PhD (1861-1912)**

Geneticist Stevens' chromosomal research debunked more than two thousand years of scientific speculation and experiments on how an animal, plant, or human becomes male or female. Her findings, published in 1905, documented that the sex of basically all many-celled biological organisms is determined at the moment of fertilization by the combination the large X and small y chromosomes. She verified that these two chromosomes responsible for determining the sex of individuals depended specifically on the presence or absence of the smaller y chromosome. Her findings ended a long-standing scientific debate; influenced the entire field of genetics; and was one of the major twentieth-century scientific breakthroughs.

<https://www.britannica.com/biography/Nettie-Stevens>

***Cecilia Payne, PhD (1900-79)**

A female physicist, Payne lived in a time when women were not awarded doctorates in physics. Thus, in 1925 an astronomy department was created at Harvard and bestowed on her the first female PhD in astronomy. Payne's scientific discovery documented the temperature of the sun (virtually all stars) is predominately composed of 98% hydrogen and helium with only 2% of its mass from the other chemical elements. Controversial and contrary to the accepted theory of the time, it became the most powerful analytical tool in stellar astrophysics. Her work is considered the Origin of the Universe equivalent of Darwin's Origin of the Species.

<http://www.usasciencefestival.org/schoolprograms/role-models-in-science-engineering/item/2660-payne-gaposchkin-cecilia.html>

***Henrietta Leavitt (1868-1921)**

In the early, uncharted beginnings of astronomy, Leavitt, a graduate of Radcliffe College in 1892, became the astronomer who charted the skies we see each night from earth. She discovered more than 2,400 variable stars; about half of those then known in

1912. But, it was her discovery of how to measure the distance between the Earth and faraway galaxies that dramatically changed astronomy forever. Her discovery enabled star distances to be calculated up to 10 million light years away and became known as her “yardstick to the universe.” It enabled Edwin Hubble and other fellow male astronomers (women were restricted by men in astronomy research opportunities) to make discoveries that changed our view of our galaxy. Leavitt also developed a standard of photographic magnitude measurements in 1913 that is accepted as “the” standard and is christened the Harvard Standard.

<http://www.womanastronomer.com/hleavitt.htm>

*Gladys Hobby, PhD (1910-93)

With her doctorate in bacteriology (1935/Columbia), Hobby focused her research on finding human uses for penicillin. The mold discovered by chance in 1929, had sat dormant for years as attempts to grow enough cultures for research failed. Ten years after her successful experimental efforts to grow enough cultures to research, penicillin became the world’s first antibiotic. Hobby was one of three dedicated scientists who patiently grew cultures for four years, then researched infection diseases in humans, and ultimately treated the first patient in 1941. Penicillin is often cited as the most important weapon developed during World War II. Dr. Hobby’s subsequent research also contributed greatly to the development of the powerful anti-tuberculosis drug streptomycin.

<https://www.nwhm.org/education-resources/biography/biographies/gladys-hobby/>

*Lise Meitner, PhD (1878-1968)

A physicist and only the second woman to earn a doctorate at a time higher education was denied women (1905 University of Vienna). Meitner, who collaborated with Otto Hahn, produced the evidence for splitting a uranium atom. She named the process fission and, suggested fission as the form of nuclear reaction to produce energy. Enrico Fermi, expert in neutron and nuclear physics, overlooked the phenomenon of fission. A Fermi coworker wrote, “The possibility of fission, escaped us.” But Fermi then constructed the first self-sustained nuclear chain reaction and won a 1938 Nobel Prize. Hahn published laboratory results of Meitner’s paper without her name and received a 1944 Nobel Prize. Meitner never demanded credit.

[http://www.planet-science.com/categories/over-11s/science-celebrities/2010/09/lise-meitner-\(1878-1968\)-.aspx](http://www.planet-science.com/categories/over-11s/science-celebrities/2010/09/lise-meitner-(1878-1968)-.aspx)

*Rosalind Franklin, PhD (1920-58)

A molecular biologist, Franklin never got proper credit for her revelation that the DNA molecule was the basis of a double helix. Her 1951 preliminary X-ray diffraction photos of preliminary DNA were stolen by her lab mate Maurice Wilkins and shown to their other two lab mates, James Watson and Francis Crick. Her X-ray photo provided the essential information her three male lab mates used for their double helix model. These three men shared the 1962 Nobel Prize. In 2003, the Chicago Medical School was named the Rosalind Franklin University of Medicine and Science, in honor of the woman behind DNA.

<http://www.pbs.org/wgbh/nova/tech/rosalind-franklin-legacy.html>

*S. Jocelyn Bell Burnell, PhD (1943-)

With her doctorate in physics from Cambridge in 1969, Burnell was the first to detect extraterrestrial pulsar signals using a large, sensitive radio telescope designed and built with her thesis advisor Tony Hewish. She alone operated the telescope and analyzed its data. Months later, Hewish came to observe her findings, but did not confer with her about how to announce them. Burnell later wrote: "I went to see Hewish and walked into a high-level conference meeting about how to present these results. A paper in January announcing the first pulsar was submitted to NATURE magazine. It has been suggested that I should have had a part in the 1974 Nobel Prize awarded Hewish for the discovery of pulsars. I am not myself upset about it after all, I am in good company, am I not!"
http://starchild.gsfc.nasa.gov/docs/StarChild/whos_who_level2/bell.html