**Women in STEM**

**Science, technology, engineering and mathematics** (**STEM**, previously **SMET**) is an acronym that refers to the academic disciplines of science, technology, engineering and mathematics. Traditionally seen as a male-dominate sector, more and more women are studying and working in STEM.



Let’s take a look at some famous women in STEM who have paved the way and encouraged more femals to enter this sector.

**Dr. Chien-Shiung Wu** (1912-1997)

*Dr. Chien-Shiung Wu is remembered as the “First Lady of Physics” for her contribution to the Manhattan Project during World War II and for her years teaching at Princeton University, Smith College, and Columbia University. Originally from China, Wu came to the United States to continue her studies where she met her husband Luke Yuan. After her retirement from teaching in 1981, Wu lectured on the importance of girls working in STEM, making her one of many*famousfemale scientists*who have championed the cause of gender equality in STEM fields.*

Dr. Chien-Shiung Wu was born on May 31, 1912 in Liu Ho, China. She graduated from the prestigious National Central University of Nanking in 1936, and after graduation she traveled to the United States to pursue graduate studies. She enrolled at the University of California, Berkeley where she studied physics and received her Ph.D. in 1940. At U.C. Berkeley, she met her husband, Luke Yuan, a Chinese physicist, and they moved to the east coast where Wu split her teaching duties between Princeton University and Smith College in Massachusetts.

During World War II, Wu was asked to join the Manhattan Project at Columbia University, which was the Army’s secret project to develop the atomic bomb.  She helped develop a process to enrich uranium ore that produced large quantities of uranium as fuel for the bomb.

After the war, she stayed at Columbia as a research assistant. In 1957, she and her colleagues Dr. Tsung-Dao Lee and Dr. Chen Ning Yang overthrew a law of symmetry in physics called the principle of conservation of parity.  Wu observed that there is a preferred direction of emission, which disproved what was then a widely accepted "law" of nature.  Her discovery about the law of parity was not recorded, and both Lee and Yang won the 1957 Nobel Prize in Physics, but Dr. Wu was not included in the award.

Even though she did not receive the Nobel Prize, Wu received many other honors and awards.  She was named full professor at Columbia in 1958 and authored the book *Beta Decay* in 1965.  She was appointed as the first Pupin Professor of Physics in 1973.  Wu was the first woman elected to the American Physical Society as well as the first woman to receive the Cyrus B. Comstock Award of the U.S. National Academy of Sciences.  She was also a recipient of the Medal of Science, the nation’s highest scientific award, and became the first woman ever to be awarded an honorary doctorate from Princeton University.

Wu continued to teach at Columbia University and conduct nuclear research until her retirement in 1981. After her retirement, she lectured widely and encouraged the participation of young women in scientific careers and became known as the "First Lady of Physics".  She died on February 16, 1997 in New York.

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**Cecilia H. Payne – Gaposchkin** (1900-1979)

*Cecilia H. Payne-Gaposchkin broke ground for* female scientists *as the first woman to attain full professorship at Harvard and was the also the first female to become a department head at the Ivy League school.  She was a pioneer in the field of astronomy and is considered a founder of modern astrophysics. Though she is now recognized for her impressive accomplishments, Payne struggled to gain attention because of her gender. It took Harvard years to offer her the role of professor and she struggled with a lower salary than her male peers. If you’re getting tired of feeling*[*like the only woman in your field*](http://www.stemjobs.com/14-things-women-in-stem-are-tired-of-hearing-include-gifs/)*, take a cue from this professor: she overcame adversity to teach at one of the*[*best colleges*](http://www.stemjobs.com/7-best-colleges-for-undecided-majors/)*in the country.*

Gaposchkin was born in Wendover, Buckinghamshire, England on May 10, 1900. Growing up in England, Gaposchkin attended both religious and private grammar schools. In 1919 she entered Newnham College at Cambridge University with the intention of studying botany, physics, and chemistry. However, after listening to a lecture by astrophysicist Arthur Eddington about solar eclipses, she decided to change her academic direction and pursue a career in astronomy. At Newnham College, Gaposchkin attended as many astronomy classes as she could, but later faced limited academic opportunities in Great Britain. In 1923, she applied for a research fellowship at the Harvard College Observatory in the USA. She became one of the first students in Harvard's new graduate program in astronomy. Gaposchkin continued her studies as the first PhD student in astronomy at Radcliffe College in 1924, where her research was published.

Upon graduation, Gaposchkin continued her work at Harvard as an astronomer pursuing her studies of the stars and the structure of the Milky Way Galaxy. In collaboration with her husband, Gaposchkin started the systematic investigation of all known variable stars and published her results in 1938, which became the standard reference in the field. During the 1930's and 1940's, Cecilia, her husband, and assistants in the Observatory made more than 1,250,000 observations of variable stars, which became the groundwork for all future studies of the galaxy. In the 1960’s, they made more discoveries regarding the Milky Way Galaxy and Magellanic Clouds.

In conclusion, Gaposchkin entered Harvard's academic community when opportunities for women in the field of astronomy were limited. Despite her discoveries, she lacked the recognition afforded her male counterparts and received a smaller salary. In addition to her scientific work, she edited the volumes published by the Harvard Observatory and papers submitted by the staff to outside journals. She also taught a series of astronomy lecture courses. It was not until 1938 that she received a permanent appointment to the Harvard staff; in 1956 she finally received a full professorship. That same year she became chair of the Astronomy Department, the first woman to chair a department at Harvard University. She retired from active teaching in 1966.

Gaposchkin was recognized by her peers for her definitive studies of variable stars. She authored or coauthored nine books and 351 papers between 1925 and 1979. These studies of variable stars and novae were widely read by both students and astronomers and helped define the structure of the galaxy and the paths of stellar evolution.

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**Antonia Novello** (1944 - present)

*As the fourteenth General Surgeon of the United States, Antonia Novello was the also the first female and first Hispanic to take the position. While in office, she focused on AIDS prevention, underage smoking, and female health. Novello found inspiration in her aunt who died of kidney failure and in a personal medical condition which limited her childhood. Because of these two life events and struggles, Novello was determined to study and practice medicine.*

Born in Puerto Rico, Antonia suffered throughout her childhood from a medical condition that could only be corrected with surgery. Because her family could not afford the long trip to the surgical hospital, she spent part of every summer getting treatment in a local hospital. It was only after two surgeries, at age 18 and 20, that the condition was finally corrected. In the meantime, by the time she was a teenager she had decided to be a doctor, so that she could help other sick children.

Dr. Novello earned her M.D. degree from the University of Puerto Rico, where she met her husband. She later completed her medical training in nephrology (the study of the kidneys) at the University of Michigan, where she was first woman to be named Intern of the Year. Novello gained experience in pediatrics in Michigan until 1974 and did postgraduate studies at Georgetown University. She later joined the U.S. Public Health Service in 1978. She became deputy director of the National Institute of Child Health and Human Development, where she focused on pediatric AIDS.

Through the prestige and authority of this office, the Surgeon General can more effectively encourage and educate the public on pervasive health issues. As surgeon general, Novello focused on the health of young people, women, and minorities. She issued reports and spoke out on under-age drinking, smoking, drug abuse, AIDS (especially among women and adolescents), childhood immunization and injury prevention, and improved health care for Hispanics and other minorities.

One of her most visible and effective campaigns was against tobacco industry advertising aimed at children, especially evident in posters and billboard advertisements that featured the cartoon character "Joe Camel." Dr. Novello also alerted the nation to the rising incidence of AIDS among women and adolescents.

After serving as Surgeon General, Dr. Novello was a special representative to United Nations Children's Fund from 1993-1996, where she expanded her efforts to address the health and nutritional needs of women, children, and adolescents, to a global scale. From 1996 to 1999 she was visiting professor of health policy and management at Johns Hopkins School of Health and Hygiene, where she advised on health services for poor communities. To mark the fiftieth anniversary of the Universal Declaration of Human Rights in 1998, Novello organized a first-time meeting between Surgeon General and seven others, besides herself, who had held the office. In 1999, Governor George Pataki nominated her to be commissioner of health for the state of New York, where she now heads one of the largest public health agencies in the country

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**Mae Jemison** (1956 – present)

*Dr. Mae Jemison was the first African-American woman astronaut, leaving her mark on history among*famous female scientists*today. Jemison studied chemical engineering at Stanford and later pursued medicine at Cornell University Medical Center. After graduation, she worked with the Peace Corps as a medical officer and spent time in Sierra Leone and Liberia. It wasn’t until 1985 that she applied to NASA’s program. During her time as an astronaut, Jemison was a science mission specialist and handled all the team’s crew-related scientific experiments while in space. Since her flight, two more African-American women have traveled in space: just an example of how Jemison helped break many barriers for female black scientists.*

Astronaut and physician Mae Jemison was born on October 17, 1956, in Decatur, Alabama. Her family moved to Chicago, Illinois, when Jemison was 3 years old to take advantage of better educational opportunities there. Throughout her early school years, Jemison's parents were supportive and encouraging of her talents and abilities, and she spent a considerable amount of time in her school library reading about all aspects of science, especially astronomy. During her time at Morgan Park High School, she became convinced she wanted to pursue a career in biomedical engineering, and when she graduated in 1973 as a consistent honor student, she entered Stanford University on a National Achievement Scholarship.

At Stanford, she received a Bachelor of Science degree in chemical engineering in 1977. Between graduation and 1985, Jemison studied in Cuba and Kenya, worked at a Cambodian refugee camp in Thailand, received her M.D. in 1981, and worked with the Peace Corps in Sierra Leone and Liberia.

Upon her return to the United States in 1985, she made a career change and decided to follow the dream she had had since childhood. In October, she applied to NASA's astronaut training program. Jemison was one of the 15 candidates chosen from a field of about 2,000, and was the first African-American woman to be accepted into the astronaut training program. After a year of training, she became the first Africa-American female astronaut**,** earning the title of science mission specialist—a job that would make her responsible for conducting crew-related scientific experiments on the space shuttle.

In 1992, during her eight days in space on the *Endeavour*, she conducted experiments on weightlessness and motion sickness on the crew and herself. In all, she spent more than 190 hours in space before returning to Earth. Following her historic flight, Jemison noted that society should recognize how much both women and members of other minority groups can contribute if given the opportunity.

In recognition of her accomplishments, Jemison received a number of accolades, including several honorary doctorates. Additionally, in 1992, an alternative public school in Detroit, Michigan, the Mae C. Jemison Academy, was named after her.

After leaving the astronaut corps in March 1993, Jemison accepted a teaching fellowship at Dartmouth. She also established the Jemison Group, a company that seeks to research, develop and market advanced technologies.