SISTERS IN SCIENCE

This issue we shine the spotlight on five women whose contribution to science should be remembered

The number of women enrolling in STEM subject courses in the Middle East is approximately 50% of applicants, with 60% of UAE women taking up employment in these fields.

However, according to the L'Oréal Foundation and UNESCO, who hold the annual For Women In Science Awards, women are still under-represented in this field, with women making up only 28% of researchers globally. Since the creation of the Nobel Prizes in Science, less than 3% have been awarded to women.

Yet, eminent women in science are numerous. Here are five who should be celebrated...

01. ELIZABETH BLACKWELL

FROM: BRISTOL, ENGLAND
LIVED: 1821 – 1910

For the first time in history, female students entering medical schools in the US outnumbered male students last year, by 50.7% to 49.3%, according to the Association of American Medical Colleges. Those female students have Elizabeth Blackwell to thank for opening the door to medical careers for women.

The first woman in America to be awarded a medical degree, Blackwell was also the first woman on the British Medical Register, allowing her to practice medicine on both sides of the Atlantic.

Blackwell was uprooted from her home in England in 1832 when her family settled in the US. After living in New York and Jersey, her family moved to Cincinnati in 1838. Just weeks later her father – a strong believer in education for his children – died. Elizabeth and her older sisters started a school at their home to keep the family afloat. It was the first of many teaching posts she held.

The death of a close friend compelled her to become a doctor. In order to raise the expenses for medical school, Blackwell spent two years teaching in North and South Carolina, lodging with medical professionals who encouraged and tutored her.

It took 30 applications to various medical schools before she was accepted to Geneva Medical College, Geneva, New York – and even that was under bizarre circumstances after the college accepted her application thinking it was a joke by a rival school.

In 1849, Blackwell, aged 28, graduated top of her class to become the first woman in America with a medical degree. Her graduation thesis dealt with typhus and the importance of personal hygiene and sanitation in the prevention of disease.

After time spent working in Paris and London, Blackwell returned to New York where still no one would employ her as a physician. After setting up her own practice, she established the New York Dispensary for Poor Women and Children in 1853, followed by the New York Infirmary for Indigent Women and Children two years later. She opened a woman's medical college at the infirmary in 1868, which remained open until 1899.

In 1869, Blackwell returned to England where she established a large practice in London.

02. MARIE CURIE

(NÉE MARIA SKLODOWSKA)
BORN: WARSAW, POLAND
LIVED: 1867 – 1934

Recognised for the discovery of radium and polonium, and her huge contribution to the fight against cancer, Marie Curie was the first woman to win a Nobel Prize and the first person to win two Nobel Prizes.

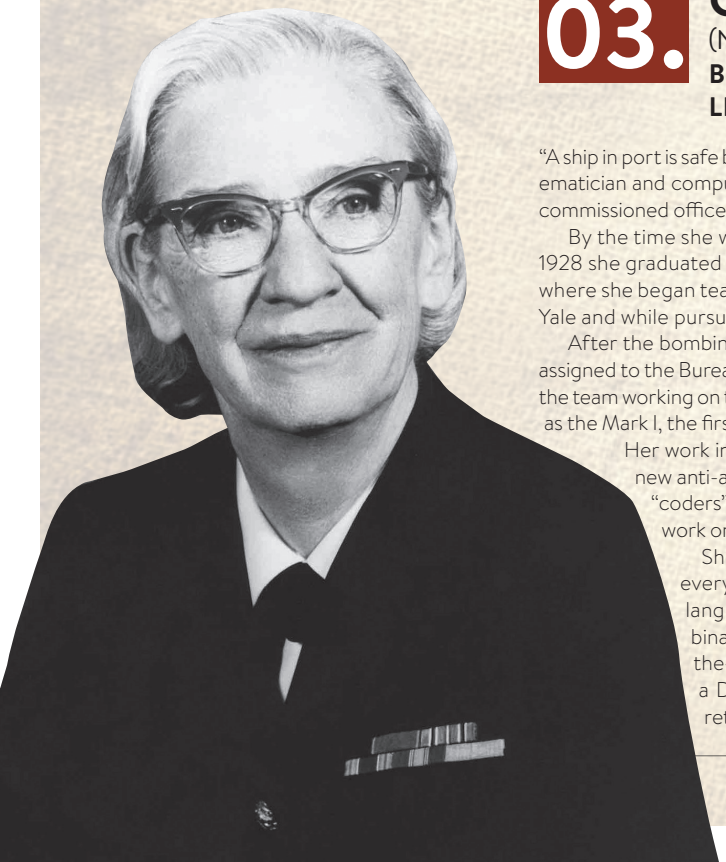
The youngest of five children, she began her working life as a governess, reading and studying in her own time. She moved to Paris in 1891 and attended Sorbonne University, where she read physics and mathematics, obtaining Licenciateships in Physics and the Mathematical Sciences. She met Pierre Curie in 1894 and they were married a year later.

While research workers at the School of Chemistry and Physics in Paris, the couple began their pioneering work into invisible rays given off by uranium – a new phenomenon that had recently been discovered by Professor Henri Becquerel. Their research and analyses led to the isolation of polonium and radium.

In 1903 Marie and Pierre were awarded the Nobel Prize for Physics jointly with Henri Becquerel for their combined, though separate, work on radioactivity. In the same year, Marie gained her Doctor of Science degree. After her husband was tragically killed in 1906, she took his place as Professor of General Physics in the Faculty of Sciences, the first time a woman had held this position.

Curie's work led to a second Nobel Prize in 1911, this time in chemistry for creating a means of measuring radioactivity. Not long after, Sorbonne built the first radium institute with two laboratories; one for the study of radioactivity under Curie's direction, and the other for biological research into the treatment of cancer.

During World War 1, Marie actively promoted the use of radium to alleviate suffering.



03. GRACE HOPPER

(NÉE BREWSTER MURRAY)
BORN: NEW YORK, USA
LIVED: 1906 – 1992

"A ship in port is safe but that's not what ships are built for." So said Grace Hopper, mathematician and computer pioneer, who also became the US Navy's oldest active-duty commissioned officer, earning her the Defense Distinguished Service Medal.

By the time she was 17, Hopper had already decided to major in mathematics. In 1928 she graduated with degrees in mathematics and physics from Vassar College, where she began teaching after receiving her master's degree in mathematics from Yale and while pursuing her doctorate.

After the bombing of Pearl Harbor, Grace joined the US Naval Reserves and was assigned to the Bureau of Ships Computation Project at Harvard University. She joined the team working on the IBM Automatic Sequence Controlled Calculator, better known as the Mark I, the first electromechanical computer in the United States.

Her work included computing rocket trajectories, creating range tables for new anti-aircraft guns and calibrating minesweepers. One of the first three "coders", Hopper wrote the user manual for the Mark I and continued to work on Mark 2 and Mark 3 as technology progressed.

She was also committed to making computing accessible to the everyman through the development of a comprehensive computer language, COBOL, which was based on English words rather than binary code, and she won the first ever Computer Science Man-of-the-Year Award as a result. She was also the first woman to be made a Distinguished Fellow of the British Computer Society. Hopper retired from the US Navy at 79.

04. ROSALIND FRANKLIN

BORN: LONDON, ENGLAND
LIVED: 1920 – 1958

Francis Crick, James Watson and Maurice Wilkins may have received the Nobel Prize for Physiology and Medicine in 1962 for solving the structure of DNA but it was biophysicist Rosalind Franklin's famous "photo 51" that steered them in the right direction.

Born in London, Franklin graduated from Cambridge University with a PhD in physical chemistry. The English chemist and X-ray crystallographer used X-ray diffraction to discover the inner structures of complex minerals and living tissue. While a research associate at the King's College, in London, Franklin's 'photo 51' showed DNA that had been crystalized and revealed a blurred X in the centre of the molecule.

While many in the scientific field believe Franklin was not sufficiently credited for her part in the discovery of DNA's double helix structure, she went on to publish 17 papers on viruses before her untimely death from ovarian cancer in 1958, when she was just 37.

05. HEDY LAMARR

BORN: VIENNA, AUSTRIA
LIVED: 1914 – 2000

The surprise inclusion on our list, Hedy Lamarr may be better known as a screen siren from Hollywood's golden era, but a recently released documentary delves into her work as an inventor.

Used by the US Navy during World War II, her "secret communication system" used "frequency hopping" to guide radio-controlled missiles underwater in a way undetectable from the enemy.

Lamarr developed the system with her friend George Antheil and it was patented in 1942. The *LA Times* said Lamarr's invention "held secret by the government, is considered of great potential value in the national defense program."

The documentary – *Bombshell* – includes audio recordings of Lamarr talking about her love of science.