

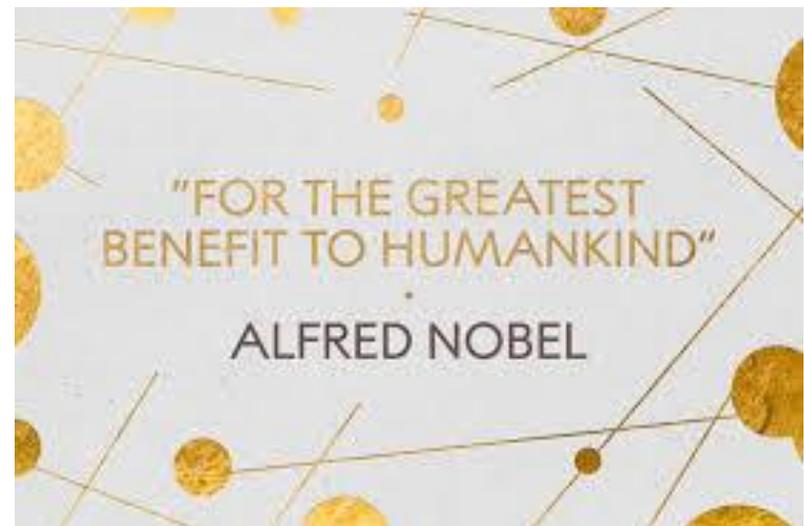
Meet the Latest Female Nobel Prize Winners!



Since the **Nobel Prize** was established in 1895, less than 60 women have been honoured with the prestigious international award. Last October, four women – Louise Glück, Emmanuelle Charpentier, Jennifer A. Doudna, and Andrea M. Ghez were added to that total, triumphing in literature, chemistry, and physics.

The Nobel Prize

On November 27, 1895, Alfred Nobel signed his third and last will at the Swedish-Norwegian Club in Paris. When it was opened and read after his death, the will caused a lot of controversy both in Sweden and internationally, as Nobel had left much of his wealth for the establishment of a prize. His family opposed the establishment of the Nobel Prize, and the prize awarders he named refused to do what he had requested in his will. It was five years before the first Nobel Prize could be awarded in 1901.



The Nobel Foundation

This foundation has been tasked with the mission to manage Alfred Nobel's fortune and has ultimate responsibility for fulfilling the intentions of Nobel's will.



The Prize-Awarding Institutions

For more than a century, these academic institutions have worked independently to select Nobel Laureates in each prize category. Between 1901 and 2020, the Nobel Prizes and the Prize in Economic Sciences were awarded 603 times to 962 people and organizations. With some receiving the Nobel Prize more than once, this makes a total of 930 individuals and 25 organizations receiving the award.

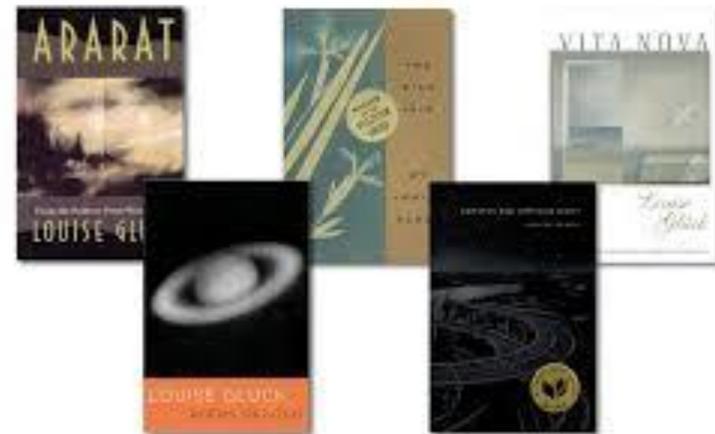


Louise Glück

American poet **Louise Glück** was honoured with the Nobel Prize in literature for ‘for her unmistakable poetic voice that with austere beauty makes individual existence universal.’

The New York-born writer, who is now a professor of English at Yale University, is no stranger to prestigious awards, having previously won the 1993 Pulitzer Prize for *The Wild Iris* and the 2014 National Book Award for *Faithful and Virtuous Night*. She was also previously named the United States’ Poet Laureate in 2003.

Her work includes twelve collections of poetry as well as some volumes of essays on poetry. Glück is also known for writing with clarity on otherwise bleak themes, like isolation, rejection, grief, and betrayal.



Her work has also toyed with classical motifs, like those from Greek and Roman mythology. For instance, in her 1996 collection, *Meadowlands*, she portrays mythological characters Odysseus and Penelope to make observations on modern-day marriages.

Glück is the first female poet to win the Nobel Prize in literature since 1996, when Wislawa Szymborska, a Polish writer, won.

‘Most of what I have to say of any real urgency comes out in poems,’ she said in an interview with *The Times*. ‘And the rest is just entertainment.’



Telescope

by Louise Glück

There is a moment after you move your eye away
when you forget where you are
because you've been living, it seems,
somewhere else, in the silence of the night sky.

You've stopped being here in the world.
You're in a different place,
a place where human life has no meaning.

You're not a creature in a body.
You exist as the stars exist,
participating in their stillness, their immensity.

Then you're in the world again.
At night, on a cold hill,
taking the telescope apart.

You realize afterward
not that the image is false
but the relation is false.

You see again how far away
each thing is from every other thing.





Emmanuelle Charpentier

Dr Emmanuelle Charpentier, a French microbiologist, geneticist, and biochemist, was jointly awarded the Nobel Prize in chemistry with Jennifer A. Doudna for their 2012 work on a new genetic editing method called Crispr-Cas9, which can be applied to experimental treatments for sickle cell disease and cancer therapies. Together, Charpentier and Doudna are the sixth and seventh women to receive a Nobel Prize in chemistry.



‘There is enormous power in this genetic tool, which affects us all. It has not only revolutionised basic science, but also resulted in innovative crops and will lead to ground-breaking new medical treatments,’ said Claes Gustafsson, chair of the Nobel Committee for Chemistry, in a press release.

The discovery of these 'genetic scissors,' which can modify the DNA of living organisms with extremely high precision, came about during Charpentier's studies of *Streptococcus pyogenes*, a type of bacteria that can cause harmful infections to human. There, she discovered a previously unknown molecule, called tracrRNA. After publishing her findings in 2011, she partnered with Doudna, an expert of RNA, and the two went on to recreate the bacteria's genetic scissors in a test tube.

Together, they have discovered one of gene technology's sharpest tools: the CRISPR/Cas9 genetic scissors. Using these, researchers can change the DNA of animals, plants and microorganisms with extremely high precision. This technology has had a revolutionary impact on the life sciences, is contributing to new cancer therapies and may make the dream of curing inherited diseases come true.

Charpentier is now the director and founder of the Max Planck Unit for the Science of Pathogens in Berlin. Prior to that, she was educated in Paris and contributed work to academic research institutions across the world, including the United States, Austria, Sweden, and Germany.



Most of her career has been devoted to understanding the mechanisms of diseases, focusing specifically on infections caused by Gram-positive bacterial pathogens.

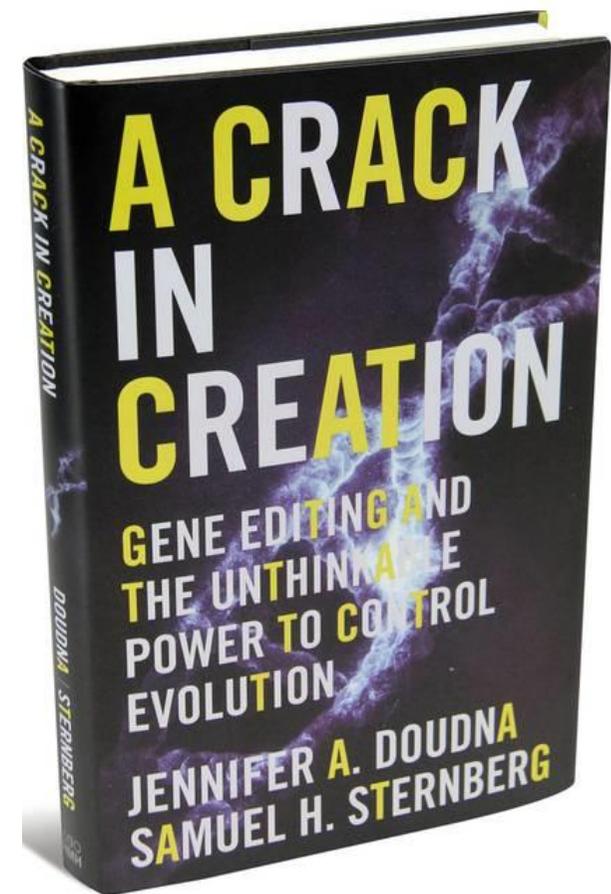


Jennifer Doudna

Dr Jennifer Doudna was jointly awarded the Nobel Prize in chemistry with Charpentier for their revolutionary work on Crispr-Cas9, becoming the sixth and seventh women to win in this category.

After accidentally discovering tracrRNA, Charpentier tapped Doudna for her expertise on RNA. Their collaboration led to the discovery of Crispr molecules, which made way for highly precise genetic surgery. In less than a decade after the discovery, their technique is now commonplace in genetic laboratories across the world.

In 2017, Doudna wrote *A Crack in Creation*, a book in which she chronicles the discovery and warns of unforeseen consequences of its use.



‘We as a community need to make sure we recognize we are taking charge of a very powerful technology,’ she said in an interview with The New York Times. ‘I hope this announcement galvanizes that intention.’

She currently works as a professor of molecular and cell biology and of chemistry at the University of California, Berkeley, where she holds the Li Ka Shing Chancellor's Chair in Biomedical and Health Sciences. She also helms Doudna Lab, which discovers and develops CRISPR systems and other RNA-guided mechanisms of gene regulation in conjunction with students and postdoctoral associates.



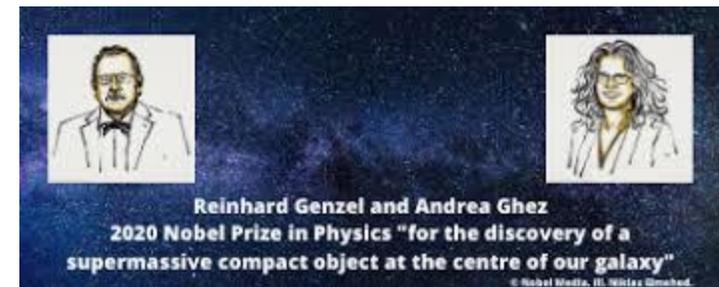


Andrea M. Ghez

Along with Dr Roger Penrose and Dr Reinhard Genzel, Dr Andrea Ghez was awarded the Nobel Prize in physics.

Penrose, a mathematician based in England, was awarded for his work for proving the existence of black holes as a direct consequence of Albert Einstein's general theory of relativity.

Meanwhile, Genzel and Ghez were awarded for their decades-long research in collecting conclusive evidence for a supermassive black hole in our galaxy. Since the 1990s, each has led a group of astronomers that have found 'an extremely heavy, invisible object that pulls on the jumble of stars, causing them to rush around at dizzying speeds,' according to a press release. By using the world's largest telescopes and developing innovative telescopic techniques, the duo has provided 'the most convincing evidence yet of a supermassive black hole' at the centre of the Milky Way.



‘The discoveries of this year’s Laureates have broken new ground in the study of compact and supermassive objects,’ said David Haviland, chair of the Nobel Committee for Physics. ‘But these exotic objects still pose many questions that beg for answers and motivate future research. Not only questions about their inner structure, but also questions about how to test our theory of gravity under the extreme conditions in the immediate vicinity of a black hole.’



Ghez is the fourth ever woman to receive a Nobel Prize in physics.

The New York-born scientist is now a professor of astronomy at the University of California, Los Angeles. Her decades-long career is also dedicated to the study of star formation.

A colour-mosaic image from Ghez's group of the heart of the Milky Way galaxy. The arrow points to the location of the proposed supermassive black hole.

Courtesy Andrea Ghez & UCLA Galactic Center Group

After her win was announced, Ghez said she hoped to inspire more women to join the field, reported The New York Times. 'It's a field that has so many pleasures, and if you're passionate about the science, there is so much that can be done,' she said.

She also was one of the authors for the 2006 children's book, *You Can Be a Woman Astronomer*.

