

NOBELS DENIED

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INTRODUCTION

2007 has been the European year for equal opportunities, 360 days devoted to the fight against discriminations based on gender, race, ethnical origins, religion, opinion diversity, disability, age and sexual preference.

The present project is intended as a contribution to the year of equal opportunities by highlighting the subject of women in science and the difficult recognition of women scientists in society.

Women today are still facing obstacles to reach high level positions in the world of research and innovation. Prejudice against women in research is still predominant , even among representatives of prestigious institutions, such as Harvard University, as the statement of the previous rector about women being less talented for scientific and technical studies well exemplifies.

THE PROJECT

This project has been presented in Milan in the prestigious location of the Triennale, Palazzo dell'Arte, to the Spoleto Science Festival, to the Turin Science week, in the occasion of the L'Oreal Unesco, for women in science price, to the Genoa Science Festival, to Geneva in the occasion of CERN Open Day. The success of this project drew a great attention of the media.

Since 1901, when the Nobel Prize was established, only 11 women scientists were awarded, in subjects such as chemistry, physics, medicine. Polish scientist Marie Curie-Sklodowska, thanks to her studies in physics and chemistry, was the only woman to receive the Nobel twice. In total, 11 Nobels were awarded to women scientists, out of 500 awarded in the 20th century. A policy that surely discriminated and penalised other researchers who did not receive any recognition, despite their fundamental contribution to many of the scientific achievements awarded.

This project of science dissemination intends to explore and deepen the difficulties women experience in the scientific field and highlight the value of their research. The most evident example are the "denied Nobel prizes" which underline the lack of importance given to past discoveries of female scientist that never obtained this award in spite of their fundamental contribution to science.

We propose an exhibition and a round table on the life of six very important women scientists of the XX century who did not get the Nobel prize for their researches and discoveries and never had a fair recognition of their work. Based on these six examples, we intend to inform the public about the present situation of women in science and explore the latest discoveries in this field by comparing the past with the present.

We have chosen six female scientists who played a crucial role in some of the most important discoveries of the 20th century: biologists Rosalind Franklin and Nettie

Maria Stevens, astronomers Jocelyn Bell-Burnell and Annie Jump Cannon, physicists Lise Meitner and Chien-Shiung Wu.

Following these six examples we intend to inform the public about the present situation of women in science and explore the last discoveries in this field comparing the past and the present conditions of being scientist and female. The art works for the exhibition will be created by the Accademia Albertina delle Belle Arti.

THE SUBJECTS



Rosalind Franklin (1920 – 1958)

English physical chemist and crystallographer, she made important contributions to the understanding of the fine structures of DNA, viruses, coal and graphite. Franklin is best known for her contribution to the discovery of the structure of DNA in 1953. In the following years, she led pioneering work on the tobacco mosaic and polio viruses. She died in 1958 of ovarian cancer.

There is no doubt that Franklin's experimental data were used by Crick and Watson to build their model of DNA in 1953.

The Nobel Prize

The rules of the Nobel Prize forbid posthumous nominations. Because Rosalind Franklin died in 1958, she was not eligible for the Nobel Prize subsequently awarded to Crick, Watson, and Wilkins in 1962.



Jocelyn Bell-Burnell (1943 -)

Northern Irish astrophysicist and Quaker who discovered the first radio pulsars with her thesis advisor Antony Hewish.

After finishing her PhD, Bell Burnell worked at the University of Southampton, University College London and the Royal Observatory, Edinburgh, before becoming Professor of Physics at the Open University for ten years, and then a visiting professor at Princeton University. Before retiring, Bell Burnell was Dean of Science at the University of Bath between 2001

and 2004, and was President of the Royal Astronomical Society between 2002 and 2004. She is currently a visiting Professor at Oxford University.

The Nobel Prize

Although she did not share the Nobel Prize with Hewish for her discovery, she has been honored by many other prize giving organizations.



Lise Meitner (1878 - 1968)

In 1926, she became a full Professor at the University of Berlin; she was the first woman in Germany to achieve this rank in any field of study. She worked closely with Otto Hahn for 30 years.

In 1944, he received the Nobel Prize for Chemistry for their discovery of nuclear fission.

The Nobel Prize

In the opinion of many scientists, Meitner should have shared the prize even if it was politically impossible for the exiled Meitner to publish jointly with Hahn in 1939. Hahn published the chemical findings in January 1939 and Meitner published the physical explanation the following month with her nephew, physicist Otto Robert Frisch, and named the process "nuclear fission".

Meitner was the first to identify the possibility of a chain reaction with enormous explosive potential. Her report had an electrifying effect on the scientific community. Because this could be used as a weapon, and since the knowledge was in German hands, Leo Szilard, Edward Teller, and Eugene Wigner together jumped into action, persuading Albert Einstein, already a celebrity, to write to President Franklin D. Roosevelt a warning letter; this led directly to the establishment of the Manhattan Project. Lise Meitner refused an offer to work on the project at Los Alamos, declaring: "I will have nothing to do with a bomb!"



Chien-Shiung Wu (1912 - 1997) was a Chinese American physicist with an expertise in radioactivity. She worked on the Manhattan Project (to enrich the uranium fuel) and disproved the conservation of parity. Her nicknames to many scientists are "First Lady of Physics", "Madame Curie of China" and also "Madame Wu". She was killed by her second stroke on February 16, 1997. Wu set precedents for womankind on several occasions. She was:

- the first female instructor in the Physics Department of Princeton University,
- the first woman with a Princeton honorary doctorate,
- the first female President of the American Physical Society (1975, through an election).

At Columbia University she contributed to the Manhattan Project by developing a process to separate uranium isotopes by gaseous diffusion and by developing improved Geiger counters. She assisted Tsung-Dao Lee personally in his parity laws development (with Chen Ning Yang) by providing him with a possible test method for beta decay. In 1956 that worked successfully. She later conducted research into the molecular changes in the deformation of hemoglobins that cause sickle-cell disease.

The Nobel Prize

She did not share the Nobel Prize with Tsung-Dao Lee and Chen Ning Yang, a fact widely blamed on sexism by the selection committee. Her book *Beta Decay* (1965) is still a standard reference for nuclear physicists.



Annie Jump Cannon (1863 - 1941) was an American astronomer whose cataloguing work was instrumental in the development of contemporary stellar classification. First woman elected officer of the American Astronomical Society.

She catalogued 225,300 stars and ordered them into stellar spectra of types O, B, A, F, G, K, M. This classification inspired the mnemonic phrase "Oh, Be A Fine Girl — Kiss Me!" still taught to astronomy students today. She also discovered over 300 variable stars, 5 novae, and a binary star. Her catalog work resulted in the classification of about 350,000 stars.

The Nobel Prize

She did not get the Nobel prize for having discovered an innovative method to catalogue stars.



Nettie Maria Stevens (1861-1912)

She was one of the first female scientists to make a name for herself in the biological sciences. She and Edmund Beecher Wilson were the first researchers to describe the chromosomal basis of sex.

Stevens was one of the first American women to be recognized for her contribution to science. She discovered that chromosomes determine sex and deduced the chromosomal basis of sex depending on the presence or absence of the Y chromosome.

The Nobel Prize

Thanks to the work of Nettie Marie Stevens, Thomas Hunt Morgan got the Nobel Prize in Physiology (Medicine) in 1933, and was able to demonstrate that genes are carried on chromosomes and are the mechanical basis of heredity. These discoveries formed the basis of the modern science of genetics. He was the first person awarded the Prize for genetics, for demonstrating hereditary transmission mechanisms in *D. melanogaster*.

THE VIDEO:

A video on the life of Rosalind Franklin will complete the exploration of the "Denied Nobels" exhibition. The video is a synthesis of the show **Photograph51** and the interview to the author and the set designer.

Storyline

London 1950's.

The true story of a discovery that led to a Nobel Prize, actually 3. The discovery of the tridimensional structure which today is known as DNA. It's a mixture of naivety and ambition, "shadows" and cynicism. The story that overwhelmed the scientific world, changed completely the old order and gave rise to the era of genetics. This honoured three scientists with the Nobel Prize, but one of the most important, Rosalind Franklin, was excluded. "Photograph 51" is the neatest photograph of DNA ever taken by X-Rays. It was Rosalind Franklin who took it.

A key image in the discovery of the DNA structure and its mechanism to transmit genetic information.

But those who showed the photograph to the world were 3 different scientists: Wilkins, Watson and Crick who had actually "stolen" it.

Rosalind, who is defined as the Sylvia Plath of molecular biology, represents the true spirit of research.

The play shows the 100 hours which were necessary to develop "photograph 51". Through the dialogues between Rosalind and the porter of Kings College in London, the audience enters a biographical path that leads to the world of research. They become witnesses and accomplices to the experimentation, the doubts and the astonishment of discovery.