

# The Contribution of Women in Science and Technology

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*Abstract* — This paper explores the significant and often overlooked contributions of women in the fields of science and technology, shedding light on their remarkable achievements, ground-breaking discoveries, and persistent efforts to bridge the gender gap within these domains. Historically marginalized, women have played pivotal roles in shaping scientific and technological advancements, yet their contributions have frequently been overshadowed or underrepresented. The study delves into the historical context, highlighting key female figures who have made enduring impacts on various scientific disciplines and technological innovations. It examines the challenges faced by women in these fields, such as systemic biases, gender stereotypes, and unequal opportunities, and discusses the evolving landscape that is gradually becoming more inclusive. Furthermore, the paper explores the importance of diversity in scientific and technological pursuits, emphasizing how the inclusion of women fosters creativity, innovation, and a broader range of perspectives. It examines initiatives and programs aimed at encouraging and supporting women in pursuing careers in science and technology, ultimately working towards creating a more equitable and diverse landscape. Through a comprehensive review of literature, case studies, and statistical data, this paper seeks to underscore the vital role women have played and continue to play in advancing science and technology. The findings aim to raise awareness about the contributions of women in these fields, inspire future generations, and advocate for ongoing efforts to eliminate barriers hindering the full participation of women in science and technology.

**Keywords:** Women in Science, Women in Technology, Gender Disparities, STEM Fields, Diversity and Inclusion, Scientific Achievements, Technological Innovations

## I. INTRODUCTION

The underrepresentation of women in science and technology has long been a pervasive issue, hindering the full potential of these fields. This research paper seeks to explore and highlight the invaluable contributions made by women in science and technology, shedding light on the historical and contemporary achievements that have often been overlooked.

The aim is to unravel the complexities surrounding gender disparities, assess the challenges faced by women in these domains, and emphasize the need for greater diversity and inclusion.

This paper begins with an overview of the historical context, showcasing notable women who have left an indelible mark on various scientific disciplines and technological advancements. Despite facing systemic biases and societal constraints, these women have significantly contributed to shaping the landscape of science and technology. The introductory section also discusses the importance of addressing gender imbalances, not only for the sake of equity but also to harness the untapped potential that a diverse workforce brings to these fields.

### A. Body:-Historical Perspectives:

The first section delves into historical accounts of women pioneers in science and technology, tracing their accomplishments and the challenges they overcame. From Ada Lovelace, the world's first computer programmer, to Marie Curie, a trailblazer in the field of radioactivity, this section highlights the often-overlooked contributions of women who paved the way for future generations.

### B. Contemporary Achievements:

The subsequent portion examines the contemporary landscape, spotlighting current female scientists and technologists who are making significant strides. Case studies and examples from various STEM fields illustrate the diverse range of contributions women are making, from groundbreaking research to innovative technological solutions.

### C. Challenges and Barriers:

Addressing the persisting gender disparities, this section explores the challenges faced by women in science and technology, including systemic biases, gender stereotypes, and limited opportunities. Analyzing current statistics, the paper aims to provide a comprehensive understanding of the existing barriers that hinder the full participation of women in these fields.

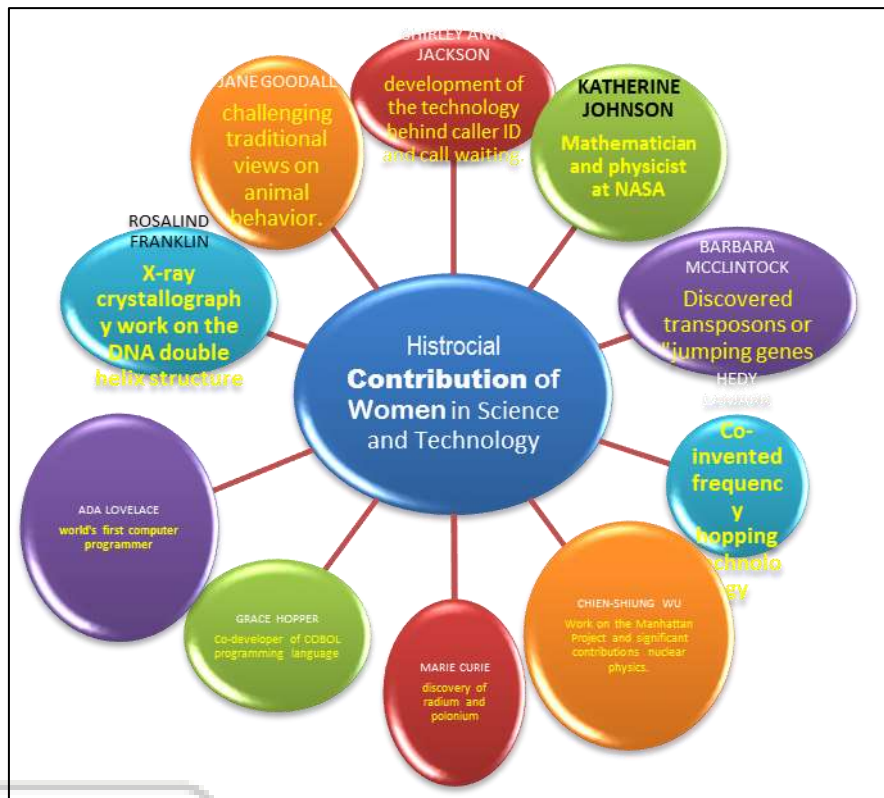


Fig. 1:

#### D. Promoting Diversity and Inclusion:

The research paper then shifts its focus to initiatives, programs, and policies aimed at promoting diversity and inclusion in science and technology. Highlighting successful strategies and ongoing efforts, this section aims to inspire a more inclusive environment that nurtures the talents of women and other underrepresented groups.

The gender gap in science and technology remains a persistent challenge, with women facing various obstacles in these fields. Despite advancements in gender equality, women continue to be underrepresented in STEM (science, technology, engineering, and mathematics) disciplines, creating a significant disparity in workforce demographics.

Several factors contribute to the gender gap in science and technology. Stereotypes and societal expectations often discourage girls from pursuing STEM interests from an early age. Limited access to educational resources and opportunities further hinders their engagement in these fields. Additionally, workplace bias and discrimination, as well as a lack of female role models in STEM, create a hostile environment for women pursuing careers in science and technology.

The problems faced by women in these fields include a lack of support networks, unequal opportunities for career advancement, and challenges in balancing work and family responsibilities. Women often encounter bias and microaggressions, which can affect their confidence and professional growth. The underrepresentation of women also results in a narrower range of perspectives, limiting innovation and creativity within these industries.

Efforts to address the gender gap in science and technology include promoting STEM education for girls, creating inclusive workplace policies, and increasing

visibility of successful women in STEM roles. Initiatives that foster mentorship and support networks can help women overcome challenges and thrive in their careers. Ultimately, achieving gender equality in science and technology requires a concerted effort from individuals, educational institutions, and employers to challenge stereotypes, eliminate bias, and create an inclusive environment for all.

Here is a list of some notable women who have made significant contributions in the fields of science and technology.

1) **MARIE CURIE (1867-1934):**

Achievements: Pioneering research on radioactivity, discovery of radium and polonium.

Notable Contribution: First woman to win a Nobel Prize and the only woman to win Nobel Prizes in two different scientific fields.

2) **ADA LOVELACE (1815-1852):**

Achievements: Recognized as the world's first computer programmer.

Notable Contribution: Worked with Charles Babbage on the Analytical Engine, developing the first algorithm intended for implementation on a machine.

3) **GRACE HOPPER (1906-1992):**

Achievements: Co-developer of COBOL programming language, pioneer in computer science and naval officer.

Notable Contribution: Coined the term "bug" in reference to computer glitches.

4) **ROSALIND FRANKLIN (1920-1958):**

Achievements: X-ray crystallography work on the DNA double helix structure.

Notable Contribution: Contributed crucial data for the discovery of the DNA structure, although often not credited alongside Watson and Crick.

5) **JANE GOODALL (1934-PRESENT):**

Achievements: Primatologist, ethologist, and anthropologist.

Notable Contribution: Groundbreaking research on wild chimpanzees, challenging traditional views on animal behavior.

6) **BARBARA MCCLINTOCK (1902-1992):**

Achievements: Nobel Prize-winning geneticist.

Notable Contribution: Discovered transposons or "jumping genes," revealing complex genetic regulatory mechanisms.

7) **KATHERINE JOHNSON (1918-2020):**

Achievements: Mathematician and physicist at NASA, integral to early space missions.

Notable Contribution: Calculations for John Glenn's orbital flight and Apollo 11 moon landing.

8) **HEDY LAMARR (1914-2000):**

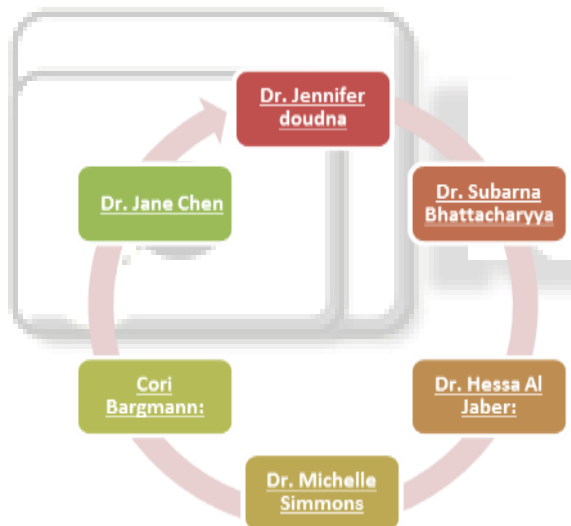
Achievements: Actress and inventor.

Notable Contribution: Co-invented frequency hopping technology, a precursor to modern wireless communication.

9) **CHIEN-SHIUNG WU (1912-1997)**

Achievements: Experimental physicist.

Notable Contribution: Work on the Manhattan Project and significant contributions to the field of nuclear physics.



15) **DR. SUBARNA BHATTACHARYYA:-**

Field: Environmental Engineering

Contribution: Research on sustainable water resources and environmental engineering.

These women represent a diverse range of expertise within science and technology and are actively contributing to advancements in their respective fields. The list is by no means exhaustive, and many more women around the world continue to make remarkable contributions in various scientific and technological disciplines.

The Contribution of Indian Women in Science and Technology

16) **ANANDIBAI GOPALRAO JOSHI (1865-1887):-**

First Indian female to study and graduate with a degree in western medicine from the United States (1886). She is believed to be the first woman to set foot on American soil from India

10) **SHIRLEY ANN JACKSON (1946-PRESENT):**

Achievements: Theoretical physicist and university president.

Notable Contribution: Work on semiconductor theory and the development of the technology behind caller ID and call waiting.

This list represents just a small fraction of the many women who have made groundbreaking contributions to science and technology throughout history. There are countless others whose work continues to inspire and shape these fields.

11) **DR. JENNIFER DOUDNA:**

Field: Biochemistry, Molecular Biology, and Chemistry

Contribution: Co-developed CRISPR-Cas9 gene-editing technology.

12) **DR. JANE CHEN:**

Field: Biomedical Engineering

Contribution: Co-founder of Embrace Innovations, developing low-cost infant warmers for premature babies.

13) **DR. CORI BARGMANN:**

Field: Neurobiology and Genetics

Contribution: Research on the genetic and neural basis of behavior, neurobiological studies.

14) **DR. MICHELLE SIMMONS:**

Field: Quantum Physics and Computing

Contribution: Leading research in quantum computing, awarded Australian of the Year in 2018



Fig. 2:

17) **KADAMBINI GANGULY (1861-1923)**

The first Indian woman to get admission to Calcutta Medical College (1884), becomes India's first female doctor & practitioner (1886) of western medicine in the whole South Asia

18) **MARY POONEN LUKOSE (1886-1976)**

The first female Surgeon General in India, (1938). She became the first woman obstetrician of India

19) **BIBHA CHOWDHARY (1913-1991)**

First woman high energy physicist of India and the first woman scientist at the TIFR (1948). The International Astronomical Union honored her by naming a white yellow dwarf star after her name.

20) **EDA VALETH KAKKAT JANAKI AMMAL (1897-1984)**

Renowned botanist & plant cytologist, made significant contributions to genetics, evolution, phytogeography and

ethnobotany. First Director of the Central Botanical Laboratory at Allahabad, 1952

21) *KAMALA SOHONIE (1911-1998)*

First Indian woman to receive a PhD in a scientific discipline. She discovered the enzyme 'Cytochrome C' which plays an essential role in the electron transport chain occurring in plants, human and animal cells for energy synthesis

22) *ASIMA CHATTERJEE (1917-2006)*

The first woman to be awarded a Doctor of Science by an Indian University (Calcutta) in 1944. She was the first woman to be elected as the General President of the Indian Science Congress.

23) *KAMAL RANADIVE (1917-2001)*

Established India's first tissue culture research laboratory at the Indian Cancer Research Centre in Mumbai, 1960. She was among the first to recognise the connection between cancer susceptibility and the interaction between hormones and tumour virus.

24) *ANNA MANI (1918-2001)*

First woman to join the Meteorological department in Pune, 1948. Her major contributions are in the field of solar radiation, ozone and wind energy instrumentation.

25) *RAJESHWARI CHATTERJEE (1922-2010)*

Woman Engineer who pioneered research in microwave engineering. She is the first woman engineer at IISc who joined the Department of Electrical Communication Engineering (ECE)

26) *PURNIMA SINHA (1927-2015)*

An Indian physicist who received a doctorate in physics under the guidance of Prof Satyendra Nath Bose. She did tremendous work in the field of x-ray crystallography of clay minerals.

27) *Debala Mitra (1925-2003)*

First Indian archaeologist served as Director General of the Archaeological Survey of India, 1981. She explored and excavated several Buddhist sites.

28) *IRAVATI KARVE (1905-1970)*

First Indian female anthropologist. She founded the Department of Anthropology at the University of Pune in 1963. She also held the post of the Vice-Chancellor of SNDT University

## II. CONCLUSION:

In conclusion, this research paper underscores the indispensable contributions of women in science and technology throughout history and in contemporary society. By shedding light on their achievements and addressing the persistent challenges they face, the paper advocates for a paradigm shift towards greater gender diversity and inclusion. Emphasizing that a diverse workforce fosters innovation, creativity, and a broader range of perspectives, the conclusion calls for sustained efforts to bridge the gender gap in science and technology, ensuring that future generations of women can contribute to these fields uninhibited by systemic barriers. Ultimately, the paper serves as a call to action, urging stakeholders to collectively work towards a more equitable and diverse future in science and technology.

## REFERENCES

- [1] Whaley, Leigh Ann. *Women's History as Scientists*. Santa Barbara
- [2] "Women in Botany". [womeninbotany.ur.de](http://womeninbotany.ur.de).
- [3] *The Slavonic and East European Review*.
- [4] "Nobel Prize awarded women". [NobelPrize.org](http://NobelPrize.org).
- [5] "Why Are There Still So Few Women in Science?"
- [6] "Gender and science where science is on the margins," *Bulletin of Science, Technology & Society*,
- [7] Ann Hibner Koblitz, "Global perspectives," *World Science Report*

Website:-

- [1] <https://ncsm.gov.in/hi/resources/blog/indian-women-in-science-technology>
- [2] [https://www.ias.ac.in/Initiatives/Women\\_in\\_Science/The\\_Women\\_Scientists\\_of\\_India](https://www.ias.ac.in/Initiatives/Women_in_Science/The_Women_Scientists_of_India)
- [3] <https://indbiz.gov.in/pioneering-work-of-women-scientists-in-india-gets-a-boost/>
- [4] <https://www.education.gov.in/en/sanskrit-vedic-institutions>
- [5] <https://timesofindia.indiatimes.com/india/chandrayaan-2-indias-1st-space-mission-being-led-by-women-scientists/articleshow/70214125.cms>
- [6] <https://indiabioscience.org/media/articles/Indian-Women-in-Science-complete.pdf>