



# THE PARTICLE POST.

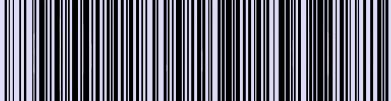
## INTERNATIONAL ♀ Women's Day

WOMEN IN  
**STEM**

Astronaut Chronicles  
Science Fest - Tarang

Creola  
Katherine  
Johnson

EDITION 2:3 (March)



# QUANTUM QUORUM



"Give up your head, but forsake not those whom you have undertaken to protect.  
Sacrifice your life, but relinquish not your faith"



S. Amarjeet Singh  
(Chairman,GTBIT)



S. Harjeet Singh  
(Manager,GTBIT)

We would like to express our sincere thanks to our respected Chairman S.Amarjeet Singh for his continuous support in all our endeavors.

We are deeply grateful to S.Harjeet Singh for his unwavering support throughout our journey, which has been vital to our growth and achievements.



DR. Rominder Kaur  
Randhawa  
(Director,GTBIT)



DR. Simmi Singh  
(Professor  
Head, Exam cell)

Thank you to our honorable director,DR Rominder Kaur Randhawa, for encouraging us to start our society and explore the world of physics.

We also want to express our sincere gratitude to Prof. Simmi Singh for continuously lighting our pathway with her valuable advice.



DR. Parsan Kaur  
(Associate Professor  
HoD, Applied Sciences  
Dept.)



DR. Daljeet Kaur  
(Associate Professor,  
Convener)

We want to thank DR. Parsan Kaur for their ongoing support and motivation, which helps us to achieve our goals.

We would like to acknowledge the invaluable effort put forth by DR. Daljeet Kaur for guiding us and providing essential ground-level support.

# LESSER KNOWN GEMS

# RAJESHWARI CHATTERJEE

Rajeshwari Chatterjee (24 January 1922 – 3 September 2010) was an Indian scientist and an academician. She was the first woman engineer from Karnataka and described herself as an engineering-scientist. During her tenure at the Indian Institute of Science (IISc), Bangalore, Chatterjee was a professor and later chairperson of the department of Electrical Communication Engineering. She had her primary education in a "special English school" founded by her grandmother, Kamalamma Dasappa, one of the first women graduates from Mysore and who was very active in the field of education, especially for widows and deserted wives. She studied in Central College of Bangalore and earned B.Sc. (Hons) and M.Sc. degrees in mathematics. In 1943, after her M.Sc., Chatterjee joined the Indian Institute of Science (IISc), Bangalore as a Research Student in the then Electrical Technology Department in the area of Communication. After obtaining a masters degree in electrical engineering in the US Chatterjee completed her PhD at the University of Michigan in 1953, aged 31. Her supervisor was Professor William Gould Dow, a pioneer in electrical engineering who had helped develop life-saving radar jamming technology during the war.

In 1953, after obtaining her PhD degree, she returned to India and became a faculty member at the IISc Department of Electrical Communication Engineering, later saying that she taught "electromagnetic theory, electron tube circuits, microwave technology, and radio engineering". That same year, she married Sisir Kumar Chatterjee who was a faculty member of the same college. After their marriage, she and her husband built a microwave research laboratory and began research in the field of Microwave engineering, the first such research in India. In the same period, Chatterjee was selected for the position of chairman in the Department of Electrical Communication Engineering. Over her lifetime, she mentored 20 PhD students, wrote over 100 research papers, and authored seven books. She taught classes in electromagnetic theory, electron tube circuits, microwave technology and radio engineering.



For her contribution and works in the field of Microwave engineering, she won many awards. Some of the notable awards and honours are- Mummadi Krishnaraja Wodeyar Award for first rank in the BSc (Hons), M T Narayana Iyengar prize and the Waters Memorial prize for the first rank in M.Sc, Ramlal Wadhwa Award for the best research and teaching work from the Institute of Electronics and Telecommunication Engineers. Chatterjee received a posthumous award in 2017 from the Indian Ministry of Women and Child Development, when she was named as one of "the first women achievers of India" for her work in microwave engineering and antennae engineering.



# QUANTUM QUEENS

## BEULAH LOUISE HENRY

In a time when the world of invention was largely dominated by men, Beulah Louise Henry emerged as a force of ingenuity, earning the nickname "Lady Edison" for her remarkable contributions. With 49 U.S. patents and over 100 inventions, she revolutionized industries ranging from textiles to office equipment and toys. Despite having no formal engineering training, Henry's inventive mind and keen problem-solving skills made everyday life easier for countless people.

Born on February 11, 1887, in Raleigh, North Carolina, Henry displayed a gift for innovation from a young age. She constantly sketched ideas and improvements for common household objects, relying on her deep curiosity and sharp observational skills. Unlike many inventors of her time, she did not rely on complex theories or advanced mathematics. Instead, she focused on practical, real-world solutions that simplified daily tasks.

Henry's inventions spanned various fields, each demonstrating her ability to apply physics and engineering principles in creative ways. Some of her most impactful inventions include Bobbin-Free Sewing Machine (1920s), Vacuum Ice Cream Freezer (1912), Typewriter "Double" (1930s), Innovations in Plastics and Toys.

Beulah Louise Henry's story is a testament to the power of curiosity, creativity, and persistence. At a time when women faced barriers in science and engineering, she proved that innovation is not limited by formal education—it thrives on determination and problem-solving skills. Her legacy continues to inspire young inventors, especially women in STEM, to think beyond limitations and transform ideas into reality.

~By  
Ishmeet Kaur | CSE-2

Born in 1887  
Raleigh, NC

First Patent (1912)  
Ice Cream Freezer

Typewriter Innovation  
(1915 - No Carbon)

Bobbinless Sewing  
Machine (1926)

Interchangeable  
Umbrella Covers (1935)

Ongoing Inventions  
(1940s-1950s)



# DR. PHOTON'S CORNER

Dr. Photon's Blazing Encounter with Venus

After bidding farewell to Mercury, Dr. Photon zoomed through space, heading toward a glowing, golden planet. "Ah, Venus! The so-called twin of Earth," he mused. But as he got closer, he quickly realized—this twin was nothing like Earth!

The thick, yellow clouds swirled like cotton candy in a storm, and the air was so heavy that it could crush a spaceship in minutes. "Yikes! It's like walking into a pressure cooker!" he exclaimed. The heat was unbearable—hotter than a pizza oven at 475°C !

Suddenly, he noticed lightning flashing in the thick clouds. "Whoa! A thunderstorm with no rain?" he gasped. The rain on Venus was made of sulphuric acid, but before it could hit the ground, the heat boiled it away!

He zoomed over the surface and saw massive volcanoes—some of the biggest in the solar system! "Are these still erupting?" he wondered.

Then, he checked his clock. "Wait a second... a day here lasts longer than a year? That means if I lived here, I could cut a birthday cake before the sun even sets – if only the cake wouldn't melt !!!" he laughed.

After dodging the crazy winds—faster than a racing car—Dr. Photon decided he'd seen enough of this scorching world. "Venus, you're wild! But it's time for my next stop."

With a final flash of light, he shot off into space. Next stop: Earth!

~By  
Kanwalgun Kaur | CSE-1



# MOVIE



## HIDDEN FIGURES → THEODORE MELFI

### Introduction

"Hidden Figures" is not just a historical drama; it is a powerful tribute to the brilliant African-American women who played a crucial role in NASA's space race. Directed by Theodore Melfi, the film sheds light on the struggles and triumphs of Katherine Johnson (Taraji P. Henson), Dorothy Vaughan (Octavia Spencer), and Mary Jackson (Janelle Monáe) as they break barriers in a male-dominated, racially segregated society.

### Plot &

### Storyline

In the early 1960s during the Cold War and the space race between the U.S. and the Soviet Union, the film follows three extraordinary women working at NASA.

Katherine Johnson, a mathematical genius, calculates crucial flight trajectories for astronaut John Glenn's historic orbital mission.

Dorothy Vaughan fights for recognition as a supervisor and masters the IBM computer system before anyone else.

Mary Jackson battles legal and social obstacles to become NASA's first Black female engineer.

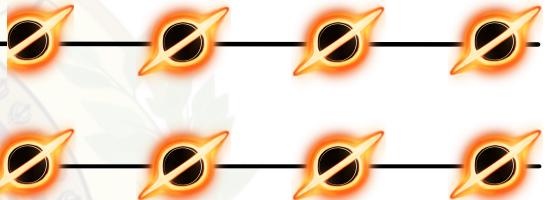
Despite facing discrimination, segregation, and systemic biases, these women prove their brilliance, resilience, and determination, ultimately contributing to one of America's greatest space achievements.

# REVIEW



## RATINGS

IMDb



## Themes & Message

The film beautifully explores several important themes:  
Breaking Barriers – It highlights how talent and hard work can overcome racial and gender-based discrimination.

The Power of Education – The story emphasizes the importance of knowledge, learning, and adapting to new technology.

Teamwork & Perseverance – It showcases how collaboration and persistence lead to groundbreaking achievements.

## Final Verdict

"Hidden Figures" is more than just a historical account—it's an uplifting, inspiring story of courage, intelligence, and determination. With stellar performances, a compelling narrative, and a strong emotional core, this film leaves a lasting impact.

Must-watch for: History lovers, STEM enthusiasts, and anyone who appreciates inspiring true stories.

~By  
Vani Yadav | CSE-DS

# RESEARCH • RUNDOWN



## STUDENT'S COLUMN

Quantum gravity is an area of research that seeks to combine the two fundamental forces of nature: quantum mechanics and gravity. THESE two concepts while having immense success in their own respective domains, but are incompatible with each other. quantum mechanics usually governs the behaviour of particles at atomic states while gravity is associated with large heavenly bodies of the universe. Researchers have been trying to untie these both theories in one theory that dictates both the microscopic and macroscopic aspects of universe. the main challenge lies that both these theories working principles are different from each other. Where quantum mechanics deals in probabilities and uncertainty of a particle existing in multiple states at once. Gravity by theory of general relativity describes it as the bend in space-time caused by massive objects. When applied simultaneously mathematical models of both the theories breaks. This challenge of unification gave birth to the idea of gravitons. These are hypothetical particles believed to mediate force of gravity similar to photons. according to quantum gravity these gravitons would be the quantum particles that allow gravity to be transmitted. But graviton are yet to be detected. Gravitational wave detectors show an inaccuracy in detecting gravitational waves which is due to the interference of quantum mechanical noise. This noise is said to be arisen by the fluctuations caused by gravitons.

~By  
Mehraj Singh | CSE-2



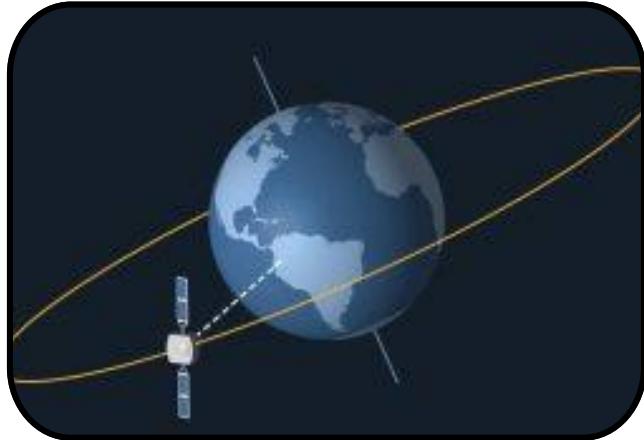
## CONVENER'S COLUMN

Despite historical obstacles to their participation, women have made outstanding contributions to research in a variety of subjects. Their contributions have greatly influenced academic and scientific advancement, from groundbreaking inventions to trailblazing discoveries. Marie Curie, the first female Nobel laureate in medicine, pioneered the therapy of cancer through her studies of radioactivity. Rosalind Franklin did not get the credit she deserved during her lifetime, despite the fact that her work with X-ray crystallography was essential in determining the structure of DNA. In psychology, Mary Whiton Calkins challenged the male-dominated academic climate of her era by developing significant theories on memory and self-psychology.

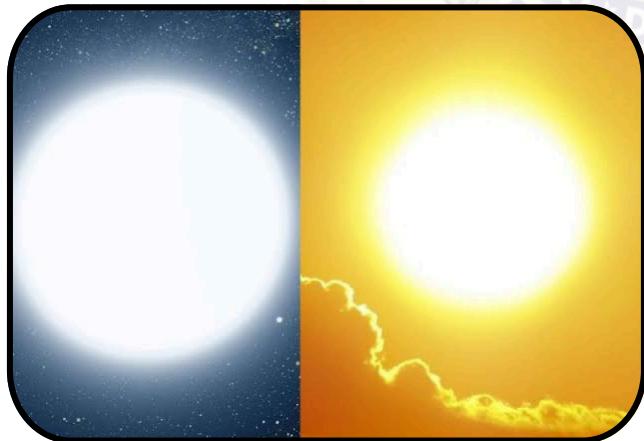
Ada Lovelace is recognized as the world's first computer programmer and is credited with creating the first algorithm. More recently, Emmanuelle Charpentier and Jennifer Doudna won the 2020 Nobel Prize in Chemistry for creating the CRISPR gene-editing technology, which transformed genetics. Additionally, women have made substantial contributions to space and environmental studies. While Katherine Johnson's calculations were essential to NASA's space missions, Rachel Carson's book Silent Spring brought environmental protection to the public's attention. Despite these successes, gender biases and underrepresentation still pose problems for women in research. To close this gap and guarantee that women continue to lead innovation and discovery, it can be helpful to promote equal opportunities, financing, and mentorship.

~By  
DR. Daljeet Kaur  
Associate Professor

# Myth busters



**Heavy Objects Fall Faster Than Lighter Objects:**  
It's a common misconception that heavier objects fall faster than lighter ones. In reality, in the absence of air resistance, all objects fall at the same rate, regardless of their mass. Galileo famously demonstrated this with his experiment at the Leaning Tower of Pisa. The difference in fall rates is only due to air resistance, which affects lighter objects more.



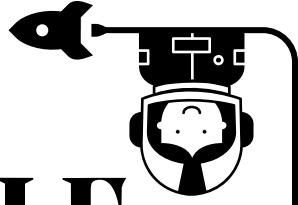
**Objects in Space Don't Experience Any Forces:**  
Many people believe that once an object is in space, it experiences no forces. However, space isn't completely empty. Objects in space can still experience gravitational forces, especially from planets, stars, and other celestial bodies. For instance, the International Space Station (ISS) is in a constant state of free-fall due to Earth's gravity, even though it orbits in space.



**The Sun is Yellow:**

The Sun might appear yellow or orange when viewed from Earth, but in reality, it's white! The Earth's atmosphere scatters shorter wavelengths of light (blue and violet), making the Sun look yellow or reddish during sunrise and sunset. However, if you were to observe the Sun from space, it would appear white due to the full spectrum of light it emits.

# THE ASTRONAUT CHRONICLE



Sunita Williams's career as a NASA astronaut shows how space travel and physics work together. Her time on the International Space Station (ISS) has helped scientists learn about the effects of microgravity on everyday physical processes, improving life in space and on Earth. In 1983, Williams began studying at the U.S. Naval Academy in Annapolis, Maryland, graduating in 1987. She became an ensign and started aviator training at the Naval Aviation Training Command. In July 1989, she trained in combat helicopters.

She flew in helicopter support squadrons during Persian Gulf War preparations and helped enforce no-fly zones over Kurdish areas in Iraq. Williams also assisted in relief efforts after Hurricane Andrew in 1992.

In 1993, she became a naval test pilot and later an instructor. She flew over 30 aircraft and logged 2,770 flight hours. Selected for the astronaut program, she was stationed aboard the USS Saipan. In 1995, she earned a Master's in Engineering Management from the Florida Institute of Technology. In 1998, she began astronaut training and traveled to Moscow for ISS and robotics training.



Williams studied fluid behavior in microgravity, focusing on capillary action, which allows liquids to move in narrow spaces without external forces. These experiments aimed to improve spacecraft fluid management, including fuel tanks and water recycling. She performed the CFE 9 times more than any astronaut, providing critical data on fluid dynamics.

Williams contributed to studies on how flames behave without gravity-driven convection, improving fire safety in spacecraft and leading to advances in combustion technology on Earth.

Selected by NASA in 1998, Williams underwent rigorous training, learning the systems of the Space Shuttle and ISS, survival techniques, and T-38 jet operations. She collaborated with the Russian Space Agency on ISS-related projects, enhancing her expertise in international space operations.

Launched aboard Space Shuttle Discovery on December 9, 2006, Williams served as a flight engineer for Expeditions 14 and 15. During her six-month mission, she performed four spacewalks over 29 hours, setting a record for female astronauts at the time. In June 2024, Williams piloted Boeing's Starliner on its first crewed mission to the ISS. Originally planned for eight days, technical issues with the spacecraft's propulsion extended her stay to nearly nine months. She and Barry "Butch" Wilmore are set to return to Earth aboard a SpaceX Dragon capsule on March 16, 2025.

~By  
Sidak | AI-ML



# TARANG 25

Event Report: GTBIT Science Fest

28 FEBRUARY 2025

The Applied Science Department of Guru Tegh Bahadur Institute of Technology (GTBIT) successfully organized Tarang, a science fest aimed at fostering creativity and innovation among students. The event provided an opportunity for young minds to showcase their technical skills and innovative ideas in the fields of science, technology, and engineering. Students made exceptional projects in both hardware and software categories, making the event a success.

A panel of judges evaluated the projects. After thorough assessment, the winners were felicitated for their outstanding contributions, encouraging them to pursue further innovations.

Many students volunteered, quantum quorum's members were also part of the people who played a vital role in organizing and managing the event. Their dedication and efforts ensured smooth execution and success of the event.

The event concluded on a high note, leaving participants inspired and motivated to push the boundaries of science and technology in the future.

~By  
Ishpreet Kaur | CSE-2



# Meet Our Team

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This society aims to unite like-minded individuals to explore physics, solve real-world problems, and make impactful contributions, envisioning a future where physics advances technology and improves lives.



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