

## Space Technology and Exploration: A Success Achieved by Women Irrespective of the Boulevard of Discrimination and Challenges

\*<sup>1</sup> Arunima Roy

\*<sup>1</sup> Assistant Teacher, Vidyanjali International School, Kolkata, West Bengal, India.

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### Abstract

Space has been an interest to many yet the mysteries of space have never been solved without facing any kind of difficulty. The exploration to space has been a kind of adventure and race to fulfil it started with several countries ultimately leading the first man to even explore it. The difficulty in reaching space was more down on Earth than up in the sky. But the countries tried to make the impossible more possible. Space science was hard as knowing the unknown that was not even known was tough let alone interpreting it. The position of women placing a stand was perceived more in a gendered manner rather than through capability. Becoming the first women in space, Valentina Tereshkova has put a hope in several women that journey in space was smooth for women but the history could be repeated only again with Sally Ride and Svetlana Savitskaya almost after 20 years. Post the first women in space, the MERCURY 13 project did start to train women to become astronauts yet the gendered norms ended the hopes of women abruptly. The incapability of the IBM computers to produce accurate and reliable data for the launch of the space shuttle made Katherine Johnson to fulfil the task of sending the first man to space, making America proud. Even after such great achievements Katherine Johnson and others, famously known as the Human Computers, received little or no recognition for their complex mathematical solving. Margaret Hamilton made the Moon mission possible with not so known software programming yet recognition as per Neil Armstrong and Edwin Aldrin had never reached her.

**Keywords:** Space, technology, women, exploration, discrimination, challenge.

### \*Corresponding Author

Arunima Roy

Assistant Teacher, Vidyanjali  
International School, Kolkata, West  
Bengal, India.

### Introduction

A fight is never won by quitting or giving up rather it is won when a person is persevered to complete the work which the women in space technology and exploration have always believed in. The fight was not for the recognition but was only to identify that women were not of weak minds rather more capable enough than given some respect for the thing they do. The world of science was harsher rather than welcoming for women and the wrath has been faced by many since time immemorial. The fight started long back and achievement came with Marie Skłodowska Curie with two Nobel Prize wins irrespective of which she was not welcomed in the French Academy of Sciences in 1911 due to her not welcoming gender (Pbs.org 2021). As per today's world, the world of science is an acronym for STEM (Science Technology Engineering Mathematics), yet the picture of women is tough to fit into it. Cecilia Payne Gaposchkin is one such woman whose name this STEM failed to include even though being the first to mention that the Sun and the Stars is

composed of helium and hydrogen elements that even took a while for people to receive and prove as accurate (Amnh.org. 2023). So much was the pressure if the discovery even was true, Payne Gaposchkin went on to mention in her thesis that the elements were "almost certainly not real" simply to protect her career (Amnh.org. 2023). The welcome note for women in science was not quite promising yet several women tried their best to make it happen.

The story of space science and technological development was something new yet the exploration to the unknown was a race which some countries were trying to accomplish. The most surprising truth is that whenever people talk about space the first name or the image comes into people's mind is of Neil Armstrong. Remarkably, the name of Valentina Tereshkova appears so rarely that at times it is believed that people forget that there was even a first woman who just after Neil Armstrong, made history to become the first female to go into space (Planetary-science.org 2023). It took the whole world especially, Russia (formerly the Soviet Union) nearly

20 years to send another woman, Svetlana Savitskaya, to become the second woman in space (Sheer, 2020). However, upon the arrival to the space station Svetlana Savitskaya had to face criticism from her other crewmates, who were male, who indicated Savitskaya to start doing her usual kitchen chores, irrespective of which she went on to perform some of the extremely skilled engineering tasks (Sheer, 2020). A woman being considered as the other sex is not new but from tasks to tasks proving the capability and ability in achieving something became the sole priority as they are still trying to create a place for themselves especially in space science.

The sending of the first female astronaut into space by the Soviet Union amazed the world. The National Aeronautical and Space Administration (NASA) tried to send women into space long before the Soviets, for which testing women to become astronauts had started in 1960 (Takacs, 2010). The programme was famously known as MERCURY 13 where 13 female candidates after rigorous training were selected to take the space exploration but unfortunately did not even make it to the aircraft (Takacs, 2010). The program was started more like a visionary for Dr. Randolph Lovelace sent women into space but the task for women was eventually doing the pink-coloured and gendered jobs rather than taking part in the actual scientific mechanisms (Koren, 2017). The discrimination of women did not end there as even after Sally Ride went to space the only questions people were interested in were what kind of make-up she was supposed to carry and the number of tampons a menstruating astronaut was supposed to take (Blakemore, 2018). The question regarding Space for Sally Ride only was how much 'Space' her make-up kits took, not how well she operated the arm and deployed communications satellites in 'Space' made the realisation that even such a larger achievement was seen in a mere gendered eye. In the modern social world, the question of women in space is not a topic to discuss rather the discussion is moulded more through other restrictions making it difficult for women or rather fear to be instigated in reaching the space programs. The all women spacewalk which was supposed to happen was not cancelled because of lack of women participation but more because of lack of suitable outfit (Thomas, 2019). The suits for performing the spacewalk were made by default of men which is difficult for some women to fit in if not having a longer arm (Thomas, 2019). It has been estimated that 560 people have travelled to space and only 70 were women while 225 spacewalks have been done out of which only 15 were women (Un.org 2021). More and more restrictions have been specified for women which has lowered the presence of women in space both in exploration and technological supervision. It is believed that women in the aerospace industry have fluctuated to around 20% in 30 years where only 11% of astronauts were women so far (Un.org 2021). Women too are restricted more than men because of the biological differences as it is believed that radiation is more harmful to women than men. The exposure to radiation risk for women to get breast, ovarian and uterine cancers are 20% more than men which increased the restriction to the journey to space for women (Kramer, 2013). It has been deferred by many that career restriction and professional development should not be measured through which gender is more at risk to radiation than the other rather restriction should be the same for both male and female astronauts. Therefore, the aim of the paper is to understand the discrimination faced by women in space technology and exploration and the way the women have improved irrespective of the challenges.

The study has been understood well through quantitative research conducted with the help of a survey on 50 people backed through secondary data.

### **The Objectives of the Research are as Follows**

- To identify the kinds of discrimination faced by women in space technology and exploration
- To explore the challenges faced by women because of the discrimination in space technology and exploration
- To analyse the work women are successful in conducting irrespective of the challenges due to discrimination from past till now

### **Literature Review**

The word Space itself is full of mysteries as space means a gap and also it does define the outer space. The word outer space was first mentioned by Alexander von Humboldt in 1845 and later popularised by H.G. Wells in 1901 although, the term space goes way back as it was first mentioned in Paradise Lost by John Milton in 1667 to define the region beyond Earth (Encyclopedia.pub 2023). The mysteries of outer space have interested many who went into the unknown to make it more known. Just after the end of the Second World War, the race to space between the United States of America (USA) and Russia (then the Soviet Union) was more like who is going to be the first and who the second remains. This race was first won by the Soviet Union (now Russia) with Yuri Gagarin became the first human to orbit the Earth in Vostok 1 in 1961 (Aerospace.org 2021). However, the Americans were not far behind as John Glenn, became the first American to make the historic orbiting of the Earth in 1962 (Aerospace.org 2021). The difficulty in reaching space was more down on Earth than up in the sky. But the countries tried to make the impossible more possible.

The historic space mission of John Glenn was successful because of a woman whose contribution with the accurate mathematical calculations made the space flight successful. Katherine Johnson made the success of the space flight possible with her deciphering of the complexity of the orbital flight which was not possible with the then IBM computers due to malfunctioning (Shetterly, 2020). Ironically, when the MERCURY 13 programme was cancelled it was John Glenn, one of the testifying astronauts, who addressed that due to the social order women are not suitable to make space exploration as it was men's job to fight wars and fly the aeroplanes (Blakemore, 2018). This provided the picture regarding the perception of people that women can send a flight to space by solving complex mathematical calculations yet she is not considered capable enough to handle the technological complexities of space machinery.

The complexities of the mathematical calculations in the space programs were too inferior for men to conduct for which women were hired. These women were famously known as the Human Computers for the work they used to do due to lack of suitable computers to perform such tasks (Smithsonian Magazine 2021). The calculations conducted by these women had to be accurate for which these women were highly respected by the engineers who were male. However, having degrees in maths and training in various kinds of coding maths and not even using those skills in suitable jobs made some women even question if such skills have been used appropriately.

Behind every successful mission to space the contribution of women was high although recognition of women neither in person nor in books was there in any form. When Neil Armstrong and Edwin Aldrin made it to the Moon it was again the accurate calculations of Katharine Johnson and many other Human Computers that made it possible. The program also had a significant woman contribution then, Margaret Hamilton, whose software programming made the Moon mission possible, although not significantly known to everyone (Theguardian.com 2021). Margaret Hamilton has been a hidden name whose appreciation came late and most recently with Katie Bouman, who helped develop the first ever images of a black hole (Theguardian.com 2021). The most heartbreaking is the fact that even after a discovery losing a Nobel Prize let alone recognition is something unspeakable. This was the case of Dame Jocelyn Bell Burnell, whose discovery of pulsars in 1967 changed the history of space science through a radio telescope (Walsh, 2020). Burnell built the Mullard Radio Astronomy Observatory with six others to study radio emission of quasars until the discovery of the pulsars of which the first 4 were discovered in 2 months while 3,000 have been discovered so far (Walsh, 2020). Although the research was carried out under Antony Hewish, when he and Martin Ryle won the Nobel Prize in 1974 for the discovery of pulsars, Jocelyn Bell Burnell's name was nowhere to be found until recently.

The journey of women from down on Earth to up in the sky was never easy especially regarding the space science as women never really was considered capable enough to become astronauts. The space programme for women was successful with Valentina Tereshkova becoming the first woman in space although NASA then was not ready to send women into space. The journey of some women to even dream to be on space was made possible with Dr. Randolph Lovelace. The women for the space programme were selected especially to perform the pink-coloured gendered jobs (Koren, 2017) which may help men to work without any hindrance in space. The training programme was known as the First Lady Astronauts Trainees (FLATs) which is famously known as MERCURY 13 (Takacs, 2010). The project name was given as the MERCURY 13 by Hollywood producer James Cross in 1995 naming it after the MERCURY 7 project of all male, who were selected for the human space flights (Museumofwomenpilots.org. 2023).

The MERCURY 13 project was started in secrecy to see if the women were capable enough to take the pain and pressure of the space flight. The programme of Dr Lovelace was based at Lovelace Foundation in Albuquerque, New Mexico which was a medical testing centre where 25 women were tested and 13 were selected for the programme (Encyclopedia.com 2023). All these women had to go through the 75 tests that their male counterparts had to go through and the top of the list was Geraldyn "Jerrie" Cobb (Encyclopedia.com 2023). The women were selected for the programme according to the following qualifications – good health, logging, college education, 21-40 years of age, married or single and licensed pilots. The testing not only included the evaluation of the heart rate and lung capacity, loneliness and pain level, sensory deprivation, tilting, spinning to dumping into the water tanks to analyse the resistance to vertigo (Encyclopedia.com 2023); but it also included injecting the ice water into ears and even to swallow a 3 feet rubber tubing (Takacs, 2010). After going through such extreme pain and rigorous training, the programme was cancelled because the military were not ready to accept women to participate in space programmes due to

their gender (Encyclopedia.com 2023). Jerrie Cobb and Janey Hart, both were the members of the MERCURY 13 project, protested against the decision regarding the cancellation of the program, which the Congress ministers responded by stating that if NASA starts allowing women to enter into space programs then all other minority groups may express the desire to fly into space too (Encyclopedia.com 2023). The increase in the criticisms and discrimination was such that when Cobb slipped off under the witness table on her high heel it led on to the questioning on her ability and capability for even considering herself competent for the space programme (Weitekamp, 2006).

The project of MERCURY 13 failed to send women into the space programme. However, it took Sally Ride to become the first American woman to step foot on the space flight in 1983 which was approximately 20 years since the MERCURY 13 programme (Blakemore, 2018). The gender biases at work was very much prevalent even when Sally Ride successfully made the space flight as the idea of female co-worker was not just new but also not much accepted (Blakemore, 2018). The only thing why NASA even considered women to be capable enough for being astronauts is due to light weight and being smaller in size, therefore, the intake of oxygen for women may be much less than men (Koren, 2017). The judgement of women was not measured by their capability but rather measured through the body size making them capable enough. The barriers regarding space flight are always broken by women since ages and Sally Ride was not the only one to do that Mae Jemison, an African American and Anne McClain, an Army major was one of them (Koren, 2017).

Discrimination and biases were not the sole challenges for the women to work in a difficult situation in space exploration rather barriers were numerous. Moreover, the discrimination in the case of clothing has been experienced by women for a longer time and it led to cancellation of the all women spacewalk due to shortage of longer arms. The suits for the spacewalk were designed in 1978 and since then update never occurred and even discontinuation of the smaller sizes in suits in 1990s made the medium size the new small (Beall, 2019). For years female astronauts were looked down upon so much that there is a lack of sufficient data regarding the impact of space travel on the women's bodies and how most of the equipment is still made by default for men (Beall, 2019). The accommodation of the female astronauts in the International Space Station (ISS) was at times difficult due to the malfunction in the design of various things. For instance, the most essential thing for a human is the use of a bathroom which is not at all accommodated for female anatomy as the urine collection and disposal device used by the astronauts has been a tube fitted for penis (Beall, 2019). The recycled water from the urine is used for drinking water which is not possible if traces of faeces and even period blood are found for which female astronauts have to train them to excrete and pee separately and in certain cases suppress periods using contraceptives (Beall, 2019). Therefore, in order to fit more men in the space programme the radiation impact on women's bodies are pointed out more which some experts have argued is true but discrimination on the professional arena is not acceptable.

The argument regarding the biological differences in the exposure to the radiation in space differs according to gender. NASA elaborates that the exposure understanding as gathered by the National Council of Radiation Protection and Measurements women are limited by 3% exposure of radiation risks in compared to men (Kramer, 2013).

NASA does differ in saying the risks may be lowered for women but the risk of ovarian, breast and uterine cancers are more prone. The impact of space flight on both male and females do not differ much which has been proven through testing by NASA. Post the testing it has been pointed out that (Reshke *et al.*, 2014):

- The memory processing in male and female astronauts do not differ much
- Men suffer from colour blindness while women are good at colour discrimination
- The sensitivity of women to temperature is good while men are better at haptic task (recognition of position or object recognition involving touch)
- The women are more sensitive to pain than men
- The loss of hearing is experienced in men than women
- Female are more susceptible to motion sickness than men
- Post-flight vestibular symptoms (feeling heavy, clumsiness, vertigo and not able to walk in a straight line) are experienced to women more than men

These have provided enough understanding that male and female are not differently affected in space flight that professional growth has to be differentiated based on gender. The females are more and more inclined to face discrimination regarding more susceptible to cancer for which men are given more scopes which are changing as the roles in technological management are challenged by women a lot.

The face of women in space exploration and technology has been changing irrespective of the challenges and discrimination faced by women in the arena. The women in the Indian Space Research Organisation (ISRO) too faced discrimination especially in the decision-making process but in case of emoluments there is no gender parity (Ramkumar, 2009). The position of women in ISRO is slightly better as more than 30 women are heading various kinds of divisions. This can also be the case that as ISRO has been inaugurated in 1969 (ISRO 2021) and first women scientist of India to get a Ph.D degree in science was Kamala Sohonie in 1939 (Viswakarma, 2023); which provides the fact that not much women were allowed to take the science subjects then. The women in India did achieve a lot in the field of space exploration and technology in both the Chandrayaan 3 and the Mangalyaan projects that included Ritu Karidhal Srivastava, B. P. Dakshayani, Muthayya Vanitha, Tessy Thomas, N. Valarmathi, Moumita Dutta, Anuradha T.K., Nandini Harinath, Minal Sampath and V.R. Lalithambika (Balachandran, 2023).

From Sally Ride to Sunita Williams and very recently Christina Koch and Jessica Meir are breaking the glass doors for women in the case of space exploration and technology. Gender based discrimination and biases and related challenges do prevail yet each day women are not just trying but achieving great heights in Space projects.

## Methodology

Social research is the process in any kind of research and study where the social scientists conduct the study through a systematic plan either following a quantitative or a qualitative form of the methods. The present research has been descriptive where the data and the reason for analysing the data have been explained in detail. The research has been conducted through quantitative research methods where the collection of the data has been through primary data collection and the data has been backed through secondary data collected through online sources.

The primary data has been collected with the help of Google Forms which has been bestowed to the respondents through the use of various kinds of social media platforms such as Facebook, Whatsapp and Telegram. Prior to sending the forms, the consent of the respondents has been taken through social media by asking whether the respondents were interested in participating in the research. The respondents were made sure that the identity of the respondents has been kept confidential. The secondary data on the other hand, has been collected using various kinds of journals, articles and authentic websites which were providing information regarding the study in detail and the researcher was able to find reliable data.

The collection of the primary data has been through the use of survey methods using questionnaires which have been provided to the desired respondents in an online mode. The questions being closed ended were constructed in the matrix format which will be helpful for the respondents to spend little time on each question. There are a set of 20 questions provided to each of the respondents to answer. The sample size was 50 respondents selected based on judgemental sampling as the criteria for selection were to be graduates. The respondents were residents of Kolkata, West Bengal. The respondents collected were both male and female between the age groups of 20-60 years of age.

The analysis of the research has been conducted through quantitative or statistical analysis of the primary data while the primary data has been backed by the secondary data to understand the authentication of the data for the study.

## Findings and Analysis

### 1. Discrimination was Based More on Gender than Capability for Space Technological Regulation

Gathering the data from the sample, it has been understood that 25.6% of the respondents believe that women do deserve equal position in the space technological regulation while 74.4% think that women do not deserve equal position than men. This interpreted that people do feel that women are not capable of handling space technology. Additionally, 14% of the respondents agree that men handle technology better than women while 2.3% strongly agree on it however, 30.2% and 34.9% disagree and strongly disagree respectively on the same. This has put forward that though people believe that technological management is more for women still discrimination regarding the agreement for the technological regulation for women prevails. 62.8% of the respondents think that becoming astronauts for women was not that easy which strongly agreed by 9.3% although, 14% people still disagree. Therefore, it has been understood that people do feel that discrimination in the case of women is there but disagreements are there too. This helps in better understanding that although people believe that women face discrimination in the space technological regulation, certain people do feel that being incapable of efficiency in the technological regulation puts a ban on the progress for women. Inequality and discrimination are most prevailing and prevalent causes of women's less participation in several arenas that has been impacting the lives of women for a longer duration. Gender inequality has been affecting women to become absent in leadership roles. The gender parity of men and women is so high (43% women and 57% men in the PhD level) that it has been creating issues for occupying positions in scientific research leading to the lacking of talent from the fields (Gonzalez, Forcen & Sanchez 2019).

Thus, women getting more and even positions in space science and technological management has become difficult and quite staining. People's ideology regarding space has not improved and lesser women coming into science has led to more and more absence in participation. The socialisation process has had a major effect on women not specifically participating in science and also in certain cases discrimination in the workplace has been creating excessive problems of sustenance. Women are capable of handling mathematical calculations in a lot of cases and have been successful in sending space shuttles in space through technological management yet thinking women in leadership roles is what is difficult to imagine.

## 2. Myth Regarding men Being More Capable Astronauts than Women Prevail

On analysing the data, it has been understood that, 25.6% agrees that when it comes to space science and technology women are thought to be incapable than men which has been disagreed by 37.2% while strongly disagreed by 14%. It has been gathered that although the myth of men being more capable astronauts does prevail, the account provided by the respondents has made it possible to interpret that the myth is breaking slowly and steadily. 39.5% agree that contributions of women are a lot while 16.3% disagree on it which again proves that change in the circumstances for women are very much happening which again the respondents agree.

Astronauts equalling men is the very thought people have when it comes to space exploration as the image fitting the position for women is quite difficult to portray. Empowerment of women through more space in the exploration as well as down on earth in technological management is opening yet space is still not considered to be the women's walk of life. Nature and nurture is the work of women that is to fulfil the biological needs of taking care of children and household which on stepping foot on the space exploration is what work is expected of them. Although people nowadays do not believe that women are incapable of anything, space science and technology has become a bigger burden both mentally and physically. This is because even though women are capable of working, staying hours in the workplace and rigorous exhaustion might hamper the family life which is considered to be the utmost priority and in certain cases due to work the thoughts of child bearing might me off the table. The shared parenting is welcomed nowadays which is making it possible to handle their careers. The belief of the people is changing due to increase in gender parity at home as well as in the workplace.

## 3. Biological Differences for Space Exploration are Considered More of a Priority

The responses from the respondents regarding the biological differences have been such that 14% agree that women may face severe health hazards' which has been disagreed by 39.5%. This proves that respondents do not believe that women face any kind of health hazards in space exploration. On the other hand, 34.9% respondents do agree that women might face menstruation problems which are disagreed by 25.6%. This again interprets people do feel that space exploration may impact the menstruation cycle a lot for women. 30.2% of the respondents do think that reproduction might become a problem for women which is disagreed by 16.3% and strongly disagreed by 7% results that people believe that as menstruation may become problematic it might affect the reproduction process for women.

Women have been subjected to various kinds of discrimination be it gender or biological, the discrimination prevails while names and identification fails on interpretation. On addressing it, the understanding of women in facing radiation and the impact of the neuro-physiological effect on both genders as put forward by NASA may not be the case for career discrimination. The lack of knowledge in interpreting the neuro-physiological differences in longer-duration space flights has been difficult to comprehend till that appropriate countermeasures should be taken in mitigating any kind of discrimination regarding women (Reshke *et al.*, 2014). The justification of NASA regarding the discrimination is that difference in military experience may impact the adaptation to the spaceflight 39% female space station astronauts are military trained than 73% of their male counterparts (Mark *et al.*, 2014). Thus, women may face certain problems in adjusting in space during menstruation as accommodation of menstruating women in the International Space Station is not well and women either have to take contraceptives or adjust accordingly. From space suits to space equipment, not many women oriented to accommodate has been sometimes challenging for women.

## 4. Challenges for Women due to Discrimination Creates a Barrier at Work

The challenges of women are a lot and therefore, 55.8% agree that women being good in sciences cannot pursue space science which is disagreed by just 7%. It has been analysed that people do agree that challenges for women are more irrespective of being capable and efficient in space technology and space science. 37.2% respondents agree that good leadership skills sometimes create a problem in working with men, while 23.3% disagree, interpreting that people do think that inferiority and superiority problems do prevail. 41.9% respondents think that women do face biases working in space which 11.6% disagrees with, providing that biases and discrimination are becoming a major issue in working through space technology.

Majority of the people believe that workplace biases against women have been prevailing and have increased a lot. The challenges are not always solely discrimination rather it is more an inferiority complex of men thinking being superior or more qualified to work in space science than women. Space exploration and spacewalk was not allowed for women not because it is only for military background, which in this case was not applicable to women, rather it was more gender based. Thinking women not even becoming more capable in handling space equipment was so instigated in the people's minds that it led to lack of clothing and more and more lack of suitable accommodation for women in the space stations. Space is not about achieving a mark to another rather like nature, a good accommodation which is not fulfilling for people as discrimination through the eyes of socially constructed norms are prevailing heavily. The description of discrimination for women are also inside the house sometime as Indian origin NASA scientist Yogita Shah who did face unwelcome from her male counterparts which at times led her to doubt herself and even sometimes not sanctioned for the expected promotions due to too much male domination (Theweek.in 2021). Shah also faced discrimination in her family as her father always expected to have a son to make him an engineer leading Yogita to achieve it becoming one of the 6 women in her class (Theweek.in 2021).

## 5. Contributions of Women Goes Reprove Irrespective of Major Achievements

Contributions are not much appreciated in the case of women as 53.5% agree that even though women are making a good position in space, biases still are there which only 11.6% disagrees with. 67.4% agree that the success of women is overshadowed due to workplace differences which 9.3% disagree. People do feel that workplace differences with men, especially for gender discrimination retards women from working properly. 55.8% agree that recognition of women lacks which lags space science that 4.7% disagrees. From calculations to contribution, women's endowment in space exploration is numerous which 53.5% agrees while 9.3% disagrees. The impact on the women's position in space exploration and technology has been efficient and has led women to participate in numerous space programs and achieve success in it.

Perseverance is known to be the key to success which the women understood after various women's contribution and after many women who were turned down for the job. Just like the feminist movement did not start and went off well letting women have equal position and equality with men in various arena, in that same way women's struggle in aerospace industry especially in the space exploration has been not a smooth ride as several women contributed which today led women to even think and aspire to enter in space technology management and exploration. The arena of science was full of obstacles for women as both internally and externally women are pushed to do the regular household chores putting aside the career choices Hanan Malkawi was one such women irrespective of gender discrimination she went on to become Vice-President of science engagement in Yarmouk University (Powell, 2018). Jessica Meir, an astronaut, also faced cultural differences at work from her male colleagues passing comments and jokes on her capability which at times she reciprocated and other times simply avoided (Powell, 2018). The contributions and major achievements of women are unnoticed and sometimes overlooked as gendered discrimination are high which women have understood how to handle in order to move forward.

## Conclusion

Space exploration has come a long way from fear to success. The most recent soft landing of Chandrayaan-3 has become the one of the 10 most viewed live streams with over 8 million viewers in Youtube (Hindustantimes.com 2023). The interest in Chandrayaan-3 led to understanding the kind of interest people have in Space exploration now. People's interest in space science has not just started recently rather, the average person's interest in space science has increased and is still increasing a lot. The achievement in space science with more and more women participation has increased in breaking the glass doors and overcoming several obstacles and at certain times even giving up the thought of marriage and having a child only to achieve the goal. The discrimination in science as well as in space technology and exploration has been widely prevalent and observed yet recognition and respect has been earned by women.

As gathered from people through the survey, it has been understood that although people do believe that women should have an equal position with men in space technology and exploration still the myth of men being much more capable prevail a bit. The struggle for women has been both internal and external, internal in the workplace in competing with male colleagues while external in gaining the desired

projects to work on. The never-ending discrimination has never been able to put a challenge on women to achieve in making a setback rather it gave courage to work more and never give up on the goal. Emmanuelle Charpentier, one of the 2020 Nobel Prize winners in Chemistry, believes that the fact that she and Jennifer Doudna became two female scientists to receive the Nobel Prize may help pave the way too many more young girls and women to pursue science (as posted in X by Max Planck Society). Even though each day people try to put a full stop on the achievement of women, which for years in various arenas it is what people have done, yet women stood tall and bowed only to receive a recognition not to hear insults. Finally, it has been beautifully put together by astrophysicists Jocelyn Bell Burnell, "There is stardust in your veins. We are literally, ultimately children of the stars" (Jocelyn Bell Burnell Quotes 2023).

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