



Women in Science Fiction: An Exploration of Missing Characters

Khondeker Dilshad Haque

Modern School, Monoranjan Roychowdhury Road, Kolkata, Email: parishaque_2013@yahoo.com

Abstract: *Countless inspiring women have made historic contribution to science but they remained as the neglected pioneers. Their invaluable contributions and discoveries are often being unaddressed in main discourse of science. It is a vicious circle that perpetuate ongoing gender inequality in a historically unfair system. Despite having considerable amount of contribution in scientific development women's achievements and knowledge in the field of science are deliberately being concealed and unaddressed not only in textbooks, media and academic discourses but also in our literary works and in another forms of art and creation. This conscious denial of facts leads to the cause of silence. There is continued inequality and vulnerability of women in all sectors irrespective of their caste, class, race, religion and region.*

Social stereotype which propagates the intellectual inferiority of women than men, fixing their role as primary care giver of family and last but not least ignorance of media and literature in making story about the female role models as a researchers or scientist. Historically, they are being perceived as "other" and remained unofficial in their status.

This work explores an exclusive and comprehensive critique of gender exclusionary practice in Indian science fiction, a field significantly neglected in academic discourse. By integrating literature, history, science education with feminist critique and education policy, the article makes a nouveau contribution to feminist discourse of science fiction and provides a critical roadmap and strategic blueprint for promoting gender-sensitive inclusive literary and educational spheres.

The study also underscores the pivotal role of education, media, and curriculum framework in contesting or challenging gender stereotypes and it has a strong advocacy for a shift and reframing of both literary and scientific narratives to incorporate ethical, rational and inclusive representations.

While analyzing the literary works on science or science fiction through the historical lens the issue of gender dimension often being unaddressed. In its long history of science based literary work women's historical legacy as scientist, researcher and as strong character of science were not recognized well or completely denied. The drought of female character in science fiction raises many questions. why is this scarcity? Is it related to our mindset, ideology, beliefs and culture in general? This paper aims to assess and historicise how the role of gender is fixed and depicted in science fiction.

Keywords: *Science fiction, Gender, Inequality, Other, Silence, Invisibility*

Introduction: No credible proof has yet been found to claim that women are biologically less capable of excelling in pure science or any of its sub-branches. The perception of inferior intellectual abilities in women

compared to men has evolved from social, institutional, and historical frameworks. History stands as a prime witness: for centuries, women were deliberately debarred from science education and denied access to scientific work. Besides historical exclusion, socio-cultural norms also discouraged and disagreed with women participating in the practice of science or pursuing a career in it. Alongside these social hindrances, institutional frameworks have also contributed—both explicitly and implicitly—to restricting the advancement of women in Science, Technology, Engineering, and Mathematics (STEM) fields. Unfortunately, this legacy of underrepresentation, viewing women as outsiders or exceptions to the mainstream norm, has not yet disappeared completely. But why are women often viewed as “tokens” or “outsiders” in science? The main causes are (Schoen, Rost, & Seidl, 2018):

1. the problem of exclusion,
2. the problem of execution, and
3. the status of exception.

Their entry and existence in the field of science are often treated as rare symbols. As a consequence, female researchers and scientists are frequently overlooked, excluded, isolated, and critically judged across various parameters. Their authority, mentorship, collaborative activities, networking opportunities, competence, and commitment to science have faced—and continue to face—significant challenges even in the 21st century. To demonstrate high cognitive ability, efficiency, and skill, the issue is not biological difference but rather the structured wiring of science into social and institutional access. Patriarchal opposition has also sidelined women’s contributions as capable problem-solvers, inventors, or effective science administrators. So, the lack of cognitive ability is not the reason women avoid STEM careers; rather, it is deeply rooted in early exposure and negative experiences. Another pertinent issue is discrimination in pay structure. It often becomes difficult for women to pursue research and maintain their careers due to this economic disparity in the workplace. Such inequality creates an imbalance between professional and personal life. Working women frequently feel isolated and susceptible to harassment in male-dominated workplaces. They are often treated as an extra addition to the culture of science laboratories and academic departments.

Women have made groundbreaking contributions to science (George, 2023). However, owing to social and historical biases, their work has often gone unrecognized. Female scientists have invented many life-saving drugs to treat malaria, cancer, epilepsy, HIV/AIDS, diabetes, and even COVID-19. They have also developed medical instruments for the early detection of diseases. Female scientists have played pioneering roles in the advancement of genetics and in the fight against inherited diseases. Their contributions are enormous.

Bengali scientist Asima Chatterjee discovered the anti-epileptic drug Ayush-56 (De, 2015). She also developed anti-malarial alkaloids from plants, and her research on cancer-fighting compounds made a significant and lasting impact on the treatment of malaria, epilepsy, and cancer (Chatterjee & Pakrashi, 1991). Similarly, biochemist Kamala Sohonie (Mitra, 2016) made vital contributions to the field of nutrition. Her work on vitamins and proteins helped in addressing malnutrition. In the post-pandemic era, we must also recall the name of Indian-American scientist Thirumala Devi Kanneganti (Karki, Sharma, Tuladhar, Williams, Zalduondo, Samir, Zheng, Sundaram, Banoth, Malireddi, Schreiner, Neale, Vogel, Webby, Jonsson, & Kanneganti, 2021), an immunologist affiliated with St. Jude Children’s Research Hospital in Tennessee, USA. Thirumala Devi Kanneganti and his colleagues (Zheng, Karki, Williams, Yang, Fitzpatrick, Vogel, Jonsson, & Kanneganti, 2021; Stern-Ginossar, Kanneganti, Cameron, Lou, Cherry, Abraham, & Martin-Sancho, 2021) discovered an effective course of action to prevent life-threatening inflammation, lung damage, and organ failure in patients diagnosed with COVID-19. Yet most of us do not know her name or contributions. This unfortunate invisibility of women scientists was recently portrayed on stage in a drama titled *No Bells* at the Winnipeg Fringe Festival, performed by the Portal Theatre Company

(Portal Theatre, n.d.). It tells the story of why so few female scientists have succeeded as laureates. Countless inspiring women have made historic contributions to science, yet they remain neglected pioneers. This is high time we look back on history with clear and accurate eyes and reassess how valuable yet under-valued their work has been.

Objective of the Study: The primary objective of this study is to critically evaluate the systemic underrepresentation, exclusion, marginalization, and invisibility of women voice in science fiction or science based imaginative literature, with a special emphasis on Indian and Bengali literary traditions, and to exhibit how this absence reflects in theory institution and practice. Not only that but also the exclusive aim of this article is to investigate the wider context of socio-cultural, educational, and institutional prejudices that hinder women's representation in STEM fields.

Specific objectives:

1. to uncover the actual objective behind the historical intention to exclude the notion of gender neutrality in science driven storytelling and in formation of character.
2. to explore the major role of science literature, media, and curriculum practices in perpetuating or challenging gender biased assumptions in scientific domains.
3. to highlight the legacy and contributions of women both actual and fictional world of science that have been consistently unrecognized, undervalued, ignored, or misrepresented.
4. to advocate for advance gender-inclusive narratives that can help to promote more balanced and equitable cultural perceptions of women in STEM and scientific literary works.
5. to critically investigate how social constructs rather than biological determinism shape women's engagement in scientific imagination and professional scientific careers.

By pursuing these objectives, the study seeks to foster and intervene a more inclusive and critical narrative to the wider discourse on gender equality in literary pedagogy, education and science outreach.

Methodology / Strategy of the Study: It involves a qualitative, interpretative interdisciplinary, research methodology based on feminist literary criticism, cultural studies, and science education theory. It relies upon textual and conceptual framework to construct a platform for critical analysis of literary works, taking evidence from historical data, media representations, and academic literature. To understand how women have been systematically erased or marginalized in science fiction narratives—particularly within Indian and Bengali contexts, it is grounded in primary and secondary sources including historically evident science fiction works, feminist texts, scientific biographies, educational policy documents, media and films. Through which it tries to identify the gender dynamics implanted in scientific narratives. Hence statistical and empirical data collection method are not widely employed. The study includes an optimum range of critical survey of the evolution of science fiction specifically in Bengali and Indian literature, tracing the origins, authorship patterns, and character representations from the late 19th century to the present.

Why Are Women Invisible in Scientific Literature or Science Fiction? If people are asked on the street to name a woman scientist character in Bengali literature, perhaps complete silence would prevail. There is ongoing inequality and vulnerability of women across all sectors, regardless of caste, class, race, religion, or region. Historical gender discrimination in STEM created a persistent male-dominated culture and lack of role models, discouraging women from entering these fields (Arnaboldi, Macagno, Villani, Biganzoli, & Bianchi, 2025). Women are significantly less likely than men to be credited with authorship on scientific papers and patents, not due to a lack of productivity but because their contributions are often overlooked, ignored, or not appreciated (Ross, Glennon, Murciano-Goroff, Berkes, Weinberg, & Lane, 2022).

Radical feminists (Mackay, 2015; Harding, 1991, pp. 3–5, 11–14, 162–165; Rossiter, 1993) have clearly stated that the education system is still fundamentally patriarchal and continues to marginalize and disregard the experiences of women. It reinforces patriarchal ideologies and values through both the formal and hidden curriculum, presenting the marginal status of women as normal and natural, rather than acknowledging it as a form of patriarchal discrimination. This has an immense impact on literary works as well. While analyzing literary works on science or science fiction through a historical lens, the issue of gender is often unaddressed. Throughout the long history of science-based literature, women’s historical legacy as scientists, researchers, and strong characters in science has either not been recognized or has been completely denied (Rosser, 1988). Although scientific themes are magnificently represented in literature and issues are explored with futuristic or hyper-developed approaches, drawing from present culture, technology, and society to construct an ideal scientific environment. This representation is often unfamiliar with our current socio-cultural context. The most crucial point is how the notion of gender is conceived within this structure of knowledge and culture. Popular science literature is not truly gender-neutral (Rosser, 1988). The ethical and axiological dimensions of scientific thinking rooted in logic and objectivity cannot be separated from the lived experiences of one gender. Therefore, a deeper examination of scientific literary works, with an emphasis on gender roles, is essential. Gender roles presented in such works can lead to social change. This potentially transformative genre lends itself to the study of society and social perceptions. To dispel gender bias in scientific literature, ethical principles and gender-free values should be appropriately incorporated into literary work, converting implicit goals into explicit ones.

A classic example of gender stereotyping is the “Doll vs. Car” conflict in early childhood. “Infants showed a consistent preference for gender-typical toys across age groups” (Liu, Escudero, Quattropani, & Robbins, 2020, p. 600). This type of stereotyping creates rigid gender roles, leading to low self-esteem, poor spatial reasoning, and underdeveloped mechanical and leadership skills among girls. On the other hand, the different exposures boys receive through toy choices may enhance their technical skills, reasoning, problem-solving abilities, and leadership qualities, enabling them to outperform girls in intellectual activities. Fortunately, this “Doll vs. Car” conflict is now being addressed as a social challenge, and greater emphasis is being placed on promoting gender-neutral and equal psycho-personal development. Empathy, emotion, intelligence, and engineering capability have no inherent gender identity, they are socially constructed. Biases can be fully removed if society does not compel girls to conform to gendered expectations. According to the APA task-force report (Neisser, Boodoo, Bouchard, Boykin, Brody, Ceci, Halpern, Loehlin, Perloff, Sternberg, & Urbina, 1996), no evidence was found for sex differences in the mean level of general intelligence. Culture plays a significant role. One gender may perform better than another in a specific field not due to higher cognitive ability, but because of differences in social exposure, educational opportunity, institutional support, and socialization. Hyde’s Gender Similarities Hypothesis (Hyde, 2005) shows that 78% of gender differences in cognitive abilities are negligible or ignorable. The perception of difference is social not biological. It is society, not nature, that assigns roles to boys and girls and promotes the idea that arts and humanities are for girls, while math and science are for boys. So, how can girls be portrayed as strong scientist or researcher characters in literary works, novels, stories, cartoons, and other forms of art and culture such as films, dramas, and television shows? Needless to say, these media often shape and depict ideal professional roles using gender as a determining tool. In popular science narratives, comics, advertisements, science storybooks, movies, telefilms, and TV serials, male characters are frequently shown as extraordinarily brilliant: the “mad scientist,” “lone inventor,” prolific mathematician, fearless astronaut, or eccentric physicist suggesting that these roles are more realistic and culturally appropriate for men. This legacy of under representing female characters persisted until the end of the 20th century. Fortunately, newer media have begun to challenge this historical and cultural bias slowly but steadily.

In 1997, the film *Contact* (Zemeckis, 1997) introduced the character Dr. Ellie Arroway, a radio astronomer. The 2013 film *Gravity* (Cuarón, 2013) featured Dr. Ryan Stone, a medical engineer and astronaut. In 2014, *Interstellar* (Lussier, 2014; Nolan, 2014) portrayed Dr. Brand, an astrophysicist. The 2016 film *Hidden*

Figures depicted leading female characters Katherine Johnson, Dorothy Vaughan, and Mary Jackson as mathematicians at NASA. In the same year, *Arrival* (Villeneuve, 2016) featured Dr. Louise Banks, a female linguist-scientist. Women have always been there, but they were ignored or erased from mainstream science stories. When they do succeed, they are often framed as “exceptions” or labelled “extra special,” as if they have overcome the impossible.

Media also often portrays scientists as geeky, awkward, and socially detached individuals who isolate themselves in laboratories, further distorting the public’s perception of scientists. This false image is reflected in science-based literary works as well. If we see more positive female role models in science-based literature, arts, and other creative fields, it may help to disprove the myth that “science is not for women.” Both academia and media have major responsibilities in advocating for and promoting the achievements of women in science. They must help reimagine and portray female scientists in a more diverse and empowering light in literature and across various media platforms.

Khadilkar, Khuda Bukhsh, and Mitchell (2021, 2022) utilized advanced natural language processing techniques to analyze English subtitles from 700 Bollywood films spanning seven decades, along with a selection of Hollywood films and Academy Award nominees. Their study (Khadilkar et al., 2022) found that while the portrayal of women in movie dialogues has improved over time in both Bollywood and Hollywood, significant gender bias remains, and true gender parity is still lacking. The study (Khadilkar et al., 2021, 2022) also uncovered a persistent preference for fair skin in Bollywood films throughout the entire period studied. Additionally, their geographical analysis revealed improved representation of several Indian states over time, yet many north-eastern states continue to be consistently underrepresented (Khadilkar et al., 2021; 2022).

A study carried out by Doughman and Khreich (2025) demonstrated a serious imbalance in gender representation, with women occupying far fewer key roles in film. The key findings of the study (Doughman & Khreich, 2025) are shown in Table 1.

Table 1: Gender Disparities in Film Production Roles and Sexism in Reviews Across Gender-Dominated Casts and Genres

	First actors,	First directors	First writers
Male	72%	91%	86%

72% of first actors, 91% of first directors, and 86% of first writers are male. Reviews consistently targeted films with predominantly female casts more aggressively than male-dominated ones, featuring 44% more benevolent sexism and a 149% surge in hostile sexism, a trend uniform across all genres (Doughman & Khreich, 2025, p.18).

Laufen (2022) highlighted significant gender imbalances among film critics, reporting that 69% were male, 31% female, and only 0.3% identified as non-binary.

The study conducted by Doughman and Khreich (2025) revealed pronounced gender biases in professional movie reviews, with women notably underrepresented in key creative roles, comprising only 28% of first-billed actors, 9% of directors, and 14% of writers were female. By restricting narrative diversity, this gender gap perpetuates systemic male-centric viewpoints across the film landscape.

Historical Background of Bengali Science Fiction: We start with the statement of eminent prolific author, scientist and as well as the Biochemist of Russia Prof. Isac Asimov that “True science fiction could not really exist until people understood the rationalism of science and began to use it with respect in their stories”.

(Sengupta, 2003) In 1851, the term science fiction was used by William Wilson (Bleiler, 2011) in his book “A little unrest book upon a great subject” (Wilson, 1851, pp. 137–149).

The depiction of women in science fiction is a critically important issue. As a major facet of popular culture and a significant field of academic study, the genre demands thoughtful representation. This makes the role of women a central concern for both cultural discourse and scholarly critique. The term “Kalpabigyan,” a portmanteau meaning “Imaginary Science” or “Science of Imagination,” was popularized and standardized in the Bengali language by the eminent writer and editor Adrish Bardhan (1932-2019) in the early 1970s (Maity, 2019, p.148). Widely recognized as a pillar of the genre, Bardhan worked indefatigably to promote this new form of storytelling. (Bardhan, 1963; Mitra, Chaudhuri, & Barman, 1965)

His efforts emerged during a pivotal era in Bengali literature. Following the passing of Rabindranath Tagore and his contemporaries, a noticeable void appeared in the cultural landscape, creating a need for new literary avenues. Bardhan answered this call with groundbreaking short story anthologies like “*Mahakashjatri Bengali*” (*Bengali in Space*) (Mitra, Chaudhuri, & Barman, 1965) and “*Sabuj Manush*” (*Green Men*), in the late 1960s (Bag & Ghosh, 2019). These works were a path-breaking experiment, creating futuristic universes and single-handedly placing science fiction within the Bengali reader’s imagination.

Bardhan’s ambition extended beyond print. In 1963, inspired by Western magazines like *Galaxy* and *Astounding*, he launched *Ashchorjo*, the first Bengali science fiction magazine—under the pen name Akash Sen. He further brought the genre to radio; a landmark broadcast of “*Mahakashjatri Bengali*” (Mitra, Chaudhuri, & Barman, 1965) on Akashbani Kolkata in 1965 featured Bardhan alongside writers Dilip Roy Chowdhury and Premendra Mitra. He also co-founded India’s first Science Fiction Cine Club, with the legendary filmmaker Satyajit Ray as its president.

Among his most popular creations was the mad scientist ‘Prof. Nutboltu Chakro’ (Prof. Nutbolt Ring), a genius mastered all scientific disciplines, always accompanied by his assistant Dinanath Nath. However, a notable absence in Bardhan’s work was the female scientist. While he created a lady detective, Narayani, it would take 55 years for a prominent female scientist, ‘Anilikha’, to appear in Bengali science fiction, notably in Abhigyan Roychowdhury’s “*Sanket Rahashya*” (Chowdhury, 2020).

The theme of science literature is historically male subjugated and this subjugation are often reflected in both the languages English and Bengali. During mid 60’s of 20th century scientific thinking of the genre of science fiction has faced few social ethical and ecological queries and that has obviously widen the thinking pattern of this typically male dominated field. “Kankabati Kalpabigyan Lekheni” (Kalpabiswa, 2021) a multi-author anthology of Bengali science fantasy has portrayed partially a gender inclusive prospect. It is found that either technological inventions or scientific discoveries those which are specifically related to physics, engineering and space exploration has echoed traditionally the sole credit of male scientists.

Bengali science fiction has initiated its enthusiastic and aspiring literary journey in the vast setting of Bengali Renaissance and its clasp of modernity. This genre is still controlled broadly by the male voice, with the few exceptions like the story of feminist utopia by an early Islamic Feminist Rokeya Sakhawat Hossain (Begum Rokeya) in “*Sultana’s Dream*” (Hossain, 1905/2005). It refers to one of the earliest examples of feminist science fiction ever written. It portrays a feminist utopia achieved through role reversal, in which men are subjected to the same seclusion traditionally imposed on women in the Muslim practice of purdah. The short story was originally published in English in the Madras-based *Indian Ladies’ Magazine* in 1905 and appeared in book form three years later. Further notable names in Bengali science fiction include: Hemendra Kumar Roy, Leela Majumdar, Premendra Mitra, Sunil Ganguly, Shirshendu Mukhopadhyaya, Syed Mustafa Siraj, Anis Deb, Abhigyan Roychowdhury. Most Bengali science fiction writers use different characters for different stories, building them up in different forms according to the need of the story but all leading scientist characters in their stories are male like Prof. Shonku by Satyajit Ray, Prof. Heshoram by Sukumar

Roy, Ghanada by Premendra Mitra, Prof. Nutboltu by Adrish Bardhan and many more. (Hossain, 1905/2005; Bardhan, 1963; Mitra, Chaudhuri, & Barman, 1965; Mondal, 2012). The history of true science fiction in India begins with Jagadish Chandra Bose, a polymath. He wrote “Niruddesher Kahini” in 1896 (Bose, 1896). The credit for first Bengali science fiction story is often given to later Bengali author Hemlal Dutta who wrote “Rohosso” (*The Mystery*). This story was published in two instalments in 1882 in the pictorial magazine “*Bigyan Dorpon*” (*Mirror of Science*) (The Editors of the *Science Fiction Encyclopedia*, n.d.) in the pictorial magazine *Bigyan Darpan* brought out by Jogendra Sadhu. The story revolved around the protagonist Nagendra’s visit to a friend’s house which is completely furnished with automatic doorbell, (Doorbell was already invented in 1830) burglar alarms, automatic cleaner for cloths. It tends to reflect the marvel at the quick mechanisation of human lives. The mystery going by the superficial description. It bears a remarkable resemblance to an 1876 humorous story of Samuel Page Widnall in Chamber’s journal with same plot (Hoene, 2020).

The genre really seems to get going with eminent poet author Sukumar Roy who was by all accounts highly intellectually adventures, even in the stories intended for children. He was deeply influenced by British writers like Arthur Conan Doyle and especially H.G. Wells as he was writing “Heshoramer Hushiarer Diary” inspired by Arthur Conan Doyle’s “The lost World”(Doyle, 1912). Sukumar was poking humour at the propensity of the scientist to name things in this story. Roy, the eminent poet infused the Bengali language with his masterful creativity and gave always a playful touch there. Satyajit Ray, the son of Sukumar Roy was also the great follower of his father. His remarkable contribution in Bengali science fiction is creating of the character like “Professor Shonku”. In this character he has embedded the properties of science fantasy more than that of science fiction which shows the literary excellence of Satyajit Ray. Ray, was also quite light hearted with the language as his father. Creation of “Prof. Shonku” is wonderful piece of work made by him. A joyful self-deprecating character with his peculiar inventions. It’s the brilliance of Ray that makes Shonku so famous. Another veteran Bengali author who indulged heavily in science fiction and fantasy is Shirshendu Mukhopadhyaya. In his popular story “Monojder Adbhut Bari” we find a scientist character who was carrying out weird genetic experiments for producing new varieties of vegetables and fruits. On the other hand author like Hemendra Kumar Roy created super humans characters in his writing “Whose consciousness reigned supreme over there corporal form”. It indicates physical being is controlled by the intellectual capabilities in his “Amanushik Manush”.

Indian science fiction is quarantined as much as it is in U.S. and it is unfortunate that Indian litercritic have silently ignored Indian science fiction and issues related to representation of gender in this specific genre. Science fiction can promote understanding of human differences and ethical thinking if it considers perspective of gender properly. But it is true that when scientist has contributed in science fiction with their imagination merged with concrete scientific knowledge it has definitely added new flavour and new dimension to it. After renowned scientist Prof. J.C. Bose future generation of Indian Scientists have also followed his footsteps entering as science fiction writer. Notable Indian Nuclear Biologist Bal Phondke, Prof. Rajashekar Bhoosnurmathhad (with pen name Raboo) Principal of Karnataka Science College, Dharwad, Prof Jayanta V. Nerliker had changed the notion of science fiction stories that of getting common people to think about science to learn science in different way. In this genre we have found the name of very few female scientists like Dr. Sukanya Dutta has superannuated as Chief Scientist at the Council of Scientific and Industrial Research ((Datta, 2007, 2008, 2009, 2010, 2011, 2013; Mondal, 2012).

Pervaded with humour, her stories elongate the key of possibilities. Dr. Dutta’s stories shows beautifully that how science fiction can be assimilated with detective fiction. Many people may not admit science fiction or speculative fiction to be the literary work but research shows that all fiction can generate critical thinking abilities and emotional intelligence for young readers. Science fiction or scientific literature provide moral guidance too that reflects their own values which may have all its own.

Quest for Gender Equality in Literary and Performing World: In a science based narratives female characters are either completely absent or not placed in a leading role consciously. Most of the cases main roles are being represented by male characters only. Sometime they are being portrayed in fiction, science writing in a passive role that is more caring, intellectually less capable having no problem-solving ability or technical expertise and they are often being controlled, monitored and judged by the leading male characters in these stories. Women are actually not being assigned to any important role in this genre of writing. Science fiction often determine the low profiled, less skilled occupations for female characters where their academic intelligence is subdued by their physical attractiveness. It creates a complex intersection between social myth, social perception and fixation of gender role where women are being placed in less competent work. It is known as “Beauty-brain trade off stereotypes”. The cause of it is actually ingrained into the theory Institution and social practice. So it is not pertinent that in what way women preferred to see themselves but it actually lies in the integral roles of academic discourse, society and media where they can only reinforce and challenge the stereotypes that can lead to inculcating of revised gender roles and expectations into new dimensions as the old perceptions often resonating many of the limiting factors for women’s day to day activities. It is an admissible truth that media and literature can play the influential role for dismantling the social and cultural myth by enhancing proper representation of women in STEM field. Consequently, the readers and viewers will also compel to change their preconceived mind set. Here we can recall the film based on science fiction is “Star Trek Into Darkness” (Abrams, 2013) was released in the year 2013 where a character of Molecular Biologist Carol Marerrs played by Alice Eve was shaped in such a manner where her capabilities and integrities as a scientist was undervalued and suppressed by her physical features only. This character had a great potential to evolve as a powerful and pivotal part of this show because the position as a Biologist is rare and graceful for science field. It is an excellent example of belittling and degrading of female character in science fiction. On critical writing about “Star Trek” Johnson Smith raised few debating issues in her critique in the year 2005. Where she has admitted the Utopian mission of “Star Trek” but seriously criticized about the absence of deep deconstruction of gender myths. According to her, the series is more gender aspirational than the gender neutral as it tends to reach equality but do not overlook the cultural barriers, social biases of that time frame. So inclusiveness and progressiveness of this show cannot proclaim the accurate equal status of gender in spite of the presence of the iconic female characters like Captain Kathryn Janeway, the first female Captain in a “Star Trek” series or the Molecular Biologist Dr. Carol Marerrs. By enhancing the proper representation of women in science based literary work or science fiction and improving the variety of roles for women through monitoring the stereotypes present, there could be potential for providing positive role models for women in STEM. Here we need a radical transformation for this literary field of science thus it could contribute to increasing the representation of women in STEM in theory, institution and practice. (Johnson-Smith, 2005). The historical journey of science fictions by Indian authors is shown in Table 2.

Table 2. Historical Journey of Science Fictions by Indian Authors

Author	Language	Year of Publication	Name of the book	Remarks
Hemlal Dutta (Dutta, 1882)	Bengali	1882	Rahashya (The Mistry)	Earliest science fiction in Bengali literature.
Ambika Dutt Vyas (Vyas, 1884)	Hindi	1884	AhcharyVrittarth	Inspired by the Novel of Jule Verne. The earliest science fiction in Hindi literature.

Jogodananda Roy (Roy, 1892, 1914)	Bengali	1892	Shukra Bhraman (Travels Around venues)	Ape like aliens roamed Uranus.
Prof. J.C. Bose (Bose, 1896)	Bengali	1896	Palatak Tufan(The Taming of Storm.) It was first published in 1896 as Niruddesher Kahini(Story of the untraceable) It is regarded as one of first works of early science fiction in the Bengali language and one of the first science fiction stories in India.	A Cyclone that goes mysteriously missing and route to Calcutta, spirited away with the help of a bottle of Kuntal Keshari hair oil emptied into a choppy sea.
Begum Rokeya (Hossain, 1905; 2005)	English	1905	Sultana's Dream	Feminist science fiction.
Cited in Surwase&Vanjari (2021)	Marathi	1900-1907	Man on the Moon.	Translated work from Jules Verne.
S.B. Ranade (Ranade, 1911)	Marathi	1911	Tarecha Hasya	Science fiction in Marathi.
Chinnaswami. Subramaniyan Bharati or Mahakavi (Bharati, 1914)	Tamil	1914 (Around)	Kaakkai parliament	Parliament of the Crows. (partly science fiction)
Sukumar Ray (Ray, 1922)	Bengali	1922	HeshoramHushiarer diary. (The Diary of Heshoram Hushier)	Prof. Heshoram is the leading role. Inspired by Sir Arthur Conan Doyle's "The Lost World".
Sujatha(pen name) Rangarajan (Rangarajan, 1973)	Tamil	1973	SorghaTheevu	Combination of Indian cultural beliefs with robotics, AI and Bioengineering. Embedded with ethical dilemmas of large technological advancement.

Satyajit Ray (Ray, 1961; 1965)	Bengali	1961, 1965(reprint ed)	Byomjatrir Diary (The Diary of the Space Traveller)	An absent minded Scientist Prof. Shonku. The eccentric hero of the story.
Adrish Bardhan (Bardhan, 1963; Mitra, Chaudhuri, & Barman, 1965)	Bengali	1963	MahakasJatri Bengali	Path breaking story of a Bengali space voyager.
Premendra Mitra (Mitra, 1945)	Bengali	1945	Ghana da	Ghanshyam Das, nicknamed “Ghanada” (‘Da’ means elder brother in Bengali), is a legendary fictional character. He is often portrayed as unemployed or a “gentleman at large.”Ghanada often acts as a saviour of the world without any acknowledgment. His characteristics include being geeky, mysterious, and partially eccentric and dramatic. He is said to have made major contributions to the world’s significant scientific events. Ghanada shares his stories of adventures and science as if everything he depicts is well-researched and historically true — such as traveling to Mars, searching for black holes, or defeating the mad scientists trying to destruct with genetically modified insects.
Gajanan Phondke (Phondke, 1978)	Marathi	1978	SadashivachaTotoya	Won first prize by Marathi Vijnan Parishad.
Jayanta Vishnu Narlikar (Narlikar, 1989)	English	1989	Vaman Parat Na Ala(The return of Vaman-A Scientific Novel)	J.V. Narlikar is an Indian Astrophysicist.
Sujatha(Pen name) S.Rangarajan (Sujatha, 1991)	Tamil	1991	PesumBommaigal (Talking Dolls)	A Protagonist girl Maya start working at lab.

Moni Shankar Mukhopadhyaya (Mukhopadhyaya, 1999)	Bengali	1999	Nivedita Research laboratory (Science based story not a fiction)	Indumati Deshai M.sc from Bombay University and D. Phil scholar of, Prof. Jimutbahan Sen.
Behuleyan Jeyamohan (Jeyamohan, 2010)	Tamil	2010 Anthology on science fiction contains twelve short stories	Stories based on rural settings of South Travancore which is his native place.	These short stories rooted to The Indian culture and all of which have a characteristic of Indian flavor. Moreover these are skillful weaving of local traditions and knowledge- bases confronting the modern scientific worldview.
Abhigyan Chowdhury (Chowdhury, 2020)	Bengali	2020	Sanket Rahasya	Anilikha the only female scientist of the story.

Contribution of Female Authors in Scientific Literature and Impact of Curriculum Value and Culture

on it: There is a history of gender – hidden curriculum for exclusion of women from science not only in India but also in west too. Women remain under-represented in leadership position in literary work based on science. Despite a rapid increase in the proportion of women in science education. The pattern of science fiction writing in west are based on two prime propositions first findings and construction of supernatural power and second it can fight and combat with the nature. It is noticeable fact that two third science fiction writers in West are men and consequently, no realistic or relatable characters are found lead by the female in their popular science writing. Feminist science fiction writer and critic Joanna Russ has famously assert that “There are no real women in science fiction, only images of them since so many women characters are based purely on male fantasy”. Regarding authorship, in 1948 10% - 15% of science fiction writers were female in West. Women role in speculative fiction as well as in science fiction has grown since then in 1999 and women comprising of 36% of the science fiction and fantasy writers there. English novel “Frankenstein” (1818) written by Shelly (1818) has been called the first science fiction novel. It is story about scientist’s great invention who creates a living creature out of scientific experiment. Mary’s literary success proved that all potential women who were denied educational training throughout history could having the potential to contribute in literature. Mary was the first woman ever to attend a meeting at the Royal Society of London who took bold political viewpoints also in her writing inspired by her radical activist parents. Did women write any utopian novels even before that? Yes we can prompt the name of Margaret Cavendish, an English philosopher, poet, scientist, science, fiction writer, and playwright who published the first novel commonly known as “The Description of a New World Called the Blazing World” (Cavendish, 1666) in 17th century which is considered a precursor of science fiction. Here we find a female in a leading character who finds a new world through the north pole filled with interesting talking animals. Margaret’s story was full of action, adventure, romance and there was also an interesting annotation on politics too. Most noteworthy fact is that she published her works under her own name while women’s literary works were profusely were debarred from publishing. Consequently, other female writers in her time would take men’s name or write anonymously. Another popular female writer of this genre is Octavia E. Butler who won multiple Hugo award, Nebula award and also a Life time achievement award for her contribution to scientific literary work. She is considered an Afro-futurist writer. On the other hand, we have found author like Ursula K. Le Guin and Andre Alice Norton who were honoured as Grand Master of the Science Fiction and Fantasy Writers of America the most prestigious award for any author. Though early published fantasy was written by and for

both genders through speculative fiction with science fiction but it has, traditionally been viewed as a male – oriented genre in western literary culture too. So scarcity is everywhere for female role model of science in literary work either east or west Shelley, 1818; Cavendish, 1666; Butler, 1994; Le Guin, 1969; Russ, 1983).

While imagining ‘a scientist’ many people think of a mad absent minded man with curly hair, surrounded by bubbling test tubes wearing a white laboratory coat. This picture is seldom replaced by the likes of Marie Curie. But to name or think of an Indian woman scientist would be difficult even for most of science graduates. Breaking the jinx of the stereotypical image of an ‘Indian women’, and to visualize her as a scientist is still an worshipped idea. This of course is an issue which is influenced by the patriarchal mind set of a society, but science with universality, objectivity, and rationality has also perpetuated an idea of being a masculine discipline which is a wrong proposition. The scarcity of female character in science based literary work and science fiction can advocate a considerable debate for academia as many questions still unanswered related to our social mind sets, ideologies and values while we count the representation of women in these genre because it shows horribly scant.

Ideologies and Values do not constitute only a subject matter to be taught in a curriculum or not verbally affirmed proposition. According to Cam (2014), it actually embodied in commitments and actions and it must be gender equal. National Curriculum Framework 2005 gave a remarkable statement that “Liberate our learners from existing inequality not only the girls but also the boys and transgendered.” Existing inequalities should be liberated through the process of socialization and reframing the curriculum. Curriculum sometime presents only one interpretation of an issue, value, event or group of people simplifying and distorting complex topics by omitting other perspectives. Despite caste, class, race, religion and culture curriculum must focus on equal practice and must address the difference of experience in the journey of value education. Concrete and integrated efforts in achieving this goal are yet to be seen. The national system of education shall be based on a new framework of curriculum which should lay emphasis on eradication of inequalities in classroom practice. As education system does work as an agent of secondary socialization, universal norms for value, peace and ethics of care so it should be employed through education in such a manner thus everyone can share moralities and goodness with their sense of ethics and responsibilities beneficiary both for themselves and society. In this context the notion of literary world which constitutes part of our hidden curriculum should also be reframed and reviewed through eradication of unequal practice of representing only one gender prominently and profusely. There should be a conscious effort to address the issue of female character in science based story knitting. The most likely reason for the imbalance in science based literary work is that society reinforces the idea that boys and girls have different interests and abilities. Gender is fluid and socially constructed concept and it follows that gender is one aspect of present society that has the potential to be represented differently in an imagined figure. Women often face “stereotype threat” which is highly integral while pursuing STEM field and it leads to decrease their self efficacy, self-confidence, own abilities and they are surrounded with confusion, anxiety, fear of lesser skills and try to avoid challenges even if equally capable with men. Consequently, they opt out STEM industries (National Council of Educational Research and Training, 2005)

In Bengali literature we find “Nivedita Research laboratory” is a story of success of a Bengali scientist Prof Jimutbahan Sen and fulfilment of his dream. He started initially a research on chemical pesticides but later he gradually became interested in natural pesticides. In this story, Indumati Deshai a promising, soft spoken, intelligent girl who assists Prof. Sen in his lab as his scholar. Unconventionally, Shankar portrayed the character of Indumati who can explore herself as the woman of science taking the reins of her own desire and ambition and making a choice out of her own volition. Female as scientist or lab researcher rarely get portrayed in fiction or novel. Shankar’s story is an exceptionally good effort (Mukhopadhyay, 1999).

Science fiction means entertainment interweaved with education. Tales of imagination told well while being rooted in scientific principles and technological possibilities. Seen from this perspective, the term that best

suits the kind of stories our scientist have is “Scientifiction”. The process of Scientifiction is defined by Prof. Peter Weingart as “a process whereby the use of and claim to systematic and certified knowledge produced in the spirit of ‘truth seeking’ science becomes the chief legitimating source for activity in virtually all other functional subsystem (Weingart, 1997). The impact of science fiction on science cannot be quantified easily but it helps us to visualize and imagine the universe through several nouveau approaches like literature, film and other creative form of entertainment. Indian science fiction has never dealt completely with the important question on gender role in it.

Indian literary works and cinemas based on science fiction normally demonstrate the issues of rationality, traditional belief and ideology of Indian culture which cannot avoid also religious dogmas and ethical dilemmas. Indian science fiction writers address that excessive dependence on technological progress disregarding ethics which can lead to a decline of human values, long term societal wellbeing and sustainable growth. These literary works also have great advocacy for establishing that everything is prefixed by nature but they have not raised ever the gender controversies regarding the absence of prominent female characters in their works. It actually perpetuate the social myth that science is exclusively a “male domain”. As the socio-cultural belief and ideology determine our real life strategy and course of action hence SF authors, directors, writers also do not want to take any risk for their creative work by setting any exceptional pattern behind or in front of the lens and pens. There is a dry spell of engrossing and observable female character in Indian cinema based on scientific literary work and science fiction. Undoubtedly, it is a crafty genre. So, to work with due accuracy and precision for avoiding the critical and complex aspects of entire field, one must deal with tactfully and skillfully for evolving new thoughts in stories which have the potential to implant long last effect in reader’s mind. Although Sci- Fi is one of the unexplored genre in Indian cinema. In 1963 a leading female character was found in science fiction movie in Tamil language “Kalai Arasi” while we find an alien character who abduct a women from the earth thus she can teach Indian Classical Music to the people of their planet as there was no classical music teacher. This film is considered as the first Indian film that featured a storyline around aliens and space travel. First Hindi movie based on science fiction is “Mr. X in Bombay” (Soni, 1964) was released in the year 1964. In this film we find a scientist Mr. Mathur, who stuck in a trouble after failure of his experiment which causes to the death of one of his employees Mr. Manohar. We have found one of the notable character of young female astronaut Tripathi in film “Cargo” (Kadav, 2020) directed by Arati Kadav. This film facilitated the way for filmmakers to trace the subtlety of this genre. The most iconic science fiction film in Bengali language is “Patalghar”(2003) (Chowdhury, 2003) based on the story “Patalghar” (Mukhopadhyay, 1983).Undoubtedly the science fiction movie cost very high but in last two decades more and more filmmakers are stepping out for experimentation with this uncharted territory and Indian audience had accepted films like “Mr. India”(Kapur, 1987), “Koi mil gaya” (Roshan,2003), “Robot” (Shankar, 2010), “Ra one”(Anubhav,2011), “Krrish”(Roshan 2006), “Krish 3” (Roshan, 2013), “PK”(Hirani, 2014), “2.0”(Shankar,2018), Sequel of Robot.

Bengali film has unforgettable contribution to glorify the prominent presence of Bengali working women of science and this making was not sudden. We may recall Dr. Rama Banerjee in film “Harano Sur” (Kar, 1957), she treats her patient who is suffering from severe amnesia after an accident. Another noteworthy character in Bengali film is Radha Mitra in “Dweep Jele Jai” (Sen, 1959). She performs as an educated trained nurse in a psychiatric ward of a hospital. She was dealing with patients of emotional trauma and gradually became also the part of therapy to heal her patients but as patients heal and move on, the therapist could not. This story is a remarkable example of care ethics of woman who strongly believes that patients suffering from mental illness should be given extra care. Undoubtedly these characters of doctors, nurses had changed the public image of a Bengali woman during late 60’s of 20th century in Bengali and Indian cinema. It portrays not only the working women in Indian cinema but also an optimistic image of independent strong and intelligent women who work for science and society which would not have been accepted by the viewers of Indian panorama even if in late 70’s. But within this framework of strong patriarchal ideology, these films

were not degrading to women and below the surface tried not to reinforce patriarchal values. One could perhaps be able to discover finer arguments within these stories that supported woman's right and empowerment through upliftment of the social and economic status by choosing her own profession to lead her life according to her own desire. A protagonist's working life is presented in various manifestations in these films actually denotes decline in economic dependence together with social recognition and standing which are considered to be the critical inputs to women's empowerment and wellbeing. To analyse women's participation in economic activities four terms are interchangeably used i.e. labour market, labour force, work force and reserve army of labour. These terms are closely associated but denote different connotations. Working women would refer to the widest range of economic and productive activities from a nurse in psychiatric ward in the film *Deep Jele Jai* to project scientist of *Mission Mangal*. Another great endeavour of Indian panorama is to give a true homage to Indian women scientists is *Mission Mangal* (Shakti, 2019) which is based on the real story of the iconic team of women scientists who executed Indian Space Research Organization's (ISRO) Mars Orbiter Mission (MOM) in November, 2013. This film is recognized as India's first inter-planetary expedition. Undoubtedly these films are reflecting changing social trend in Indian scenario in spite of fiction needs more and more women scientists and women author to revive our imagination.

When it comes to intelligence and merit women were often kept in back stage either in science laboratory or in scientific literature. Needless to say that it is a long thorny journey for women in science and their journey can be described by quoting the Spanish poet Antonio Machado (Machado (1912/2008):

“Traveler there is no path.

The Path is made by walking...

Beat by beat, verse by verse...”

Conclusion: This study uncovers the actual objective behind the historical intention to exclude the notion of gender neutrality in science driven storytelling and in formation of character. It explores the major role of science literature, media, and curriculum practices in perpetuating or challenging gender biased assumptions in scientific domains. It highlights the legacy and contributions of women both actual and fictional world of science that have been consistently unrecognized, undervalued, ignored, or misrepresented.

Potential future research directions include:

- Moving Beyond the Anglosphere: Global and Postcolonial Perspectives,
- Intersectionality Beyond Gender
- Media and Form: Beyond the Print Novel
- New Theoretical Frameworks: Posthumanism, Material Feminism, and the Non-Human

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