

Equality, Diversity, Inclusion

Picture a Scientist

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Keywords:

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Introduction

“There is no greater agony than bearing an untold story inside you. Prejudice is a burden that confuses the past, threatens the future and renders the present inaccessible.” - Maya Angelou

Picture a Scientist is a film of stories, most of which are told by women. Men are used sparingly in the documentary; when they are not adding context to a woman’s story, they appear as the embodiment of structural sexism (and misogynoir): the villain. In this way, the documentary is about men, but not really. These tales represent a wider issue of the ways in which women are systemically and systematically kept from reaching the highest levels of success in STEM. Here, some of our researchers reflect on and relate to these stories.

A problematic dynamic

In the first 10 minutes of the documentary, Nancy Hopkins describes how Francis Crick walked into the lab where she was working, approached her desk and groped her breasts. It’s a shocking story to hear decades after the fact, just as it was shocking for Hopkins to experience at the time. She recalls, ‘I was so startled, I didn’t quite know what to say or do...I just didn’t want to make a fuss. I didn’t want Francis to be embarrassed, I didn’t want Jim to be embarrassed. I just tried to pretend nothing had happened.’ Hopkins is not alone in experiencing this kind of sexual harassment:

‘I experienced very similar acts of transgressions by men, including the casual breast grabbing. However, I made sure the person in question did that only once! So sometimes I find it hard to understand why so few women actually speak out right then and there. Perhaps it is easier to react to explicit physical transgressions than to more elusive acts of male dominance and ignorance.’ - ‘W’ (female)

This is often asked of women who experience sexual harassment: why don’t they immediately speak out when they are harassed? It is a question that the documentary anticipates and spends the next 80 minutes answering, drawing on the experiences of Dr. Jane Willenbring as a case study.

Willenbring recounts her experience as a student under David Marchant, who threw rocks at her, blew ash in her face and called her a “cunt”. Willenbring waits 17 years to write a Title IX complaint against Marchant. Why? Dr. Paula Johnson, President of Wellesley College, explains the problematic dynamic between students and supervisors:

‘If you think about science, we have a system that

is built on dependence. Singular dependence of trainees[...] on faculty for their funding, for their futures.’

This facilitates an environment in which harassment can occur as those who speak out risk their careers in doing so:

‘There has been tremendous progress with the proportion of women in STEM compared to a century ago, but progress is still slow. To an extent, this can be attributed to a system built on dependence. The singular dependence of trainees on faculty for funding sets up a power dynamic and a working environment conducive to harassment. Consequently, there exists a leaky pipeline as women drop out of science’ – Ninu

‘There are very few, if any, professional environments outside academic Science, Medicine and Technology where the words “Family” and “Community” are used to describe such global and diverse groups of people[...]However, a family’s primary purpose is not only to safeguard its existing members. It is also to nurture, accept and listen to new and existing members. ALL new and existing members without exception. But it is evident that we have a system that is built on singular dependency and imbalanced power dynamics; an environment that can inherently breed harassment and inequality. Suddenly the use of the phrase “Scientific Family” feels hypocritical.’ – Dimitrios

The Iceberg

The kind of harassment that Hopkins experienced is, as the documentary tells us, the tip of the iceberg:

‘The metaphor of an iceberg is used in the documentary to depict the various forms of sexual harassment in science. What is visible is merely tip of the iceberg, which constitutes less than 10% of sexual harassment, and includes behaviours such as unwanted sexual attention, coercion and assault. Whereas what lies underneath is the devastating spectrum of subtle exclusions, vulgar name-calling, demeaning remarks, being left off emails and collaborations, not given due credit, questioning competence, being passed over for promotion[...]’ – Ninu

It is what lies below the surface, beyond the obvious sexual advances, that regularly reinforces the message that women are not welcome in the field.

Is it any wonder, then, that we have a leaky pipeline? Picture a Scientist reports that at major research universities, 7% of deans and fewer than 3% of provosts are women of colour. Sangeeta Bahtia recalls being in her undergraduate class that was roughly half women and

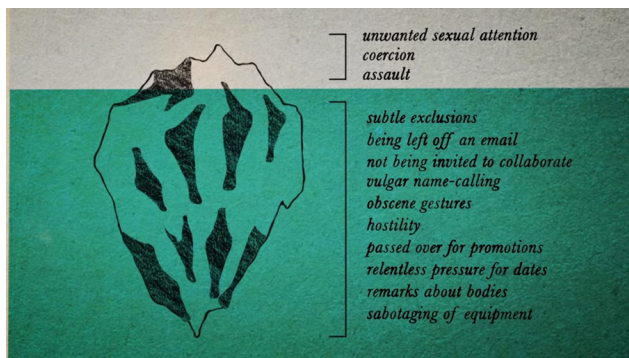


Figure 1: 'The iceberg'

wondering 'what is all the fuss about? There's plenty of women in this classroom. Maybe it's just a matter of time.' When Sangeeta looked again in senior year, 7 out of 100 women remained. Women become even less represented in STEM as you climb the ladder. As Dr. Raychelle Burks says, 'the higher you go up the ivory tower, the whiter it gets. And the more male, and the more hetero...the kind of majority dominant viewpoints come out.'

Representation matters

'Overlooking talented women (often in favour of less talented men) is universal and neither restricted to the US nor science. This year and for the first time in its history, Oksana Lyniv conducted a Wagner opera at the Bayreuth Festival. For the longest time, the festival's organisers deemed Wagner too masculine for a woman. If a woman must become a conductor, then at least stick to more feminine music like Mozart or Puccini (interview with Lyniv in the German newspaper 'Die Zeit' July 8th 2021). Ridiculous if you think about it. Biology has the same reputation of being more 'feminine'. I don't remember many women at my university being tutors or academics in chemistry, physics, mathematics or engineering, but there were quite a few in biology. In my first year reading chemistry, around 15% of us were women. In biology, the rate was about 50%.' – 'W'

'If you see it, you can be it,' says Dr. Raychelle Burks, who has been mistaken for a custodian, challenged over parking in the faculty lot and been ignored when voicing her ideas in meetings. She is one of the 2.5% of the science and engineering employees in the US workforce who are Black women¹. She emphasises the importance of representation as she considers how most scientists she saw growing up were fictional, such as Star Trek's Nyota Uhura (played by Black actress Nichelle Nichols). 'She was in charge of comms, but really she was a scientist,' Burks recalls. Nichols' impact has been widely felt by Black women (and men). On seeing Uhura for the first time, Whoopi Goldberg recalls calling, 'come quick, come quick, there's a Black lady on television and she ain't no maid!'² Goldberg would later go on to play Guinan in the series. Nichols also recalls meeting Martin Luther King Jr., who told her not to quit the show, saying, 'for the first time, we are being seen the world over as we should be seen.'³

The importance of representation was felt by our researchers, too:

'Although an unrealistic TV series, I found the female surgical intern character of Dr. Christina Yang in Grey's Anatomy quite inspirational. Without women in science, we lose half the best people. It's worth pondering if the world could afford such a loss, a loss of great discoveries.

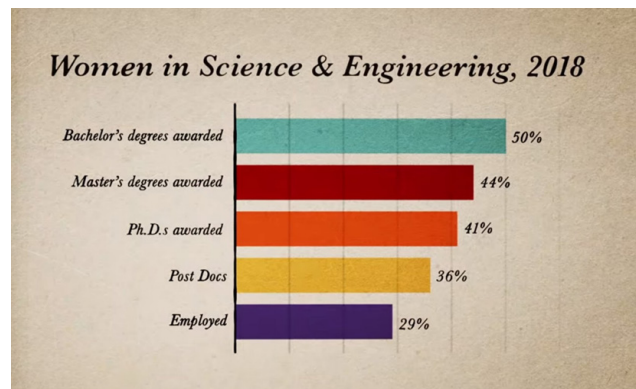


Figure 2: The 'leaky pipeline'

We should never forget that the X-ray diffraction image of DNA generated by Rosalind Franklin was instrumental to the discovery of DNA structure by James Watson and Francis Crick. In the 21st century, we could be proud that Dr. Sarah Gilbert's research led to a solution for the Covid-19 pandemic in the form of vaccine. There could be more Sarah Gilberts who would have more to offer to the world if this discrimination didn't exist.' – Ninu

Picture a Scientist dives deeper into issues of representation by looking at women of colour in the field and in doing so, shows the compounded disadvantages they face in STEM. In 2016, women of colour represented 34% of all women aged 18 years or older in the US, but only 2.2% of PhD awardees (Figure 1)⁴. As approximately 51% of people in the US are women, the award rate for women of colour would be approximately 8 times higher than reported in the documentary if they were equally represented in the field⁵.

There is a survivorship bias in this documentary, just as there often is in texts that look at sex-based discrimination, as one of our researches has noted:

'In The Authority Gap, [Mary Ann Sieghart] focuses on high-profile women (and so did the documentary). In an interview on the Guardian podcast, Today in Focus, Sieghart justifies this by pointing out that if even high achievers struggle to get heard and taken seriously then how awful must it be for the average woman? Those that work in offices, shops, as teachers or nurses, without many social, political or educational credentials backing them.' – 'W'

But the documentary does share the story of one woman who was forced out of the field: the anonymous ex-student of David Marchant who had wanted to become an astronaut. As she recounts her story, the viewer hears for the second time of Marchant calling a female student a "cunt". We begin to understand that this is his pattern. Marchant goes on to tell her that 'he had decided that [she] would have no future in any polar studies and that they would make sure that [she] got no funding.' As Marchant was involved in funding decisions and there were no alternative sources of funding, that spelled the end of this woman's career in science and her hopes of becoming an astronaut.

What was the deciding factor that allowed one of these women to go on to develop a successful career in science while the other could not? We are left to guess. Perhaps juxtaposing these similar stories with their opposing outcomes serves as a reminder that for every high-profile woman who beats the odds and succeeds in the face of discrimination--who gets to share her story--there is another (likely countless others) that did not. Jane Willenbring's story is just the tip of the iceberg.

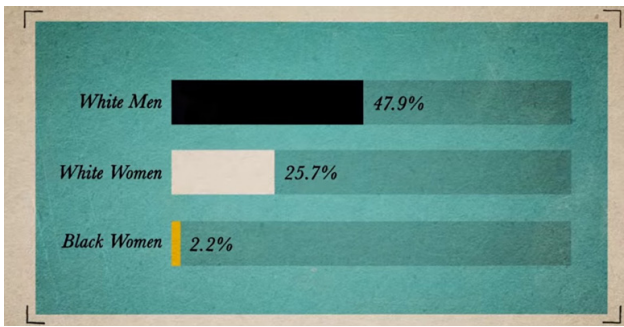


Figure 3: Ph.D.s in STEM awarded to U.S. citizens in 2016

It's just a matter of time

'I think there are grounds for cautious optimism, both in data putting the number of professional female scientists at 46% of the workforce in 2019⁶ and in the working environment of NDS, which I think really well illustrates the benefit of consciously and openly levelling the playing field both with initiatives such as Athena Swan but also with having an 'on-the-ground' culture of being able to speak up and address difficulties as they arise. Picture a Scientist serves as a reminder that the progress made since the MIT report over two decades ago is fragile and encourages you to think about how you can positively and constructively contribute to continuing efforts to make science a diverse and welcoming environment so that the best scientists are recruited and retained and enabled to devote their time and effort to scientific progress.' – Oliver

Numbers are improving, but bias remains. Corinne Moss-Racusin discusses a study she worked on in which participants were given identical applications to assess – half believed the applicant came from a woman, 'Jennifer', and half from a man, 'John'. The woman was rated as less competent, less likely to be hired, less likely to be mentored and started on a lower salary than the male applicant (Figure 3). Moss-Racusin's findings were supported by the work of Mahzarin Banaji, one of the original founders of Project Implicit, who discusses the use of the Implicit Association Test (IAT) to better understand the deeply rooted implicit biases that we all harbour. She reflects on her own performance in the IAT:

'I thought I could do this. So I take the test and it turns out I can't do it[...]And the feeling you get as you take the test is one of utter despair. I ought to be able to associate female and male with science equally[...]To discover that I cannot do that, I think is profound.'

It seems that women are entering into and

succeeding in science in spite of these biases, which result in them being undervalued and made to feel unwelcome. Understanding this bias and working to eradicate it is a crucial step in levelling the playing field for female scientists.

Conclusion

The documentary opens with two tales of abuse: one of David Marchant against Jane Willenbring and one of Francis Crick against Nancy Hopkins. There is both a narrative symmetry and dichotomy in placing these stories side-by-side. Despite his actions, Crick was and remains one of the most well-known names in science. Rosalind Franklin's comparative obscurity and erasure from the history books places Crick as a prime example of how scientific discourse has historically been written by men to exclude the achievements of women. Crick remains a household name...a Nobel Prize-winning proper. But in the end, their stories diverge. In its final scene, we are told that the U.S. Board on Geographic Names renamed the Marchant Glacier in Antarctica. In this story, it is Marchant who will be erased, his achievements superseded by the abuse he committed against women.

The work to eradicate bias and discrimination and remedy the years of erasure women in science have experienced is only beginning. Our researchers reflect on personal responsibility and what they think lies ahead for scientists in the UK and in NDS.

'Perhaps the first thing to say is that Picture a Scientist is a really well-made film. Yes, it's bleak and uncomfortable in parts, and doesn't exactly tackle an easy subject matter, but in spite of that it's inspiring to watch: a real story of triumph in the face of adversity. There's one scene that particularly sticks in my mind, where the professors who authored the 'MIT report' reconvene on its 20-year anniversary, all with stellar academic careers achieved within a system that, either by act or omission, made their ascent more challenging. It's really sobering to have the struggles and difficulties of female scientists laid bare, a depression compounded by considering the loss to science: all the time, effort, resources, and even careers that have been consumed trying to navigate and change a system that theoretically exists to facilitate scientific progress.' – "Oliver"

'As a woman of colour in the current era, I have benefitted significantly from the efforts of these brave women who have made science more welcoming and equitable to all. I have been fortunate to work in laboratories with equal or slightly higher representation of

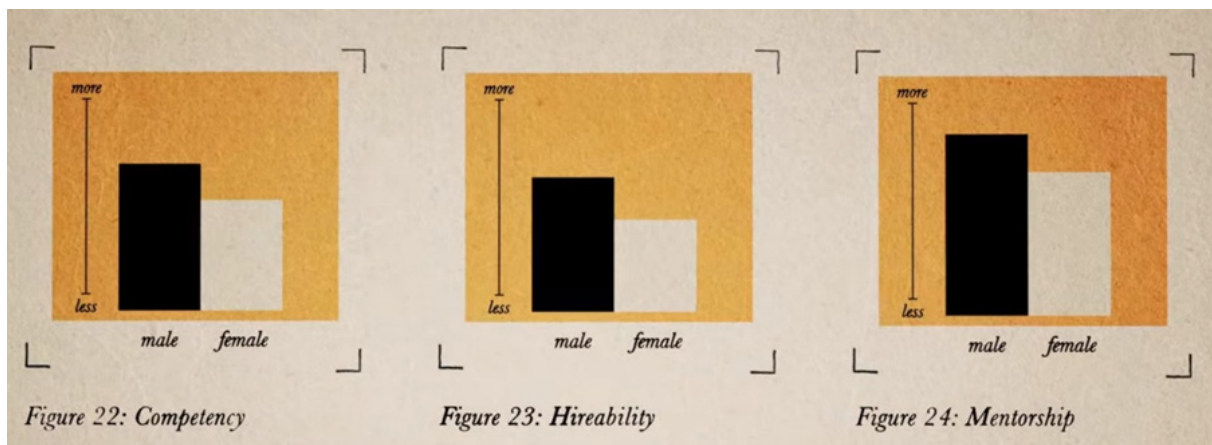


Figure 4: Comparative scores on identical applicants from the study quoted by Corinne Moss-Racusin

women scientists. However, many of the issues portrayed in this US based documentary can also be translated to the UK landscape. On my first day in NDS, what struck me were the photos of male surgeons in the hallway. I wonder why there is less representation of female surgeons.’ – Ninu

‘It is an inescapable fact that the issues discussed in this documentary are not unique to our field. We should demand and expect leadership and accountability from the people in positions of power in science. However, quick change has only ever succeeded from the ground up. We ALL should look at the entire iceberg and do our best to systematically identify and address the issues that lie below the surface on a daily basis to create the nurturing environment we should have in place.’ – Dimitrios

‘I cannot offer oven-ready solutions to the problem other than advocating to speak up, don’t suffer fools gladly and don’t be intimidated by any male display behaviour. “Be sand not oil in the gears of the (male) world!” – Günther Eich’ – ‘W’

Picture a Scientist is currently available to view on Netflix.

Conflicts of interest

None.

Funding

None.

Consent

None.

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