

Chronicles of a Queer Relationship with Science

CHAYANIKA SHAH

This article traverses a journey of a person in science and feminism, highlighting a trajectory in which her relationship with science, its praxis, and its understanding, all transformed as her engagement with feminisms also evolved. The narrative highlights the change from a narrow understanding of science and a career within it, to the emerging multiple possibilities of being a person in science—a change made possible because the feminist lens shifts focus from the question of women in science to a feminist understanding of science. The process, hence, results in a slow inhabiting of the “outsider” in a reimagined landscape of the discipline.

Scientist. This is too lofty a term for me to lay claim to. It also conjures up an image that is far from most people that I have seen appointed as scientists at different levels across all the Department of Science and Technology institutions.¹ In trying to imagine the scientist in the image of the one and only true scientist—with a halo of electrified hair around his head (read Einstein)—and finding no one around me who matched it to full effect, I choose to stay with the phrase “person in science” instead.

‘Person in Science’

In true scientific methodology, the obvious first question is: Who is a person in science? Do only those engaged in research in frontier areas and in world-renowned institutions of science qualify as “persons in science?” (And, I am not even going into the politics of who or what decides what world-renowned and frontier areas are.) Do just those getting published in international journals with high impact factors count? But, then, how does one objectively arrive at the right impact factor to qualify? Are those working in public university systems, who teach and research, eligible for this descriptor? Or, can the ones who only teach science be called persons in science because they have done some amount of research at some point and keep knowing more about science through reading and teaching? What about those who chose to move on from research in science to research about science? Are they persons in science?

As I write, my list of questions goes on growing. But, then I move them aside to address the question: why is this a concern at all? I think it matters because a recognition of a “person in science” is essential to listen to their narrative of being in science. Knowing who this person is—that all important question of subjectivity and location—is important because in this most “objective” of knowledge production systems, it will determine what they say, but will also determine how seriously their narrative will be read. And, that brings me to the other subsumed question: who is this person?

Does it matter if the person is a man or a woman, or has any other gender identity; if they are white, black or ally with any other colour in the racial spectrum; if they are Brahmin, Dalit or non-Brahmin and non-Dalit, or wherever in the graded hierarchy they may have been made to fit; does it matter if they are religious, atheist, agnostic, or have tried to understand their relationship with the spirit of the universe in other ways; if they grew up in the North, South, or the North within the South or the South within the North in the geographical and political globe; does it matter if they are able-bodied, disabled or temporarily able-bodied or disabled?

Chayanika Shah (chayanikashah@gmail.com) is an independent scholar and queer activist.

The descriptors go on and the characteristics keep increasing in number. As I write each of these today, I see different persons and feel that, yes, every one of these locations and standpoints matters. These matter in every human endeavour, in every epistemological exercise, in all academic and non-academic pursuits, and so these should matter in science too.

But, such an emphasis is seen, even today, as some sort of attack on the pristine nature of science, and so is taken on by a person in science with hesitation and self doubt. The experience cannot be challenged, but is often reduced to that of an individual and as specific to them, and thus an aberration. When many experiences seem to resonate and refuse to be subsumed under specific and individual aberrations, then, with equal vehemence, questions about whether these are bona fide people in science ensue.

I write this long preamble to lay the ground for my experience, but also to assert that as much as I speak of my trajectory or of trajectories of others like me, I also speak of my understanding of science and relationship with science. An understanding which, though personal, speaks of the political that frames this personal account while being sketched by it. It shifts the normative ways of relating, and, in doing so, queers² the being itself. And, in this understanding, the question of what is recognised as “doing science” and accepted as “being in science” is a part of the story of science.

Me, the Character

In the 1960s and 1970s when I was growing up, my parents took me to every “temple of modern India,” and till I grew up—in years and thoughts—I truly believed in the Nehruvian dream of modernity. Science and its rationalism were the charms of modernity for me. It also led to an almost wilful erasure of the particularities of who I was or where I belonged. We were in mainland India, with no discomfort with the idea of the nation as one monolith. In hindsight, I think that this centred location made me the person that I am and experience the world in the ways that I did.

The first riots that I remember in Nagpur were in 1968 around the imposition of Hindi as the national language. For a nine-year-old me—whose parents originally came from the Kutch region, far in the west, but who chose to speak to their two daughters in Hindi because that was the language around us—this rejection of Hindi did not make sense. But, neither did the imposition of Devanagari sign boards and number plates in our convent schools, when the medium of instruction was English.

We spoke the language of the region, but did not know how to explain our markers of religion and mother tongue to others around us (or even to ourselves), markers that needed to be filled in forms ever so often. No one around us was Kutchi-speaking (in any case what was this language without a script) and neither were they Jain. Not just that, no one around us knew what both of these were. So, we had simple explanations. We were Kutchi-Gujarati or even just fake Gujaratis (after all Kutch was a region in Gujarat), and we were “Hindu Jain.” The latter was probably our parents’ need to stress that we were not from “alien” religions like Islam or Christianity, but were from this land.

Nagpur itself had just become a part of Maharashtra, and so was as alien to Marathi and being Maharashtrian. The city as such was a distinct region of Maharashtra, it was more like a central Indian city and was fairly mixed in its population. So, we did not feel like big misfits, but we also did not fully fit. I think that has been my location in most mainstream spaces I have inhabited later as an adult. I was never a complete outsider, but neither did I ever feel like a complete insider. It has taken many years and experiences for me to realise the richness of this middle ground, and to occupy it not with tentativeness, but with a sureness of foot.

My parents were first-generation learners. Though we were born into Jainism—which did not believe in caste—we were Banias by caste. Education was not accessed as a matter of routine. Amongst his many siblings, my father was the only one to go to college and was the first dual graduate (in science and law), and my mother was the only woman to complete her school education in her family. They became adults as the nation was being formed and that possibly gave them the chance to dream different dreams from the traditional ones. Circumstances forced them to migrate away from the “community” and probably that helped as well.

So, both of them, especially my mother, wanted their daughters to study and grow up to be earning women, and, if possible, professionals. I wonder if similar dreams would have been seen for a son, or if he would have been forced or lured to continue the businesses that my father had started. Luckily, they did not have a son, and the daughters benefited from this dream of theirs.

Initial Flirtations

Those were the times when being an engineer or doctor were the chosen paths for “bright” middle-class children (a class that my parents aspired to and soon become comfortable in, and whose upper edges they later occupied). For some strange reason, I did not want to take up either of the professions. A favourite teacher said that I could do a PhD and become a scientist and somehow this became my choice. Till date I do not know what drove me away from a well-known path and towards one that was unfamiliar to everyone around me. I truly wish I could say that it was my love for physics that took me to it, but I think it would be dishonest towards the self that I remember from almost four decades ago.

So, in some way, the subject was chosen by default and the path ahead, though triggered by suggestion, was followed up with conviction. It was a serious attempt at giving it my best and soon it uncovered a new world before me. I completed my undergraduate degree in a regular government college where no one could understand why “good” students were in science and not in medicine or engineering,³ and there was no real nurturing of interest and knowledge, apart from a little prodding and encouragement from a couple of teachers. However, my adventure at trying to see what was possible brought me to the other great dream of modern India—the Indian Institute of Technology (IIT). I do not know what path I would have taken if I had chosen the “softer” biological sciences.

Today, central universities providing subsidised education are under serious attack by both, those who want corporatised education and those who want to control freedom of thought and all notions of autonomy. I look back and realise that the IIT, then much cheaper than it is now, was accessible to me because of subsidised public education. It became a space where the world truly opened up for me.

The IITs set the standard for who was considered “intelligent and smart.” But, within the IIT, of course, those who came for the engineering Bachelor of Technology (BTech) degrees were seen as the real brains. After all, the ones who opted for science could only be those who did not get into an engineering stream of their choice. In 1977, I had not even opted for a full five-year undergraduate BTech degree or for the postgraduate Masters in Technology or a PhD, but only for a two-year Masters in Science, which incidentally was looked down upon even more. I stayed on for my PhD till 1985 and soon figured my place in this graded hierarchy of subjects and degrees. The campus had 3,000 students of whom only 70 were “ladies,” all living in the “ladies” hostel (LH)!⁴ In this residential campus, we were all supposed to be temporary inhabitants with no real claims to belonging. And yet, there were vast differences and unequal claims amongst us.

This complex space was my home for the next eight years, where I truly learnt being an adult, and this was my first real relationship with physics as a subject.

The Relationship Blossoms

Although I speak of a specific campus, which was very male in its composition, I think it epitomised the masculine character of science and engineering in general and made the hierarchies very obvious. There was not even a half-hearted attempt at flattening the pyramid; everything here underlined it. The admission process to the IIT set this ball rolling and the geography of this predominantly residential campus sealed it. In this little island just outside the island city of Mumbai, the sylvan surroundings jostled with the harsh architecture of the buildings. Nature ran wild in the approach roads to the campus, but all constructions determined the locations of the various humans that inhabited that space: the lower someone was in the hierarchy the further away they lived from the main institute.

Going there and living for the first time away from home, in an environment that was culturally very different from what I was used to till then, was as exhilarating as it was full of surprises and shocks. As Sumathi Rao reminisces in her article in this issue, ours was a class with a large number of women students by IIT standards. This was a relief, but the campus itself was a difficult terrain to navigate. Sexual harassment was a casual timepass for the “gentlemen,” the “brilliant students at IIT.” The “ladies from LH” were not taken seriously and the behaviour of the majority of this so-called cream of society was at times worse than what we had witnessed till then.⁵

And yet, there were many variations within the student population. Along with those steeped in competition of the worst

kind, there were also those who did not want to be a part of it. There were those who had learnt the tricks of the system and were set to make it big in the world outside, and there were a few who chose to make different paths for themselves. There were also those defeated by the harsh system, a system that did not pause to look at variation, which valued certain kinds of merit⁶ so much that it did not create any space for those who had something else to offer. Some dropped out, others went into depression, others raced ahead without thinking, acing their tests and counting their grades. Some got effortless grades, others managed to pursue what impassioned them. Meeting this wide range of people from varied backgrounds was in itself an education.

In the department itself, having others who were interested in the subject and who had a lot more exposure helped me form a relationship with physics. This was also the first time that I was being challenged by the complexity of physics itself to some extent. The syllabus was very mathematical, but I did not complain because I liked maths. However, in the rush to get good grades and keep up with the pace, the learning of the subject did not really deepen. We were in typical science classrooms where we learnt to understand and work with “ready-made physics.” Its making was never a part of our classroom.⁷ In hindsight, I think I learnt the nuts and bolts of making physics work, but the heart of the subject moved away from me. Almost three-and-a-half decades later I can see what should have been done to keep that heart ticking. It needed a peek into the heart and a softer engagement, not just the nuts and bolts of making it work.

Meanwhile, the rat race of the institute worked at every level. The third semester in MSc meant giving the Graduate Record Examinations, filling the pre-applications, and soon after, almost everyone serious about the subject moved out to study in American universities. I decided to not apply, to step out of this race. Again, I think it was an unusual decision at the time because no one was stopping me from going. I think my parents would have supported me and I could have made it to a decent university, but I chose not to. The only certain thought I remember was that I wanted to be in India, and if I could not even do my PhD here because the facilities were not good enough, how on earth was I going to come back to work here.

So, in a sense, the irrational need of wanting to live in this country took an upper hand in my thoughts about life, and over what was good for me as a person in physics. This too can count as my first *gaddari* (betrayal) of sorts, or a negotiation in my relationship with physics itself. It was not to be the centre of my world and that meant that I could not be at the centre of the world of physics. We did not break up, though. We learnt to chart our paths differently from others who followed the well-trodden ones, an art that became a part of how I formed all relationships.

I tried to go to other institutes for my PhD, spaces that were known more for pure science research and hence superior than the technology-centred institute I was in, but that did not happen. I always thought it was because of my lack of merit, but who knows how much of my being a woman played a role.

We shall never know this. Writings of different women from across the world have shown the commonality of this feeling of “not being good enough,” because in our dedication to the sciences we all want to believe that who we are should not matter here.⁸ This is much evidenced in Sumathi’s article as well.

I too thought that for many years. Now, it really does not matter, but it could be that I was as good as or even just a little better than the male candidates. It is true that I would have definitely not have been good enough for an institute to take the risk of losing me to marriage, which was expected of a woman my age from my kind of background. After all, the teacher in my first school had answered my mother’s queries on my progress with a clear, “She is alright. Why do you worry? Anyway you banyas get your daughters married after they finish school.” Maybe, the selection committee was smart to not take the risk of saying it out loud, but it also could not take the risk of wasting a seat on me.

After the First Rupture

Ultimately, I was back again for a long-haul PhD programme in the familiar terrain of the IIT. I look back and thank myself for not wanting physics bad enough, for not being “good enough,” and for the various selection panels in the research institutes to not have been gender-sensitive enough. After all, it was still not the 1980s; they cannot be blamed. The present versions of feminisms had yet to happen!

The slow-to-settle-in PhD programme gave me the time to pause and look around. This was the time when I truly “grew up” and became more aware of the world around me. As I went into the narrower and narrower details of my calculations and my specific areas of research, my political and emotional selves soared into vistas that had gone unnoticed until then. It was a strange combination of things. This was after the Emergency, the beginning of the 1980s in Bombay—politically, a very happening time. I was just starting to become an adult, full of energy and dreams and also away from any adult control or protection.

These were heady times. The mess workers’ struggle on campus to become institute employees, which was long fought and finally won with the support of a few students, was an eye-opener on strikes and the rights of workers. The massive student strike in March 1980 pushed us into direct confrontation with a mulish and authoritarian institute.⁹ Four students went on an indefinite hunger strike on being asked to leave the institute as they were apparently underperforming. All these students were either from marginalised castes or were foreign nationals. Other students supported their strike and called for a boycott of classes on 7 March 1980. On this day, some students gheraoed the director in his office with their charter of demands, which was disbanded by the police, called into the campus by the administration. By the end of the day, the students on hunger strike were forcibly picked up and the institute was declared *shut sine die*. All students from all over the country, and even foreign nationals, were asked to vacate their rooms and leave the campus in 72 hours.

They were all called back in a phased manner after three weeks and made to sign a declaration saying that they would not participate in any coercive actions while on campus. This declaration was challenged by students and deemed illegal by the Bombay High Court.

Much before the Mandal Commission, we were recognising that getting people admission was not all that was needed. We understood that people in power needed to put more in place, but we were too naive and politically inept to carry this forward. The irrationality of merit and caste was felt, but we were not sure about how to address it further.

We were not strong enough as a student community to handle the repression when the institute shut down. The student unity was too superficial to withstand the disturbance this caused to all academic plans and schedules in the last semester of the passing-out batch.

This, however, helped me see the institute and what it stood for in clearer terms. Not one faculty, at least in my memory, came and stood in support of the students. I do not recall any discussions within the faculty to think of what they could and should do to make the programmes relevant for all students. In an institute of technology and science—disciplines that are supposed to be rational in character—no rational discourse took place. The only thing I know that the department of physics did was to physically separate the research students of theory physics, who till then sat in one room. We were all sent to rooms outside our respective guides’ cabins. Since we were seen as being active in the agitation, the room that had witnessed conversations on everything, including our work, was seen as dangerous and thus disbanded.

Talking about each other’s work, sharing of information, learning from each other, the spirit of communism that science is supposed to nurture, according to Robert K Merton, was actively discouraged.¹⁰ I do not think that our department and our institute were exceptions. Those that were unlike these would have been the exceptions. This is how physics research happened—in silos, in isolation from the world and in competition with each other—and, today, I can clearly see that it did not match the ways that I was learning to lead my life.

Living in the hostel and belonging to the minority gender taught me many lessons in life and politics. We were learning to live communally and were also learning feminism and progressive politics. The first thing we did was fight for the re-naming of the “ladies hostel” to “Students’ hostel 10,” giving up on both, the distinguishable name and the fact of being “ladies.” We changed the rules of our hostel and had many discussions in large general body meetings where we tried to arrive at consensual terms for living together. Today, as I read of the Pinjra Tod campaigns, at one level it is a *déjà vu*, giving a sense of how things do not seem to change. At another level, however, is the realisation that what remained confined to one space at the time can, today, take the shape of a voice across multiple campuses and locations.

Harassment by guides who held immense power over their students was a system that we could not dent, but many amongst us survived with support from others around. We saw

the feudal nature of this relationship too often: how it is conceived with full control of one teacher over their student, and the actual ganging up of teachers in support of each other when there was a crisis between a student and their guide. Sexual harassment of young research scholars by dashing and impressive young faculty, leaving the student confused about what part of it was consensual and what was not, was a common thing to talk about. (Another sense of *déjà vu* happens as one hears the stories of harassment by people like R K Pachauri, Tarun Tejpal, Mahmood Farooqui and many others.) I was amongst the lucky ones who did not directly face any of it, but who lived it through holding hands of friends who did.

The system involving guides and research students itself was faulty. Research in most of the science disciplines (especially where there is experimental work) is such that the student is very dependant on the guide and their research areas. This leads to immense power and control in the hands of the guide. There were no inbuilt mechanisms of checks and controls to negotiate this imbalance of power and I do not know if any have been put in place even now. As women, who were often coming from privileged class and caste backgrounds, we spoke amongst ourselves of the gendered nature of this harassment. But, I am sure there were other such groups that spoke of the casteist nature of this harassment or even the regional nature of it, to name a few. It took almost two decades for the Vishaka Guidelines on sexual harassment to come into being and we still wait for an articulation of what may be covered under the "Rohith Act."

I guess we survived by becoming tough. Maybe that was the true training of science and engineering. There was no space for femininity and we adapted our genders in ways that allowed us to survive this masculine environment. The male students had references for the three genders in the world—male, female, and the *IT* female (also known as "nonmale" in later years; Joseph 2005). After we passed from this prestigious institute, we also realised that jobs were not easy to come by. Companies refused point-blank to take women on board, often with the lame excuse that they did not have a women's toilet!

That all of these should have been matters of concern for those in charge of the institute was not even considered. It is the presence of the critical mass within and the powerful voice of feminisms outside that is now allowing us to ask for changes in institutional mechanisms. At the time, we battled with it all on a case-to-case basis and without any support systems, other than our own. As I look back, I think of the many who may not have felt the confidence to be part of the friendship networks and the camaraderie. We survived. Many other students did not. Student suicides of those from marginalised castes was a reality even then.¹¹

Demands of Monogamy and a Separation

My personal negotiation of my doctoral research was on an even keel. I had a decent guide and no major hiccups. But, as the PhD ended and the world outside demanded plans, the conflict within me became intense. Research in condensed

matter theory meant a lot of algebra and computation. While it was fun to do those lengthy calculations, their connections to the world of physics, and the connection of physics to the real world as I saw it around me, became more and more elusive. I rued it as a problem with degree-oriented research and hoped that it would get better.

After the thesis was submitted, I got a chance to go for a summer school for three months. It was an international institute for "third world scientists." For the first time, I was surrounded by theoretical physicists from different parts of the world. The reality of the rat race of publishing, the "you scratch my back and I scratch yours" arrangement, and the sexism, which was not as evident in India because of my class and caste privilege, showed that the global world of physics was not very different from what I had seen back home.

It was disillusionment at one level and a reality check at another. I also met some people who were truly devoted to the subject and excellent at it. I realised that I was not that enamoured by this physics after all. If this was to be my career choice, then it required a monogamous, dedicated relationship from me, which I was not ready to offer. I was not ready to give it my all because I wanted to be an active part of a process of change in the world. In the final analysis, the balance sheet of my life with only a career in physics research was not exciting enough. And, most importantly, the research that I was doing did not seem to have anything to do with the world around me.

And so, I chose to not continue in research. This was the second rupture in my relationship with physics. For years, I struggled trying to explain this act of mine. This articulation seems to be the closest to having been able to talk about it. I have no idea what would have happened if I had taken another path, and I do not think about it too much because this was a conscious choice. I did not ever want to sever my connection to physics completely because, apart from the fact that I liked it, it was all that I had been trained in after all those years. So, I chose to teach. Wanting to completely give up on physics research, I decided to not even apply to a state university and teach postgraduate courses. I decided to take up what many women in science are forced to take up in Mumbai, a teaching job in a regular college.

I digress here to make a point about this phenomenon. Call it the two-body problem of Mumbai. A commercial city, Mumbai, and has no claims to match the academic standards of Delhi, Kolkata or Hyderabad. But, it has premier institutions for research in the sciences as well as an *IT*. (Just goes to show the kinds of islands scientists have made for themselves, such that they are not even noted as contributing to the academic potential of this city.) But, my point is not about this. Since many of these institutes follow the policy of not giving jobs to two persons in science married to each other, when one of them joins any of these institutes, the other joins a college.¹² And, there are no prizes for guessing the genders of the two people. As a result, Mumbai colleges have gained some "good" teachers. I, too, for reasons different from theirs, chose the same path.

With great difficulty, after a few months of teaching in a junior college in 1986, I did get a job in a degree college; a temporary appointment with a renewal every year. After the third year, the renewal did not happen. I fought a case for three years to be reinstated with all the back wages and a permanent job. Before I go into the formal relationship with physics that I developed after this, I must speak of a life in science outside of the narrow domains of the discipline and formal education that I was simultaneously inhabiting. This was a part of the new acquaintance with science itself.

Renewed Acquaintance and a New Beginning

My involvement with the People's Science Movement in Bombay in the early 1980s, with the unique Hoshangabad Science Teaching Programme in the middle schools of Madhya Pradesh in the late 1980s, and while writing a companion book for the television series *Bharat ki Chaap* on the history of science and technology in India in the early 1990s, raised concerns. Who has access to science, what are the ways in which this can be increased, how does one speak of a people's science? From there grew an interest in the history of science as seen from a context.

These questions got further complicated with other questions about science and technology. Some arose from the Bhopal gas tragedy, where the collusion of capital and state power led to the denial of even basic immediate relief to those who suffered exposure to the gas. The blatant denial of justice continues till today. The late 1980s also saw the Narmada

Bachao Andolan, which questioned mainstream development and through it the whole paradigm of progress and modernism that Western science and technology propagated, which had informed the Nehruvian model of growth for India in my childhood.

Alongside were the struggles of the women's health movements which raised similar questions from the point of view of hazardous contraceptives tested and tried on women's bodies through family planning programmes. Here was the triad of international pharmaceutical companies, eugenic population control programmes acting across and within national boundaries, and the patriarchal control over women's bodies, all being assisted by the understanding of modern science.

Engagements with all these made me understand science in ways that no training in science had even attempted to do. No description and understanding came easy. Finding one's way through the false dichotomy between science and technology, the politically manipulated language of the use and misuse of science or of good and bad science, and the easy slippage between the purity of Indian and native knowledge and the evil character of the Western and modern has been a journey of sorts, made sometimes with a few others, but often in isolation.

Feminist engagements with different disciplines, and the need to take this lens to science, united a few people in their search for a feminist critique of science. A few books found in some hidden rack of the IIT library, which one could still access on an alumni library card, a few books procured from the

**New in EPWRF India Time Series
Module on Educational Statistics**



- Features**
- Presents all-India and state-wise annual data from 1981 onwards.**
 - Structured in three sections :**
 - Literacy in India
 - School Education
 - Higher Education
 - Includes data on SC/ST students and school education in rural areas.**

The EPWRF ITS has 16 modules covering a range of macro-economic, financial and social sector indicators on the Indian economy

For more details visit www.epwrfits.in

new and growing women's studies centres, others procured from friends—and we began a conversation in fits and starts. As this critique grew robust and substantial, I started seeing my subject, physics, as any other discipline with a sociopolitical context to it, rather than the exclusive, neutral discipline it claimed to be. By the time I went back to college, I had made fresh acquaintance with science itself and, in turn, with physics too.

Nurturing Relationship

The final sheen to this new relationship came from teaching physics to undergraduate students. The joy of seeing the fun that physics could inspire in first-time learners; the “aha” moments that came to me as I taught it and thought about it; the ways in which I learnt the subject to be able to teach it to students who had often come to it not through a love for science, but just as another graduate degree; and then that occasional set of students who wanted to do more than the necessary and pushed themselves and me as well. Teaching physics kept me connected to the awe of human explanation of worlds far beyond the realm of the everyday. My politics and critical eye kept me grounded to the sociopolitical complexity of human explanations.

Thus, we, physics and I, came to a kind of restful balance. We both knew the other's limitations and possibilities, which is the stuff of which mature relationships are made. And, this (should I say thermodynamic) stability led me to take physics with me to all my explorations. It pushed me to take science to feminism and thus came about the “Feminist Science Studies” course for women's studies students, devised with sociologist Gita Chadha. It also pushed me to bring this feminism to my science education class because, in my new understanding of science, studies of science had to be an integral part of science and, hence, science education.

As I wrote elsewhere,

Breaking down the objective, detached, neutral method into its real practised self is what makes for a feminist science education. ... This shift will benefit not only all the women who are already in science and those many others who aspire to be there, but also the very cause of science education itself, as it holds the promise of a more relevant and much needed education for all. This will result in a more informed public that benefits from understanding the nuances and complexities of science, and a more sensitised scientific community that takes this discipline to newer depths while recognising the limits and possibilities of partial visions instead of supposedly enlightened certainties. (Shah 2012)

It is my firm belief that teaching this understanding can make a huge difference, particularly to those who are not able to find their space within this world. The language of merit and superior intellect of those doing science, which otherwise dominates the landscape today, does damage to the self perception of those who are not present in mainstream science—persons from marginalised genders, castes, races, regions, those with disabilities, and many others. It strengthens the existing man-made hierarchies of society in the name of being objective.

But, more importantly, the potential of bringing other contexts to the knowledges that science creates will enrich science. It will truly help build a better relationship with its object of study, that is, nature. Who does science and why, has an

impact on many things: the nature of questions asked, the ways in which answers are sought, and the ways in which the knowledges gained are disseminated and made a part of common sense. These questions shall enrich science, the scientific community and also its place in society.

And Life Goes On ...

To sum up my story, my caste and class locations were not right for this pursuit of knowledge, but neither were they marginal. My childhood was spent in the postcolonial period when the nation was being imagined. Small transgressions within dominant caste locations were part of this imagination and aspiration. Our gender was more of an outlier, but privileged by our caste and class positions; many like me learnt to survive.

We struggled hard with our gender locations to be allowed into this enterprise of science. In spite of our outsider location, our privileges of caste and class made it easier for us to be there. And, these made us accept the narrative that good science merely required brilliance and genius, dedication and hard work. We did not see the Brahminical, masculinist, upper-class character of these attributes and the emphasis on objective merit that this “naturally” demanded. We too were enamoured by our passion for science.

In the initial refusal on my part to accede to such a single-minded, full-hearted, monogamous devotion that research in science demanded, I think I set off on a path that transformed my love for physics. I learnt to see it in its full form as a human endeavour. Its questions, methods, and theories, all acquired a location and dimension in the lived reality of the world. This realisation brought back the heart into physics, but took away the capacity to expertly play with the nuts and bolts. Maybe, changing the terms of the relationship and my insistence on keeping all my loves going led to this little queering of the pitch that adds fun and zest to what could have otherwise been a staid story of a woman scientist!

Although the question—Am I a person in science?—that I asked at the start of this narrative bothers me even today, I think I have made peace with it. This peace was made possible because of the various other borderlands that I have inhabited. I never gave up a claim to the centres of society but almost never gained complete access to them. I never got entirely pushed out because of the constant proximity to the centre that came with the privileges of birth. As I said earlier, I am within but never quite a fit—in science too.

Postscript

Since this is meant to be a conversation between two of us who are physicists, here are a few thoughts as I read the other narrative in the pair, that of Sumathi. We have been classmates and we have been in touch off and on over all these many years. The similarity of our backgrounds is evident in our writing and yet there are so many differences, some of which we have never managed to speak about. I feel that I completely understand what she speaks as a woman in science. It is quite interesting to note that even though I left formal science research fairly soon, our narrations resonate with each other. However, brief my encounter with that world, I understand the

nuances of where the natural sciences research institutes differ from those of the social sciences. I appreciate the efforts made by those within these institutes, to learn from their experiences and make space for women in science.

But, one of the things that is different for us is the ease or unease with which we inhabit the world of science. For me, the point of not being seen as a “person in science” by those who can lay claim to the label “scientist,” has taken a while to come to terms with. That is why, perhaps, I have never had a dialogue on “Women and Science” or “Feminist Science Studies” or even on “Women in Science” with Sumathi or others like her. The Women in Physics initiative cannot see how people like me can contribute to improving the lot of women in physics. I am not enough of a woman in physics and hence my critique is seen as an outsider critique of physics/science. At the same time, feminist science studies is so sidelined within the humanities and the social sciences that it has not felt robust

enough to talk to the natural scientists. The gap just goes on increasing and our paths that start with such similarity soon become skewed.

I was forced to undertake this interrogation of science because of where I was, which those who continued to stay in did not need to, possibly because they were right in the middle of it all “running to stay in place,” as Sumathi aptly says in the voice of the Red Queen. It is these dialogues around science, and its training and education, that are needed between those within the “scientists’ world” and those outside. This is urgent because just merely drawing in women or any of the others from the margins of society, who have also been excluded from this enterprise for so long, does not make them succeed and stay or contribute to a different science. Something fundamental has to shift about how we understand and teach and talk about science for that to happen. And, I do hope that this is the beginning of such a conversation and that it will grow.

NOTES

- 1 Most pure and applied science research outside of the university structure happens in these state-supported institutes.
- 2 Queer is as much a descriptor of marginalised gender and sexual identities, as it is the politics of challenging the structures that maintain heteronormativity. It is used as an adjective for people, relationships and politics, and as a verb with an attempt to analyse and reconstitute normatives. In this article, I use it in both these senses.
- 3 For my parents, the dilemma in “good students” opting for pure sciences over professional education was partly because the former meant becoming a professor in a college or university, which was and continues to be less lucrative than being an engineer or a doctor.
- 4 Out of these few women, the number of women in the undergraduate engineering programme was minuscule. The intake of female undergraduate students in the IIT still fluctuates between 8% and 10%, forcing the government to consider reservations for women students (Pandey 2017).
- 5 I had the misfortune of reading a book edited by Urmila Deshpande and Bakul Desai, *Madhouse: True Stories of the Inmates of Hostel 4* (2010). It confirmed every bit of misogyny that existed in that campus, which is recounted unimaginatively and without an iota of reflection even two or three decades later.
- 6 As a science and technology institute, the emphasis is on a certain kind of mathematical logic and ability. Merit is measured mainly in terms of the ability to deal with mathematics, and all other faculties and abilities of individuals are undermined as not “meritorious” or at least not relevant to engineering education.
- 7 I borrow this phrase from those in science education who are making a case for teaching not only ready-made science, but also “science in the making.” See Shah (2012).
- 8 One of the first times that I realised this was while reading Evelyn Fox Keller’s essay, “The Anomaly of a Woman in Physics,” and Evelyn Hammond’s interview with Aimee Sands “Never Meant to Survive: A Black Woman’s Journey.” As the editors write in the introduction, “Both articles describe the alienation and self-doubt engendered by being part of an extreme minority. Both Keller and Hammonds doubted their own abilities before questioning the

- culture of science that worked against their survival” (2001: 7).
- 9 An official version of the strike can be found in Manchanda (2009: 136–39).
- 10 As one of the first sociologists of science, Merton (1973) wrote: “Four sets of institutional imperatives—universalism, communism, disinterestedness, organised scepticism—are taken to comprise the ethos of modern science”.
- 11 The year 2016 began with yet another caste atrocity in a central university campus in Hyderabad, and everyone was forced to acknowledge the harsh reality of students from the marginalised castes in these so-called premier institutions. This violence is not new and its presence is more rampant than what any of these institutes have ever recognised, as a list collated in 2011 suggests. This was compiled after another such suicide of a Dalit student in IIT Bombay. See <https://thedeathofmeritinindia.wordpress.com/2011/04/25/list-of-dalit-students-committing-suicide-in-last-four-years-in-indias-premier-institutions/>.
- 12 In recent times, probably inspired by the feminist movements around them, women in science research have campaigned within their research institutes to change some of these policies. Some of the spousal hiring policies have changed. However, it remains to be seen if the phenomenon of one of the spouses being in research and the other taking a teaching position in a college or a university changes or not. There have been other demands related to flexitime for both women and men to be able to meet with other caregiving responsibilities.

REFERENCES

Deshpande, Urmila and Bakul Desai (eds) (2010): *Madhouse: True Stories of the Inmates of Hostel 4, IIT-B*, Delhi: Westland.

Joseph, Anjali (2005): “Women at IIT an Endangered Species,” *Times of India*, 30 December, <http://timesofindia.indiatimes.com/india/Women-at-IIT-an-endangered-species/article-show/1351736.cms>.

Keller, Evelyn Fox (2001): “The Anomaly of a Woman in Physics,” *Women, Science, and Technology*, Weir Mary et al (eds), 1977, New York: Routledge.

Manchanda, Rohit (2009): *Monastery, Sanctuary, Laboratory: 50 Years of IIT Bombay*, New Delhi: Laxmi Publications.

Merton, R K (1973): “The Normative Structure of Science,” *The Sociology of Science: Theoretical and Experimental Investigations 1942*, Chicago: University of Chicago Press.

Pandey, Neelam (2017): “Reservation for Female Students in IITs Could Soon be a Reality,” *Hindustan Times*, 16 January, <http://www.hindustantimes.com/education/reservations-for-female-students-in-iits-could-soon-be-a-reality/story-FxBUmOE3AMbedw3xW51wBL.html>.

Sands, Aimee (2001): “Never Meant to Survive, a Black Woman’s Journey: An Interview with Evelyn Hammonds,” *Women, Science and Technology*, Weir Mary et al (eds), 1977, New York: Routledge.

Shah, C (2012): “From Numbers to Structures: Navigating the Complex Terrain of Science, Education, and Feminism,” *Contemporary Education Dialogue*, Vol 9, No 2, pp 145–71.

Wyer, Mary et al (eds) (2001): “Introduction,” *Women, Science, and Technology*, 1977, New York: Routledge.

Licensing by EPW

EPW has licensed its material for non-exclusive use to only the following content aggregators—
 Contify, Factiva and Jstor.
 Contify currently disseminates EPW content to LexisNexis, Thomson Reuters, Securities.com, Gale Cengage, Acquiremedia and News Bank.
 Factiva and Jstor have EPW content on their databases for their registered users.
 EPW does not have licensing arrangements with any other aggregators.
 EPW requests readers to let it know if they see material on any unlicensed aggregator.
 EPW needs the support of its readers to remain financially viable.