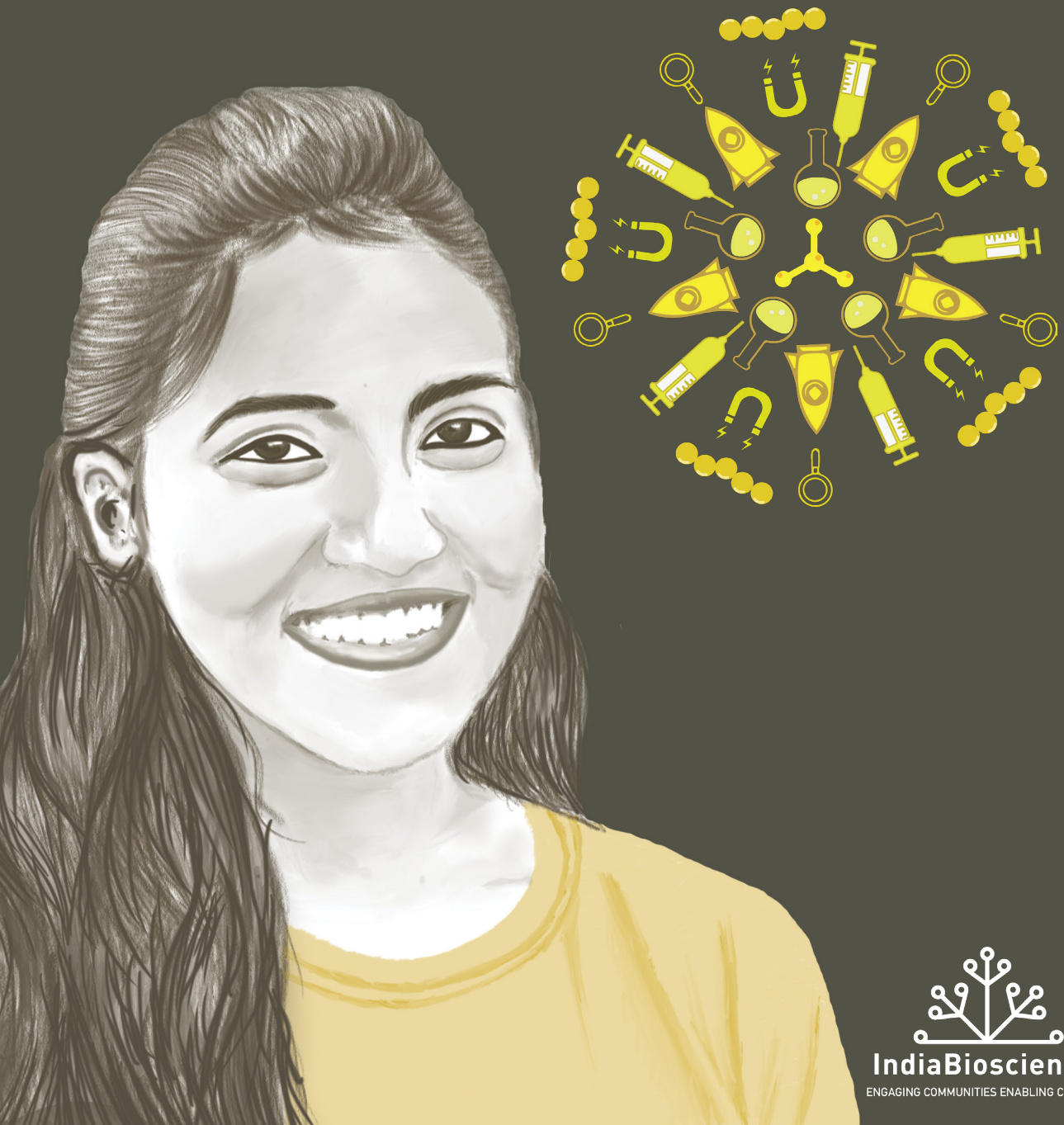
SPOORTHI

Celebrating Indian Women in Science

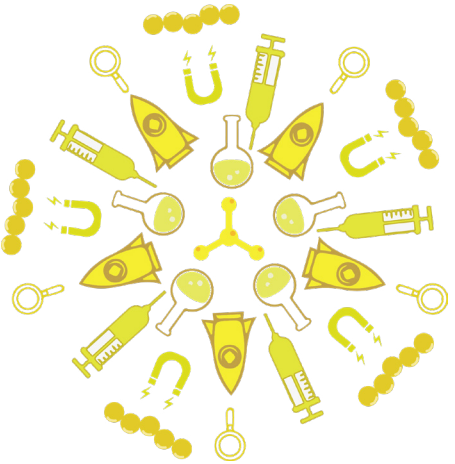


IndiaBioscience
ENGAGING COMMUNITIES ENABLING CHANGE

Cover Page Concept

'Spoorthi' means inspiration, enthusiasm or spark. Featured on the cover is a young woman who has embarked upon her scientific journey. The mandala composed of icons inspired by science and arranged to emulate a sparkle represents her enormous potential and the multiplicity of paths available to her.

(Model for cover image - Sudeshna Saha, Junior Research Fellow, NCBS)



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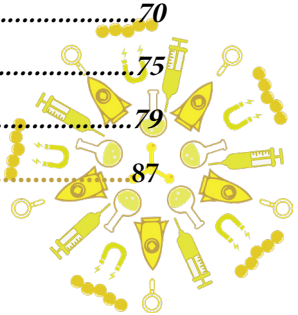


FOREWORD

This booklet discusses a spectrum of issues faced by our women colleagues in scientific institutions. I believe that this will be a valuable resource against gender-specific biases facing us on an almost daily basis. I congratulate IndiaBioscience in conceiving and compiling the collection and consider it my privilege to write this foreword.

As I write these words, I recall an incident from my days in school. I was a fairly mediocre student, and one particular year a girl in the class stood first. She was a good friend, and I, therefore, went around telling everybody how happy I was to see her do well. Much to my surprise, I was chided by friends and elders. How could I languish behind when a girl stands first in class? To make matters worse, I was actually appearing to be happy about this. At that age, I did not quite understand why nobody ever had a problem with the other boys standing first. This kept me disturbed for several months and was perhaps my first encounter with gender bias. I bring this up here to make the point that gender-related discrimination starts much before women or men become scientists. Therefore, in addition to the workplaces across our country, a mindset change is essential when parents guide their children. The values imbibed in those early years will stay forever.

A vibrant and successful scientific enterprise requires equal and enthusiastic participation across genders. It is our duty to facilitate such participation, and speak up when we perceive partiality. This is already happening, because I now see a willingness to discuss gender-specific issues across fora. I hope for a future where women express themselves freely and fearlessly, and society supports them in doing so. This will not come easy, but then, aren't good things worth fighting for?

Roop Mallik
Professor, Tata Institute of Fundamental Research
Member of Board of Advisors, IndiaBioscience

Conversations

The women who have contributed to the following sections come from diverse backgrounds and have each forged their individual paths in science. We asked them a few questions about their journey.

Bushra Ateeq,

Molecular oncologist, Indian Institute of Technology (IIT) Kanpur

Bushra Ateeq is an Associate Professor and Intermediate Fellow of the Wellcome Trust/DBT India Alliance at the Indian Institute of Technology Kanpur. Her research interest revolves around identification of the genetic alterations that initiate cancer, and understanding the molecular events that drive cancer progression.

Devapriya Chattopadhyay,

Paleobiologist, Indian Institute of Science Education and Research (IISER) Kolkata

Devapriya Chattopadhyay is an Associate Professor at the Department of Earth Sciences, Indian Institute of Science Education and Research (IISER), Kolkata. She is a a paleobiologist broadly interested in the evolution of molluscs and the factors that guide their evolutionary trajectory.

Dhanashree Paranjpe,

Ecologist, Abasaheb Garware College, Pune

Dhanashree Paranjpe is a Ramalingaswamy fellow and lecturer at the Department of Biodiversity, Abasaheb Garware College, Pune. Her current research focuses on human-wildlife interactions, in particular focusing on the impact of human vicinity on Indian Peafowl populations across India.

Farah Ishtiaq,

Ecologist, Indian Institute of Science, Bengaluru

Farah Ishtiaq is a Wellcome Trust/DBT India Alliance Intermediate Fellow at the Center for Ecological Sciences, Indian Institute of Science. Her research encompasses many aspects of biology including conservation genetics, ecology, evolution ecology and host-parasite interactions in vector-borne diseases.

Jugnu Jain,

Entrepreneur, Sapien Biosciences, Hyderabad

Jugnu Jain is the co-founder and CEO of Sapien Biosciences, a company engaged in biobanking and personalized medicine. A molecular geneticist and cell biologist by training, she returned to India after 26 years of professional experience in both industry and academia in the US and UK to begin her own independent venture into bio-entrepreneurship.

Lipika Sahoo,

Intellectual Property Professional, Lifeintelect consultancy Pvt Ltd , Bengaluru

Lipika Sahoo is the Founder & CEO of Lifeintelect Consultancy Pvt. Ltd and has 18 years of experience in academia and industry in the areas of technology, innovation & intellectual property. She holds a PhD from Indian Institute of Science (IISc) and is passionate about technology & innovation, helping scientists and business owners protect their ideas by enabling generation of valuable intellectual property, be it an invention, a design, a product, an idea or business process.

Meenakshi Munshi,

Scientist 'G'/Adviser, Department of Biotechnology, Govt. of India, New Delhi

Meenakshi Munshi is Scientist 'G'/Adviser at the Department of Biotechnology (DBT), Government of India. She has served as the Director of DBT, the Nodal officer for Institute of Life Sciences (Bhubaneshwar) and Nodal officer for IndoTunisia Joint Programme for Cooperation. She was a recipient of the prestigious Fullbright fellowship.

P Hemalatha Reddy,

Educator, Sri Venketeswara College, New Delhi

P Hemalatha Reddy is the Principal of Sri Venkateswara College, New Delhi. Alongside, she has been involved in promoting quality and excellence in higher education by being part of various high profile committees in Delhi University. She has also been a peer team member in NAAC and a DBT task force member for Star Projects.

Sarah Iqbal,

Public engagement officer, Wellcome Trust/DBT India Alliance, New Delhi

Sarah Iqbal is a scientist turned public engagement practitioner in India. She holds a PhD in Biochemistry from the University of Oxford, UK, and was a Postdoctoral research Fellow at the Scripps Research Institute, USA. Sarah now works at the Indian science funding agency, the Wellcome Trust/DBT India Alliance, where she manages their science and society programs and science communication and leadership training initiatives.

Savita Ayyar

Research Management Consultant, Jaquaranda Tree, Bengaluru

Savita Ayyar is a Research Management professional with over ten years of experience in diverse areas of the field and is the Founder of Jaquaranda Tree, an independent consultancy service. Trained as a biochemist, developmental biologist and neurobiologist, she gained experience in grants management during stints at Wellcome Trust, London and Research Development Office (RDO), NCBS, Bangalore.

Smitha Hegde,

Educator, NITTE University Centre for Science Education and Research, Bengaluru

Smitha Hegde is a Professor at the NITTE University Centre for Science Education and Research. She has been teaching undergraduate students of biology for over 16 years, while her research interests lie in the field of plant molecular biology.

Sonam Mehrotra,

Cancer biologist, ACTREC, Mumbai

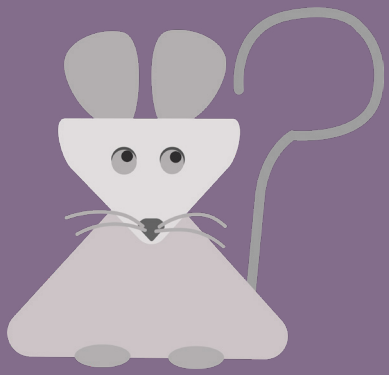
Sonam Mehrotra is a Wellcome Trust/DBT India Alliance Intermediate Fellow at Tata Memorial Centre - ACTREC, Mumbai. Her research focuses on investigating the role of a novel cancer associated gene named BRCA2 and CDKN1A Interacting Protein (BCCIP) in prevention of replicative stress.

Suhita Nadkarni,

Neurobiologist, Indian Institute of Science Education and Research (IISER) Pune

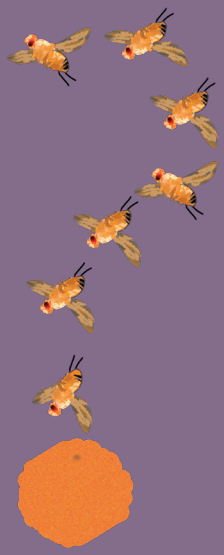
Suhita Nadkarni is an Associate Professor at the Indian Institute of Science Education and Research, Pune. Her research interests lie in understanding the molecular pathways involved in synaptic transmission in normal function and pathological states, by using detailed biophysical computational models.

Arabidopsis thaliana

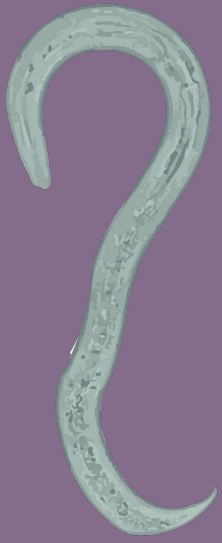


Mus musculus

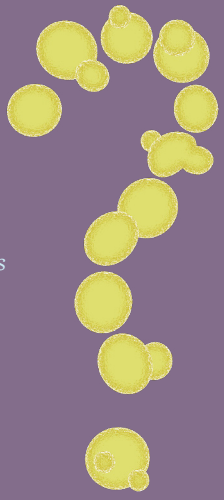
The question marks used in this section were crafted to represent popular model organisms used in life science research.



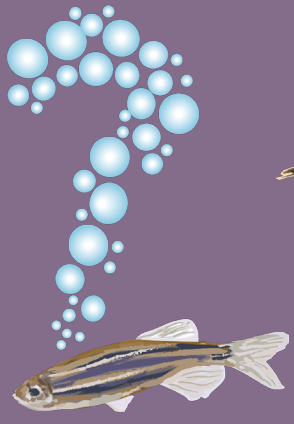
Drosophila melanogaster



Caenorhabditis elegans



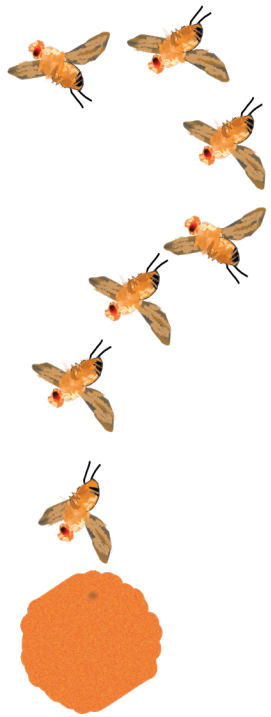
Saccharomyces cerevisiae



Danio rerio

Taeniopygia guttata

What has helped you the most in reaching where you are today?



Suhita Nadkarni,
Neurobiologist, IISER Pune

A family that made it possible to realize my interest and provided the framework and a support system to pursue it. A partner who is an equal parent and an equal householder.

Devapriya Chattopadhyay,
Paleobiologist, IISER Kolkata

It is a combination of my attitude and the environment I grew up. Being an independent person from a very early age helped me a lot to withstand the failures that came in my way and build my confidence. Growing up in a household with two working parents who were in academia instilled the love for knowledge from early on. Teachers and peers helped me to shape my subject interest all the way till PhD. Now it's my students who challenge me everyday and keep me on my toes.

Smitha Hegde,
Educator, NITTE University Centre for Science Education and Research

Support from my mother during the crucial years of childbearing and rearing two children. Those 10 years were hard but were made bearable by the constant support of my family. My father instilled the "anything is possible" attitude, but my mother was the main source of support, she drove me to completion and took upon herself the role of "Mothering" my children in my absence. She was always there, not only for me but also for my children.

Sarah Iqbal,
Public engagement officer, Wellcome Trust/DBT India Alliance

I was always confident that my training as a scientist and the skill set I have acquired will come handy, no matter which career I ended up choosing. This, along with the fact that I have always been unabashed about leaving active research, probably helped me look for opportunities that truly interested me. In addition to these, my parents' unwavering support for whatever I have chosen to do has been invaluable.

Jugnu Jain,
Entrepreneur, Sapien Biosciences

Persistence and belief that I can do it if I set my mind to it, focusing on the positive, working hard, and doing the right thing – this attitude has helped me a lot. I have had many difficult situations where I have had to reach deep inside me to get strength. I learned by practice to remain calm, organize my thoughts, and not despair. When a problem seems overwhelming, I try to break it down into pieces that I can tackle bit by bit. I learned that I can train the mind like other muscles. I keep a 'diary of happiness' where I write down 3 things every night that made me happy that day. It helps put things in perspective and reinforces gratitude for all that is right, especially on days when a lot seems not right. It helps that what I have set out to create is much larger than myself, for a good cause, and needed in India. So I remind myself that the troubles along the way are smaller than the vision and should not be allowed to stand in the way. I have support from my co-founder, friends and family to let off steam and get advice when the going gets tough.

P Hemalatha Reddy,
Educator, Sri Venketeswara College

I have always had a great passion for science right from my early years. Determination and hard work along with perseverance allowed me to follow the path of my heart. It was difficult at each step, right from choosing my course at masters level to pursuing PhD after marriage, and starting to work as a first-generation working woman. But my passion drove me to explore research in order to placate my quest to learn more. There has been no turning back from there.

Sonam Mehrotra,
Cancer biologist, ACTREC

My training during graduate school and postdoctoral studies in the U.S. has immensely helped me in my career. In addition to research, my experience with grant writing, thinking analytically and most importantly the art of asking questions has benefited me the most.

Bushra Ateeq,
Molecular oncologist, IIT Kanpur

I think the right attitude, grit and resilience are the three important attributes that helped me going no matter what happened, and I owe it to my mother for instilling these qualities in me. She put herself as a powerful role model, her determination and strong faith encouraged me to follow my dreams no matter what obstacles came my way. She always stood by me, and had confidence in my capabilities even when I doubted myself. Interestingly, after my graduation my first choice was to join the Air Force, which was unexpected coming from an academician's family. Despite the unusual choice she not only supported my decision but accompanied me to the Air Force Selection Board at Varanasi. However, that was not to happen, and later she supported me whole heartedly with the same zeal throughout my PhD and a long drawn Postdoctoral tenure.

Dhanashree Paranjpe,
Ecologist, Abasaheb Garware College

There are several factors which "conspired" to drive me where I am today. The path has been full of twists and detours, gaping holes and bumps so my academic journey seems more like an adventure park ride than a smooth running track. I think my journey has been decided more by interesting questions than by comfort with particular study system. A lot of hard work, self-learning, patience, grit, never-say-die attitude has helped along the way.

The Leaky Pipeline: A Social Scientist's Perspective

Anitha Kurup

When we look at the representation of women in STEM disciplines, India has a very different picture when compared to the west. Our leaky pipeline does not arise because of low enrolment of students in STEM disciplines at the undergraduate or even postgraduate level. Over the decades, representation has been growing across the science streams at the undergraduate level, leading to nearly equal gender ratios in many streams. The data indicates that at the postgraduate level in 2018, there is over 50% representation of women, while nearly 35% of those doing doctoral research are women.

Therefore, it is clear that the main issue is not the participation of women in science streams at the higher education level. Our issue is that after PhD, where are these women going? And I think that is the fundamental question we should be asking. While we are vigilant that the supply end is steady and growing and that the enrolment rates doesn't drop, we need to shift our attention and concentrate on what happens at the other end, when these women graduate.

Here, our understanding is hindered by the fact that we do not have data in the public domain regarding the number of people who complete their doctorate. This data will be extremely useful if made available by gender and discipline, to understand the trends and shifting patterns over the years. Currently, since uploading the thesis on Shodhganga is mandatory, making this data available is relatively easy. Preliminary analysis of the data can be done at the national level and made available in the public domain. Similar databases from the US and European countries are a case in point.

On the formation of workspaces

The institutions for higher education in our country can very broadly be classified into four kinds – 1) Universities, 2) Institutes of national importance, 3) Research labs, and 4) Mission mode institutes, like ISRO, DRDO etc. Amongst these four kinds of institutions, the quantum of research that is visible has, for the large part, been produced by Institutes of national importance. And it is in these institutions that we have the least number of women. So, it is very important to understand the sociology of how workspaces get constructed.

"WHEREVER A POSITION CARRIES HIGHER STATUS AND GREATER ECONOMIC RETURNS, IT HAS PREDOMINANTLY BEEN MEN WHO HAVE FILLED THESE POSITIONS."

Wherever a position carries higher status and greater economic returns, it has predominantly been men who have filled these positions. This is because they have had a historical advantage and have gained entry well before women. For women, at that time, there wasn't an adequate supply chain, and as a result their entry was delayed. So, once men occupied these positions and stayed there for decades, the rules of the game of these workspaces became tailored to be suitable for men – men who had the privilege of having women as homemakers. Once these rules were established, over decades they got entrenched and when women started entering these spaces, they faced resistance at the level of the entry itself. Some women have forged their way in nevertheless, but the numbers are very, very small, and the resistance persists across all levels: not just during entry, but also at the time of career progression.

Need for evidence-based research

What would be very useful to understand the career trajectories of these women is a systematic longitudinal study, for which Institutes should record and allow access to their data. The moment you put the data together, it becomes stark clear that there is problem. For example, we can look at an institution like the Indian Institute of Science, and ask what was the percentage of women entering the institute when it was first established. After this, if we look at the progression over decades, and if we find that it has not changed substantially, we can state confidently that there is a problem, since the reason for the skewed ratio cannot be that the supply chain of

women has not increased for the last hundred years.

This has been one of the larger questions, and I think somewhere we have lost sight of the real problem. Until now, the underrepresentation of women has been captured partially by using frameworks that put the onus of the problem on the women. We are told that women make a personal choice of leaving science research, or that there are societal and family factors responsible for their underrepresentation. While I will not discount that these are important factors, I do not believe that these are the only reasons why more women are not out there occupying higher positions. And this is borne out by the study that I did with the Indian Academy of Sciences, where we asked women why they are no longer doing research. Over 60% of the responding women said that the main reason is that they did not get an opportunity. Based on intuition, perception and the limited framework that we were willing to see, it was always stated, "Women are not there in research because they do not want to be there". It was large-scale data that helped us counter this viewpoint.

Most comments made about the status of women in science at meetings and conferences are put forward on the basis of anecdotal personal information and this may not reflect the larger truth in many cases. I have done a survey of over 681 women across the country, and I think evidence-based research becomes extremely important to understand the problem in its totality.

"Over 60% of the responding women said that the main reason they are no longer doing research is that they did not get an opportunity."

Changing workspaces, changing stories

It is important to understand that the social or societal context of these frameworks, as well as the organizational spaces, are constantly interacting and changing. Negotiations are taking place at all of these institutions and resistance is being challenged. Hence, changes are bound to happen and consequently the number of women will increase. In the pursuit of increasing the number of women in these institutions, it is important to document and highlight the positive experiences of women scientists who are part of these establishments. This will provide the needed impetus for women considering

their entry into science and technology institutions. Documenting and analyzing the data of these successful women who are invisible is critical. We need to speak to these women and men who are championed these changes to make them possible. We need to capture these success stories in order to say that there is evidence of people being able to make it up there.

As a researcher who has been studying this issue over a decade, I see that the ways in which biases operate, both conscious and unconscious, keep changing. And it is important to recognize these changing forms and to address them. This means that we will have to be constantly in touch with women entering and progressing in these scientific workspaces, because the challenges they face today will not be the same challenges that they face a decade later. To capture this dynamic process is a very important part of understanding women in science. If we don't recognize the ways in which the trends operate, we will end up addressing questions that no longer exist or are irrelevant.

"Unless we take a multidisciplinary approach to understanding the issue of gender in science, we will not understand it in its entirety."

Not just a scientist's problem

It is very important, both at the national level and at the policy level, for the government to recognize that the problem of women in science cannot be studied by scientists alone. They do not have the training and they do not have the necessary perspectives that can help them recognize and understand the complex sociology of academic workspaces. While all of them are good at doing their science, I think it takes a different disciplinary approach to understand groups of women or to understand organizations and institutions. This is a social phenomenon which has a political and an economic context and unless we take a multidisciplinary approach to understanding the issue, we will not understand it in its entirety.

This calls for a different form of expertise and therefore including social scientists into understanding this problem is extremely critical. Scientists and social scientists need to conceive the problem together and set clear research objectives in order to make sure that the concerns of women in STEM are taken into consideration, but are set into a context that will allow us to understand how these organizations and

groups operate.

More importantly, I think it is important to include men in these discussions. You need perspectives from both science and social science to understand how have they navigated these spaces. It is important to locate your allies in different spaces and make them part of this larger journey of trying to redefine gender equality in workspaces, so that they're able to harness capacities of both men and women, who bring in their own strengths into furthering the cause of science and contributing to the national development. We also need to realize that gender identity is not defined by sex alone.

Right now, as a part of a study that we are running at NIAS, we are generating a lot of qualitative data, but it is not sufficient. One institution alone cannot study this diverse country. We should be launching national studies to collect data from across the country, and use this data to put forth a national report of women in science.

On policies and interventions

> "I THINK WOMEN ARE SO INNOVATIVE, THAT THEY OFTEN CREATE THEIR OWN SYSTEMS TO WORK THROUGH ISSUES AND STRIKE A WORK-LIFE BALANCE."

I think India is fairly good at putting a policy in place. But when we are looking at interventions, policy direction should have an institutional focus which requires a strong and able leadership to put changes in place. For every intervention that we make to promote and retain women in science, we will have outcomes that are positive and negative. We cannot allow the negative incidences to withdraw resources that could give women a way to move forward. Science institutions do not operate in isolation, they are part of a larger society. So, one of the things that have come up in discussions is whether we can have gender neutral interventions that will allow both men and women to redefine or reallocate their resources and responsibilities both at the workplace and at the home front.

At the same time, any policy that is put out needs to be reviewed and evidence needs to be gathered in terms of how it is getting used. This is very important and cannot be decided on the basis of just a few people's experience. We should be taking into consideration the experience of a large number of women scientists and carefully

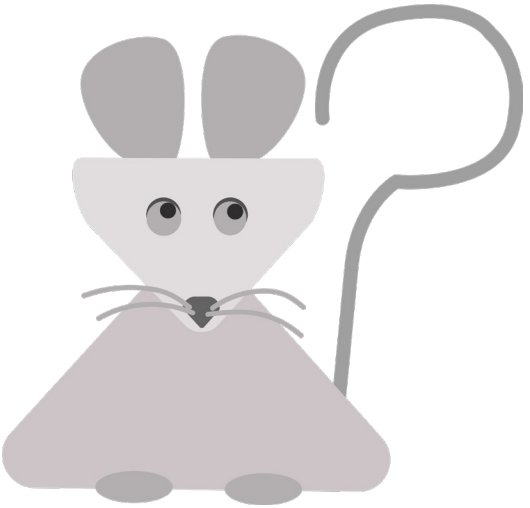
assess how many have benefitted from a policy versus the probability of misuse of the same.

I strongly contend that while coming up with interventions, representation should be redefined to have women at leadership positions right from the board level to directorships and deanships. This is just as important as increasing representation from the bottom-up approach. This is something we cannot approach sequentially; we have to increase representation at all levels simultaneously, since this is what will change the climate of the organization.

There has been very little study on women in leadership. I know a large number of women leaders, and they have very distinct trajectories. For my next project, I want to understand these trajectories and find out if there are lessons here for others to imbibe. We don't have to follow them exactly. I think women are so innovative, that they often create our own systems to work through and strike a work-life balance. But if we have knowledge about a wide variety of women who use very different strategies to progress, that is an information base that one can use to develop their very own approach to leadership.

At some level, I think we are very sub-critical when it comes looking systematically at questions of women in STEM. We have isolated researchers in different institutions looking at this sort of data. Instead, we should push towards larger-scale initiatives to generate data, and theorize it in the Indian context.

Who are some of the female role models or mentors that you have looked up to?



Bushra Ateeq,
Molecular oncologist, IIT Kanpur

My mother is my first female role model that I always looked up to. But then at every phase of my life starting from my childhood, I was fortunate to have crossepaths with many strong, compassionate and confident women from numerous disciplines, be it my nursery class teacher, or favourite Biology teacher, University professors, first postdoctoral supervisor and so many others. Personally, I believe that one can have more than one mentor at a given point in one's career, and truthfully their gender does not matter, if at all one would only benefit from the different perspectives that they would provide. Basically, I believe it all narrows down in what context you need help or guidance.

Devapriya Chattopadhyay,
Paleobiologist, IISER Kolkata

Unfortunately, I did not have any female role models whom I wanted to follow. Instead I looked up to successful people around me and wondered why don't I see anyone of my gender. This significant absence probably inspired me to become an adventurer to define my own path and follow it without any hesitation.

Jugnu Jain,
Entrepreneur, Sapien Biosciences

I have had many role models. I was born in Jhansi – Rani Laxmibai has been a deep inspiration. I know the famous poem by Subhadra Kumari

Chauhan by heart – 'khoob ladi mardaani voh to Jhansi vaali rani thi'. She was brave and fought like a man in a war with legendary horsemanship. So I try to emulate her by being strong, and not expecting concessions just because I am a woman. I love reading biographies. Professionally, Marie Curie's was one I read as a young teenager. Her dedication to and excellence in science, fetching her 2 Nobels in 2 different areas of science, have been inspiring. It's interesting how equal the relationship between Pierre and Marie Curie was. As I embraced genetics, I read the work of Barbara McClintock who discovered 'jumping genes'. She was so good in cytogenetics that she had an intuition about her maize chromosomes and genes. On my personal front, I have many strong women in my family and friends circle. My nani, maternal grandmother, taught me that one's axis must always be determined by oneself, and not by others. One can be happy and create happiness even in unhappy circumstances.

Sarah Iqbal,
Public engagement officer, Wellcome Trust/DBT India Alliance

I always dread this question because I am unable to share only a few names. There have been many in the past and there are so many out there today who inspire me in different ways. There are women who have shown me the power of kindness and selflessness (a rare quality to find these days which is often looked down upon as a weakness), the importance of persistence and patience, standing your ground – believing in yourself, not taking yourself too seriously, and pursuing, against all odds, what you absolutely love. I know so many women who embody these qualities, their stories and practice serve as a source of unending inspiration for me. I would also like to use this opportunity to say that there is a fine line between blind reverence towards someone and being inspired by them. Let's try to stay away from the former.

Suhita Nadkarni,
Neurobiologist, IISER Pune

I have fortunately been surrounded by independent thinking women at most stages of my life and career. These women never faltered from speaking their mind and were deeply were committed to equality, practiced it and were passionate about their work. I also had the sense of the long-term happiness and fulfilment these women were enjoying through their work. That alone was inspiring. The list includes my grandmother, my mother and several of my teachers.

Lipika Sahoo,
Intellectual Property Professional,
Lifeintelect consultancy Pvt Ltd

My mother and scientists like Marie Curie, Barbara McClintock, Katherine Johnson and many more. More importantly, I am continuously inspired by every woman I meet, who with family, jobs, challenges trying to holding on to her ground and making a difference in people around her

Sonam Mehrotra,
Cancer biologist, ACTREC

My Aunt who is a scientist and a Professor from NEHU Shillong really inspired me to study Life Sciences. My mother and both grandmothers have all been very strong women in their own right. They taught me how to balance family and still not give up on my dreams.

Meenakshi Munshi,
Scientist 'G'/Adviser,
Department of Biotechnology, Govt. of India

My role model in early life was my grandmother and later my friend's mother Mrs. Shirley Sharma who was not only a motherly figure but a friend with whom I could discuss anything under the sun, with a wonderful lively person around, I considered myself lucky to meet her and still I am in touch with her.

Dhanashree Paranjpe,
Ecologist, Abasaheb Garware College

My first and foremost inspiration and role model is my mother- a retired university professor, who planted the seeds of curiosity about natural world in my mind. She is a statistician who carved out her career in ecological statistics, when only handful of people cared about statistical analysis in the field of ecology. From early childhood I was enthralled with stories about her field trips with ecologists working on plants, wasps, microbes, tigers, birds, elephants, even humans. I heard and saw how scientists collected data, struggled with making sense out of the numbers, excitement of new discovery, and satisfaction in doing good science. So from early on, I couldn't visualize myself doing anything other than- teaching and doing research in ecology! My mother has mentored me from the early years of my scientific journey. She has taught me to look at the data from different perspectives, the best use(s) as well as pitfalls in using statistical methods for understanding biological phenomena and so many other "tricks of the trade" –at no charge at all!! Although it almost sounds like a cliché, I have to mention this - She is the best mentor and the best critique of my work.

P Hemalatha Reddy,
Educator, Sri Venketeswara College

I am fortunate to have many people who have made me what I am today at different stages. It started with my science teacher at undergraduate level who identified my passion towards science at an early age and guided me to choose my Masters programme. In this journey I met some wonderful people at the beginning of my career who mentored me in undergraduate teaching and research and further to contribute in quality science teaching at the national and international level.

Savita Ayyar
Research Management Consultant,
Jaquaranda Tree

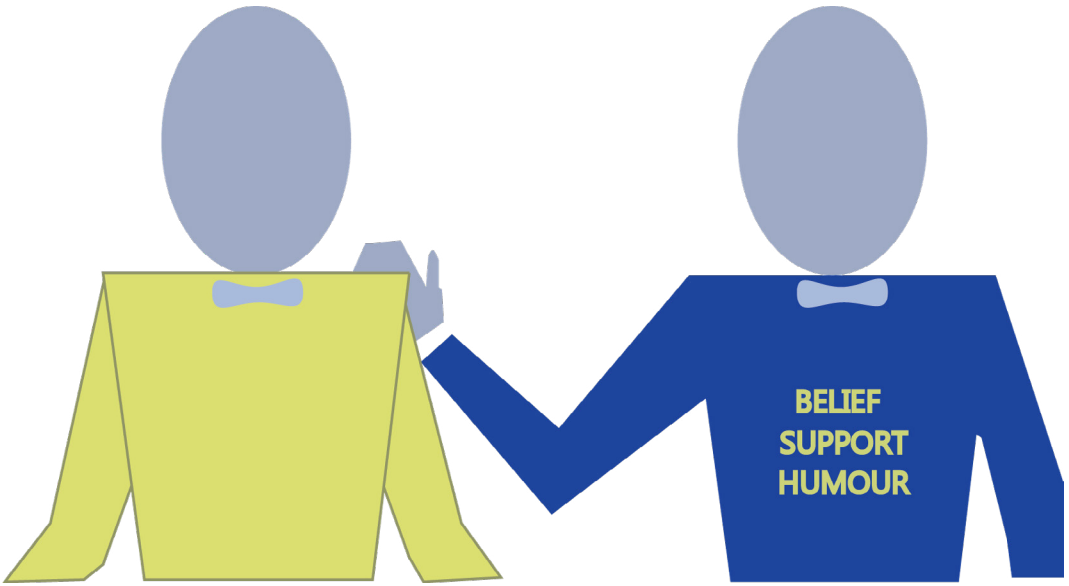
I have been extremely fortunate to have had some great mentors along my career path. It is vital to pick one's mentors wisely. Your mentor does not need to be a woman because you are one. Your mentor does not need to be a scientist because you are one. Rather, your mentor needs to have a sustained interest in your development as it makes a useful contribution to the bigger picture.

The Sum Of The Parts Of A Mentor

Sreelaja Nair

Remember Anupam Kher'`s character in DDLJ? Though a left field view, that character has many of the important traits I would look for in a mentor and would infuse my mentor self with. Now, for those who view mentoring as pseudo-parenting, the comparison would make a lot of sense: the character is a constitutive gain-of-function of the cool-dad phenotype. However, such a reductive view would be quite tragic for this article. That the character is a parent is incidental and irrelevant. Pertinent are the traits Kher's character manifested: **belief**, **support** and **humour**. So, what are the ideal proportions of belief, support and humour in a mentor?

As is often the case with things of immense value, articulating the particulars of it becomes difficult. Let's see if I can walk everyone through my thoughts on this. The typical expectation from **belief** as a trait in a mentor is that they believe in the mentee's ability to succeed. Of course if it was that simple every well-wisher could be a mentor. More important is a mentor's implicit belief that the mentee is confident and mature enough to know what they want. This trait is a difficult one to acquire for a mentor and an excellent self-test for all wannabe mentors. This nature of belief is also the fulcrum on which a mutually respectful mentor-mentee relationship achieves balance.



To understand the balance I allude to, one must delve into what the imbalance is. Due to the skewed seniority or expertise of the mentor, a mentor-mentee relationship teeters on the edge of a power play. With the aforementioned trait of belief, the mentor can forfeit some of that power before the start of the play. The ability to forfeit the rest of the power, on demand and in a controlled manner, is a test (another one!) of how good a mentor one could become.

The predominant non-pseudo-parenting view of a mentor is that of an advisor. In a culture where advisors are seen as know-all gurus, it is a tricky costume to wear at work. My personal realization is that the individuals I invariably turn to when I need guidance discuss rather than tell me what to do. Yet, I walk away feeling I can take on the world (yet again) after the interaction. So, how does one let someone benefit from one's seniority and expertise without telling them explicitly what to do?

> "In a culture where advisors are seen as know-all gurus, it is a tricky costume to wear at work."

My best guess is the nature of the second trait I listed – **support**. The explicit nature of support expected from a mentor is recommending and promoting the career of the mentee. Of course every mentor does that; if one is unable to, then this juncture is perhaps as good a time as any to introspect on whether one's role is that of a referee or a mentor (a test, again!). However, the nuanced form of support is undoubtedly an acquired trait in a mentor. I say this because it is human nature to feel compelled to tell someone what to do when approached for advice, the classic "I know this is good for you, so I think you should do this" power play. But remember, the belief component empowers the mentee to be the best judge of that.

The trait of support I refer to is in the ability of the mentor to discuss the choices before a mentee without colouring the possibilities with the "odds of success", based on their experience and seniority. In my view, this is an important component of giving advice as a mentor: the mentor does not know if their advice will lead the mentee up the path to success or down a rabbit hole. It is important for the mentor to be aware of this fundamental drawback in their advice. This is where the controlled relinquishing of the rest of the power as a mentor comes into play. All a mentor can do is ensure that the mentee is aware of the pros and cons of their choices as well as of seeking you out as a mentor. A good mentoring discussion in the past should

enable a mentee in their present to not feel like they were unable to live up to the perceived expectations of success.

> "A mentor is one of the few individuals in one's life who is aware of the mentee's aspirations and their limitations."

Now, after belief and support, why did I choose **humour** as the last trait in a mentor? I did so because I think Victor Borges was right when he said humour is something that thrives between one's aspirations and limitations. A mentor is one of the few individuals in one's life who is aware of the mentee's aspirations and their limitations. When the latter influences the outcome of the former, someone needs to step up and point to the mentee the achievements in the balanced middle. If the mentor and mentee can share a genuinely funny moment about a hole the mentee finds themselves in, there is always light to be found at the end of that grey tunnel.

While writing this up, it was natural to reflect on personal experience. In my career as a researcher, I am fortunate to have mentors who personify the three traits I listed above. Once when I found myself in the proverbial hole, my mentor used some choice words (not appropriate to disclose here) to describe the situation. We laughed heartily at that outburst, but in that demonstration of spontaneous indignation I realized the depth of my mentor's belief in and support of me. I also realized that if I could acquire the right proportions of belief, support and humour, I could be a mentor someday, in every sense of the word.

What is your favourite part of being in science?

Bushra Ateeq,
Molecular oncologist, IIT Kanpur

I think my favourite part of being in science is the freedom it brings, I can chase the problem (research question) of my choice, brainstorm ideas with my team members, and most importantly it keeps my childlike inquisitiveness alive. It's like a win-win situation where you get paid to do something you actually enjoy doing.

Meenakshi Munshi,
Scientist 'G'/Adviser,
Department of Biotechnology, Govt. of India

The most exciting part of being in science is that it teaches you to observe things keenly, connect the dots and become self-dependent. The grind you go through in doing research makes you ready for taking on real life challenges at different layers with more confidence. It teaches you how as a loner you can deal with challenges life throws at you without losing the purpose of life.

Suhita Nadkarni,
Neurobiologist, IISER Pune

The journey of discovery using tools of your choice. This journey is typically never solitary but one that includes interactions with and contributions of students, postdocs, colleagues and mentors. This is my favourite part. An ongoing conversation that is challenging, forces you to think in different ways. From that 'aha' moment where all the data suddenly makes sense to being able to convince your colleagues that it is indeed how it works.

Sarah Iqbal,
Public engagement officer, Wellcome Trust/DBT India Alliance

While it lasted, I absolutely enjoyed being on the bench and racking brains (and limbs) to find answers to those burning questions in science – to work on your own unique scientific problem, was exhilarating. The best part about my current job is that I get a birds eye view of the research happening in the country – one is perhaps a lot more in tune with the implications of scientific research now and its importance for the society -something that you are not exposed to while working in the lab where we mostly concern ourselves with a specific scientific question. Similar to research, in my current role I get to work on complex ecosystem problems that require an understanding of the scientific enterprise and its challenges, and requires analytical and problem-solving skills to examine as well as to find solutions to these problems.

Devapriya Chattopadhyay,
Paleobiologist, IISER Kolkata

The best part is to discover new things every day about the nature, society and even about myself because a training in science teaches you to question anything and everything, to be ruthlessly logical and brutally honest.

Jugnu Jain,
Entrepreneur, Sapien Biosciences

The fact that there are new discoveries, that knowledge grows with new ideas. The sense of curiosity and exploration. A purity. Rationality of argument. There is less hierarchy in general. Science at its core benefits society and it is rewarding to bring out solutions and products such as new drugs and diagnostics, that help patients.

Lipika Sahoo,
Intellectual Property Professional,
Lifeintelect consultancy Pvt Ltd

Science makes you think, it gives the courage to challenge the status quo.

Savita Ayyar
Research Management Consultant,
Jaquaranda Tree

I started my career as a scientist. Somewhere along the path, my work shifted to facilitation of science. The world of science is dynamic and goes beyond boundaries of all kinds. Science integrates despite going down into the minutest of details and also has the potential to touch many lives. I enjoy being able to contribute to that transformation.

Dhanashree Paranjpe,
Ecologist, Abasaheb Garware College

Most scientists would say the best part of science is the excitement of discovery, understanding something that no one else has understood/ thought about yet. However, for me the best part(s) are quite different. As a bonus of doing research, I get to meet many wonderful, diverse set of people during my field work. I stay in villages and talk to people about their everyday life. These simple, so called uneducated people, understand and "practice" science in their own ways, i.e. they build testable hypothesis, are very keen observers, they also conduct little experiments while growing their crops or tending to their livestock, make "educated" guesses about how much rainfall will be there this year, predict many a times how animals/ plants around them will respond to particular weather conditions. They may not understand formal language of science but they do know and appreciate the significance of scientific inquiry. To me, these insights have been most humbling and rewarding at the same time. My research has given me an opportunity to interact and learn from such diverse group of people- from farmers to world class scientists-that is no doubt the most favourite part of doing science!

P Hemalatha Reddy,
Educator, Sri Venketeswara College

On one hand, it is the systematic and analytical approach of modern science; and on the other, the ability of being able to enlighten young and inquisitive minds of students by teaching them complexities of science at ground level.

Sonam Mehrotra,
Cancer biologist, ACTREC

Analyzing data fresh from an experiment and then designing and conducting experiments to address more questions. A story that develops from one's own work is the biggest reward.

Smitha Hegde
Educator, NITTE University Centre for Science Education and Research

The ability to generate new knowledge, freedom to propose, experiment and learn for oneself.

Science as a rewarding career choice: is it?

Sandhya S. Visweswariah

I think before I begin, a few definitions are required. 'Science' is defined as the knowledge obtained from the careful study of the structure and behaviour of the physical world, especially by watching, measuring and doing experiments, allowing the development of theories to describe the results of these activities. 'Reward' is defined as a thing given in recognition of service, effort, or achievement. The definition of 'career' I particularly liked was 'an occupation undertaken for a significant period of a person's life and with opportunities for progress'. Finally, 'choice' is defined as the art of choosing between one or more possibilities. These definitions need to be borne in mind as we go along in our discussion.

In order to make a career choice, one should be self-aware. What are the activities that interest and excite you the most? Are you naturally curious about the world around you? Are you interested in finding out how things work, and trying to recreate them? Most importantly, do you often ask the question 'why' and more often, ask 'why not'? These remain the widely prevalent characteristics of a scientist, and are coupled to a desire for scholarship and open-mindedness.

The 'reward' one gets as a scientist is to be able to answer such questions in a way that satisfies one's own mind, yet being influenced by the minds and ideas of others who are asking similar questions. The reward is the recognition from your peers that the work you have done is of importance. The reward need not necessarily be an award, or a title, or a prize – they should remain secondary aspirations for a scientist, and not the prime motivation for taking on science as a career. More often than not, such 'awards' elude a scientist, but not the reward of making a discovery that one thinks is important.

Therefore, science is indeed a rewarding career if one's perspectives are in sync with the quest for knowledge.

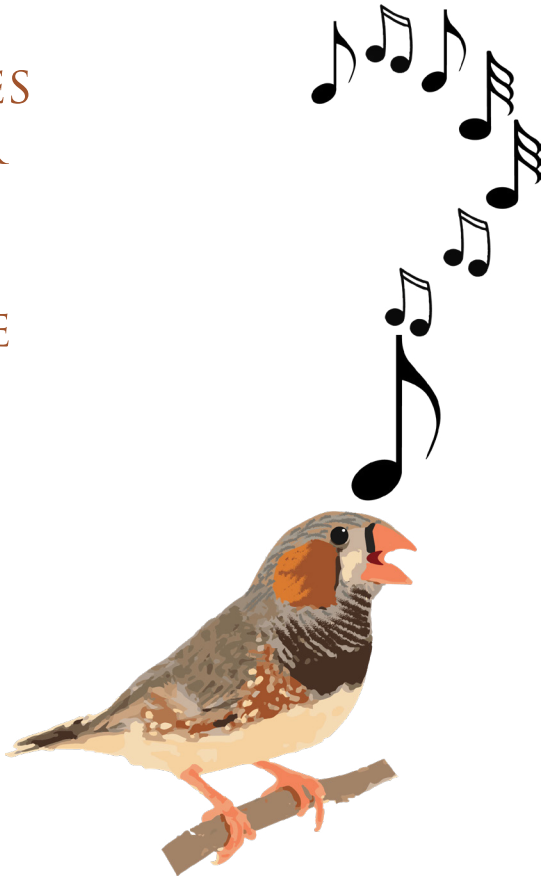
We now come to the aspect of 'choice'. To take on science as a career, unlike other careers, perhaps one has to make an 'active' choice to become a scientist, rather than a default option that naturally follows as one collects degrees. Unfortunately, I find that in our country, many students of science have not 'chosen' science but have had it 'thrust' upon them – much like 'arranged' marriages! While the latter do of course succeed in many cases, one may not have made a true and well-informed choice. It is imperative that we educate our students on what is expected from a career in science – based on what science is, and science does. This will ensure that almost all people doing science find it 'rewarding' as defined in the previous paragraph.

"How many people get up every day, anticipating a new discovery? And, if you are lucky, how many jobs allow you to make a contribution to the betterment of the world as a whole?."

It is also important for budding scientists to realize that remaining in academic science is not the default option. In fact, given that less than 10% of PhD degree holders end up in Universities running their own laboratories, a life in academia for scientists should be considered the 'alternative' career. Most trained scientists go on to teach, or work in industry or research laboratories, or even branch out into scientific communication and scientific art. All such activities are extremely rewarding too, and most certainly allow career progression over many years.

So is science a rewarding career? In my mind, yes, of course. How many people get up every day, anticipating a new discovery? How many occupations allow you to meet new people who look at life in a way that you do, with the same priorities as you? How many jobs allow you to travel and see the world, so that your horizons broaden? And, if you are lucky, how many jobs allow you to make a contribution to the betterment of the world as a whole? And most importantly, for those of us who are involved in teaching and inculcating scientific thoughts and ideas in young people, how many jobs allow you to see the future? One must look to adopting science as a career choice not for monetary gain or fame, but to live a life in a logical and honest way, striving to make a difference in the lives of others, while smiling through your own.

What were the biggest challenges you faced in your journey to this point and how did you overcome them?



Farah Ishtiaq,
Ecologist, Indian Institute of Science

In my early career stages, my family (especially my mother) wasn't very positive about my choice of career. My father was very supportive, but he died quite early on, the year I started my PhD. It has been a long battle to convince my mother that there is value in what I do, so what if it's not engineering or medical degree. With my persistence and determination, I think I overcame some of this. Later in my career, arbitrary rules such as age criteria on faculty positions in India have been a major hurdle in establishing my career but it has not been able to stop me.

Jugnu Jain,
Entrepreneur, Sapien Biosciences

There have been many times in India that I had to fight eve-teasing (it's a mild word for something that is NOT mild), and gender discrimination. During my MSc at Pantnagar university, girls/women had to report back to the hostel by 9pm and not allowed in the library unlike boys who had access until the library closed at 11pm. When I insisted I be allowed the same privileges as boys

had, the University made my parents sign a letter that the University would not be held responsible for my safety on their campus and that I was using the library at my own risk. Boys harassed me daily by making lewd comments, leaving indecent drawings on my table, deflating my bicycle tires but I persisted through it all. Those 2 years toughened me and deepened my resolve to ignore naysayers and fight inequality. When I went to Cambridge, UK for my PhD, I was totally dependent financially on my scholarship which was barely enough to survive. We had to pinch pennies all the time, including not being able to afford calling home in India since it cost almost 3 pounds per minute. There were many lonely times where I missed the love and comforts of home, family and familiarity. At such times, I would remind myself that I came to the UK for a purpose and I must finish it and not give up. I cultivated hobbies and pursued many extra-curricular activities to keep myself busy, learn as much as I could and make the best use of my time in that country. There are many trials and tribulations in my entrepreneurial journey which can not be fitted into a paragraph here. One of the ways I cope is by pasting inspiring quotes and poems in my cupboards and other places where I will see them every day and recharge.

Savita Ayyar
Research Management Consultant,
Jaquaranda Tree

On several occasions, I have initiated work for which there was neither precedent in my own environment nor an immediate peer group for me to derive insights from. There were several systemic challenges on each of these occasions. Difficult as these moments were, help always arrived in the form of mentors, collaborators, colleagues and others. These situations also presented challenges within, with the little voice of doubt inside saying “You are not good enough” or that “that is too big a problem”. My family and mentors have played a huge role in helping me believe in myself and stay focussed.

Smitha Hegde
Educator, NITTE University Centre
for Science Education and Research

The lack of recognition of research as "work" in academics. Only teaching hours are counted and considered as full-time work. But all the extra hours put in are not even considered as "workload". However, the products of research such as papers, projects are very much desired by management in traditional colleges.Thus in my opinion, unless research work is recognised in workload, college

teachers will not be enthused to take up research along with teaching.

Meenakshi Munshi,
Scientist 'G'/Adviser,
Department of Biotechnology, Govt. of India

As a woman there are challenges at different levels and different layers of life. The biggest challenge begins at home itself when someone else decides your course of life. Hailing from a small town (I belong to Kashmir) has its own challenges and it is here I had to take a bold decision of leaving a permanent government job to pursue research as a career. All my relatives threw a fit and said that I have become arrogant by studying in Mumbai. I was happy with my decision but it was a tough to be on my own as I had no one to fall back on in case of problems which kept creeping in. But what kept me going was the strong belief that good things will happen and it is just a matter of time. Many times it was hard to deal with issues but I never regretted my decision, I strongly believe in God so when I am unable to figure out I just leave it to Him. The irony of the fate was such that I had to leave active research due to my health issues This led me to look for Plan B, so I did a degree in Journalism & Mass Communication. At times every day was a struggle of different kind; with a family of my own, a small kid with a soft job and the worst part was I couldn't share my frustrations with anyone as it was my own decision of leaving a permanent government job and opting for a temporary job. The only thing which kept me going was the strong belief in self. The lesson I follow as a bible in my life is that if you want to succeed, work hard. Even if success doesn't come through, don't worry, at least you will have no regrets. Above all, I feel it is important to be a good human being - the rest will fall in place, it is just a matter of time

Dhanashree Paranjpe,
Ecologist, Abasaheb Garware College

The biggest challenge has been coming face-to-face with gender bias, harassment and other unethical practices in scientific community. Not so long ago I have (first-hand) heard the following statements spoken by prominent scientists in reputed research institutes in India targeting various young women who were hard working, sincere and promising scientists - "Girls become useless to do science, their priorities change when they get married", "Oh- she got her name on the publication by flaunting xxxx in front of her boss", "I wouldn't have given her another year's extension

on this project if I had known that she is pregnant", "Does she know what research means? Just because her mentor/ husband is a big shot scientist she gets to be a faculty here" and so on and so forth. I saw many of my female friends and colleagues put their personal lives on back burner and suffer just to prove that they are "worthy of doing science", to prove that they are not "distracted" or become useless due to their marriage/ family responsibilities/ personal relationships. I saw a lot of this and other unethical practices during my time in India such as contempt/ disrespect for each other's fields of science, publishing manipulated data, side-lining project assistants' or students' contribution in a publication, honorary authorships being given - it was disheartening to say the least.

I decided to quit not just research but even academic field after finishing my thesis. I took a break after my PhD, got married, went abroad, and did some soul searching. The "itch" of becoming an ecologist wouldn't let me quit. With full support of my wonderful family, I started teaching at Univ. of California at Santa Cruz (UCSC), and then returned to research. I learned to block out nay-sayers. With a renewed confidence and fresh ideas, I returned to India on Ramalingaswami Re-entry Fellowship. I already knew that the career break after PhD and resulting "gap" in my publication record is going to put me at disadvantage in hiring process- and it did! I was indirectly told in many institutes that I was above the age of being hired for a starting position- there are no written rules against hiring older candidates but somehow people are reluctant to do that. In short, I am past my "expiry date". I chose a study system (Indian peafowl) that I had not worked on earlier during my PhD or postdoctoral research. So I was told that I am taking too much risk. My only answer is to show with data and publications, that I can build my independent research project without a "position", without a mentor, working in a college set up which can offer me only basic infrastructure facilities and some freedom to choose my teaching load.

Suhita Nadkarni,
Neurobiologist, IISER Pune

Getting the infrastructure needed for my lab to be up and running has been the most challenging component thus far. I had to learn the technical aspects of designing and setting up a high performance computational facility which initially was not part of my agenda and was a unplanned sink of time. High Performance Computing (HPC is a male dominated area and It was deeply frustrating to

experience the vendors continually ignoring my feedback but eager to please the two other male colleagues with whom I was making a combined purchase). It took more than two years and many iterations to have a system that is stable and finally delivers!

Devapriya Chattopadhyay,
Paleobiologist, IISER Kolkata

One of the major challenges for me was to establish my research group and to keep it moving once I returned from USA. I had to understand the obstacles of setting up a laboratory from scratch which I was happily oblivious to. I also experienced the hardship of field-based studies in India. Developing a group of motivated students solved majority of the issues as they took the lead role in tackling the issues. Apart from these, another challenge that I faced throughout my academic career was a nagging confusion of whether I am being treated differently. For me, both success and failure because of my gender are equally disturbing. Because the society still has to go a long way before we really can treat everyone equally, there were reasons for such doubt. I don't think, I have overcome the challenge completely. I still ponder on this. There are instances where things did not go the way I hoped and discrimination played a role, I suspect. To me the only solution is to work really hard for the love and thrill of the discovery alone. This is often hard without funding or infrastructure. But that is the only way out. And that is what I continue to do.

Bushra Ateeq,
Molecular oncologist, IIT Kanpur

I won't say that there were no challenges, I had my share, particularly when I was searching for an independent faculty position in India. I was even questioned about my "academic pedigree" at one of the premier institutions during job interview. But I didn't let such unfounded cynicism dampen me, in fact that further strengthened me and in turn, it helped me take a step back, get more clarity and confidence, and gear-up for the next stage.

Sonam Mehrotra,
Cancer biologist, ACTREC

Setting up collaborations in India. Bureaucracy and procedural delays. I overcome them by being very patient and following up.

Sarah Iqbal,
Public engagement officer, Wellcome Trust/DBT India Alliance

I don't think I would call anything as the "biggest" challenge so far but these come close – struggle to find a good supervisor and funding both at

doctoral as well as postdoctoral level at foreign institutions, to find a job that would align with my interests (but I found one in the end!) and dealing with the uncertainty of entering a totally new field of work and unlearning many things that one had been trained in. The learning curve is steep, confidence is low, when you transition to a new field, but it helps to have an open mind and a desire to learn, unlearn and grow. In addition to these, in my current role, I am faced with new and really "unusual" challenges on a daily basis but they are also what keep me going every day.

P Hemalatha Reddy,
Educator, Sri Venketeswara College

The biggest challenge is to establish a department at Undergraduate level where teaching would be interactive. Catering to the needs of brilliant students and inculcating interest in undergraduate research was my primary aim. Small research projects had to be introduced to make the students understand the flavour of research to begin with. Therefore my biggest challenge was to be able to get research grants to fund my research and in turn to train students. There were no student grants and funding schemes like STAR projects specially for UG colleges available at that time. I had to get the grant through the usual R&D channels. Convincing the board not only that my science is good enough to be funded, but also that I would be able to carry out quality research in an undergraduate college was quite a challenge. I will not say I succeeded every time, but I take pride in being able to make them sit upright and take note of my work. Today after almost fifteen years Undergraduate research is an integral part of good science education across the nation.

Lipika Sahoo,
Intellectual Property Professional
Lifeintelect consultancy Pvt Ltd

Being married and having kid, and doing PhD especially in Bioscience is tough. Many a times thought of quitting but somehow with family support, understanding husband and bit of determination helped me to sail through.

"He" is not a gender neutral pronoun

Rashna Bhandari

My education in English medium schools during the 1980s led me to unconsciously believe that "he" and "him" are gender neutral third person singular pronouns. Our history books in middle school taught us about "Early Man" – how he learnt to use fire, how he invented the wheel, and how he domesticated animals (surely there were an equal number of Early Women, but that thought never struck me at the time). Everything I read outside school – books authored by Enid Blyton or Agatha Christie, English classics, or mid-20th century novels - reinforced gender stereotypes, and freely used "him/he" to discuss an unknown third person.

It was only when I moved to the United States at the beginning of the 21st century that I first heard and read the terms "he or she", "he/she", or "s/he" used to talk or write about a third person in gender unbiased terms. I also came across the ingenious use of "they" as a singular pronoun for genderqueer or third gender individuals. It was initially difficult to remember to be politically correct, but the importance of these cumbersome terms was not lost on me. It became apparent that the native English speaking West had recognized the gender bias inherent in their language, and were now at pains to correct it.

During my time abroad, I started reading and thinking about gender bias in academia. I came across studies which reported that the number of women PhD graduates in biomedical sciences in the US/Europe were roughly equal to the number of men, but only 15-30% faculty were women (1, 2, 3). The reasons for this 'leaky pipeline' are many (1), but it was wonderful to witness these discussions, and know that the scientific community wanted to do something to fix this.

Upon starting my own research group in India, I carried these thoughts with me. I was now in the habit of always using gender unbiased terms in my conversation. For instance, I would say "I think this referee does not understand the point we are trying to make – he or she has not read this part of the text carefully". My students quickly and subconsciously picked up this habit – they now correct me by interjecting a "he or she" into my sentence if I ever slip up! I am so sensitized now that I find the generic use of 'he' to be quite jarring. For example, it would strike me as odd if someone would say "Every faculty member should be allowed a student of his choice, and every student should also be permitted to join a lab he chooses".

"If the current NCERT history textbook for Class VI can use the term "Early People", why can't all of us start referring to our students, post-docs and faculty as "they" instead of "he"?"

More recently, I have been reading about the backlash against this political correctness in the West (4) and wondered if I was taking my own bias towards the use of gender-neutral terms too far. Did I judge others to be biased if they used "he" instead of "he/she"? My conclusions from this introspection are that the use of gender-biased pronouns does not necessarily mean that the person in question is biased against women, and conversely, being politically correct does not always indicate that the speaker is free from bias.

However, I still strongly advocate against the use of "he/him" when talking about a generic third person. It has now been proven that unconscious gender bias is hurting the careers of women in STEM fields (5). We should do all we can to correct this imbalance. The Unconscious Bias Observer Scheme practiced during staff recruitment at the Department of Chemistry, University of York, is an outstanding effort to promote equality and diversity in academia (6).

As highly educated individuals engaged in an intellectual profession, all of us should make a conscious effort to use gender unbiased terms in our everyday speech and in our writing. If the current NCERT history textbook for Class VI can use the term "Early People", why can't all of us start referring to our students, post-docs and faculty

as “they” instead of “he”? Tolstoy said “Everyone thinks of changing the world, but no one thinks of changing himself” (7). Let us heed a rephrased version of this thought: “Everyone thinks of changing the world, but no one thinks of changing **themself**”! (8)

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6. https://www.york.ac.uk/chemistry/ed/resource-hub/unconscious-bias-scheme/
7. Tolstoy L. “Three Methods Of Reform” in Pamphlets: Translated from the Russian (1900) as translated by Aylmer Maude, p. 29.
8. The third person singular pronoun ‘themself’, is increasingly being used instead of ‘himself’ or ‘herself’ to refer to a person of unspecified sex.

Improving gender equity in academic workspaces:
What male scientists can do to help

Sunil Mukhi

A very gradual improvement in the status and representation of women in scientific workspaces in India is discernible during recent years. This has come about because of the personal courage and tenacity of a few women academics, and perhaps an equally gradual evolution of our culture, but not so much through any specific change in institutional practices. To pursue their passion, women have accepted considerable injustice – for example taking up jobs that provide inadequate child support, or being passed over for leadership positions, or simply accepting a lower-ranking position compared to their academic achievements.

There are men in academia who actively support better representation for women, but their proportion is still quite small. A similarly small proportion of men (though often holding positions of authority) display skepticism and resistance towards this goal. It seems likely that a large majority of male scientists fall in between these two ends, and their active involvement can help the situation to evolve much more rapidly.

Perhaps the biggest obstacle to this is a sheer lack of awareness on the part of men of the injustice inherent in the system. Yet, institutionalised prejudices against women in science are real and have existed for centuries – one just has to look at the many women scientists in the 20th century who deserved a share of a Nobel prize but were denied it. Studies of the nature and impact of historic gender discrimination are widely available. It is desirable for male academics to study and share this information in order to heighten awareness among themselves and their colleagues.

Though an academic workplace can also be challenging for men, women scientists face singularly complex and subtle forms of discrimination that need to be observed with care and sensitivity. Men lead their daily lives – for the most part – travelling in public spaces unmolested, and get down to work without being followed by watchful eyes or receiving unwanted compliments on their personal appearance. Women face

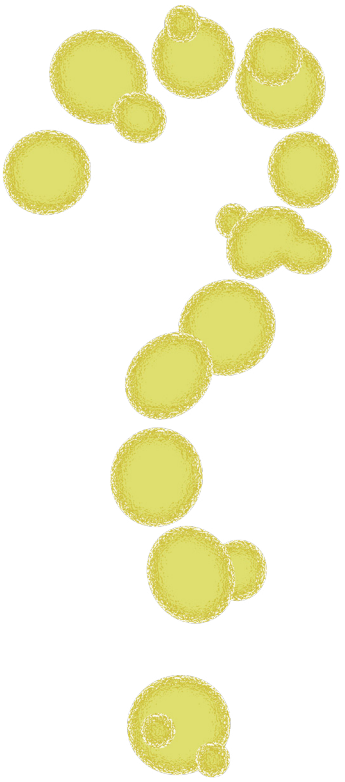
> "Perhaps the biggest obstacle is a sheer lack of awareness on the part of men of the injustice inherent in the system."

hassles of this sort on a daily basis, but they try to "adapt" and work around these issues keeping bigger goals in mind. Yet the strain of being always on one's guard, in situations where men tend to be relaxed and focused on their science, takes a toll.

More fundamental problems arise for women academics when they are judged according to standards that have been unfairly created or modified for them. It has been noted that certain traits in men are interpreted as showing a "decisive", "strong" or "assertive" nature – all positives, while women academics with the same traits tend to be labelled negatively as "aggressive" or "difficult". Sometimes a single problematic woman colleague in the field is effectively used to label all women, while no one would think of an equally problematic male colleague as representing all men. The degree to which such inconsistent judgements jeopardise the career path of a woman academic can hardly be overstated. But in order to address double standards they need to be identified, and for a woman to do this raises an additional burden on her: of getting into frequent debates with colleagues and being seen, inevitably, as a "complainer". The helpful intervention of male scientists in such situations can considerably lighten this burden.

A male scientist who is committed to improving gender equity needs to be both principled and pragmatic. The principle is to treat women as equal human beings with equal cognitive abilities, deserving of equal opportunities, and to make sure this is widely understood and accepted. The pragmatic approach is to make those small efforts that can have a significant impact to redress past injustice in the future. Incentivising women students, particularly those who face negative social pressures, highlighting the historical achievements of women scientists, making workplaces more women-friendly, are all small steps that can have a cascading impact. But finally it is increased representation of women on faculties and decision-making bodies that has the greatest potential to redress the balance and create a truly gender-neutral environment. To this end, institutions and their leaders need to lay down guidelines on how to enhance the gender representation in small but steady increments.

What does success mean to you?



P Hemalatha Reddy,
Educator, Sri Venketeswara College

Success, to me, comes in small packages. If I am able to inculcate the knowledge that I have gained over the years in my students, I consider myself successful. If I find my students climbing up the ladder of success and making a name for themselves internationally, then with them, I feel equally successful. If I am appreciated for tackling administrative problems using my scientific logic and not muscle power, that is my success as a scientist. And success to me also is balancing the personal and professional life by not neglecting either of them for the sake of the other.

Smitha Hegde
Educator, NITTE University Centre for Science Education and Research

The ability to make a change. I am happy to have touched the lives of over 10,000 students till date, in their formative years as a teacher.

Jugnu Jain,
Entrepreneur, Sapien Biosciences

It boils down to two important things for me – a) to be able to leave the world a better place for having been born in it and having the opportunities given by my parents, family, friends, teachers, mentors, countries, and mother earth b) to be at peace with myself in my life, personal and professional, physical and mental, since we only have one life.

Sarah Iqbal,
Public engagement officer, Wellcome Trust/DBT India Alliance

My definition of success has definitely evolved over the years. Today, in my view, success is finding a purpose and working towards achieving it and making a positive impact on people's lives. I detest the association of fame, wealth, and all the other conventional terms that describe success. If the definition traditionally used for success is to be followed, only politicians, those in business or in the entertainment industry would be considered successful and not scientists, educators, health and social workers and others who make significant contributions toward the welfare of the society.

Dhanashree Paranjpe,
Ecologist, Abasaheb Garware College

Success in scientific research has been traditionally assessed based on publications, awards, positions you hold, visibility/ publicity of your research and other such criteria. For me, success has meant surviving in academia, enjoying the process of discovery, inspiring students and colleagues to do good research, awakening the curiosity about science in common people. My research may not result in new technology/ patents/novel methods/treatments. If common people perceive my research as important and relevant, if it helps wildlife, environment, conservation, leads to new understanding about natural phenomena, then that will be counted as a success.

Bushra Ateeq,
Molecular oncologist, IIT Kanpur

For me, success is a long journey with many milestones. And every time I cross any of these milestones, which could be as simple as a successful experiment, or a good presentation by my student, a satisfying lecture delivered by me, or an impactful discovery by my group, all these events adds to success. The true essence of being successful is to keep pushing harder and higher, and striving to do better.

Suhita Nadkarni,
Neurobiologist, IISER Pune

Most definitely figuring out how the brain works. Bit by bit with each nut and bolt (while not leaving one nut behind when putting the pieces together again!). Success of students and postdocs, in that they continue to be contributing scientists themselves and good mentors.

Farah Ishtiaq
Ecologist, Indian Institute of Science

Being good at what I do and having positive influence with my work.

Meenakshi Munshi,
Scientist 'G'/Adviser,
Department of Biotechnology, Govt. of India

Every human being's expectation from life is different. To me success is making difference to someone else's life in whatever little way I could. Create an ecosystem where at the end of the day you feel satisfied with whatever little you have been able to do for the for an individual or community at large.

Devapriya Chattopadhyay,
Paleobiologist, IISER Kolkata

For me being successful means to be able to inspire people by my honest work and share with them the same excitement that I enjoy every day, diving deep in the world of knowledge and discoveries.

Sonam Mehrotra,
Cancer biologist, ACTREC

As a scientist, being successful means that we have contributed significantly in a field; whether it is to improve understanding in a field, development of new methods and/or novel applications of an existing product.

Savita Ayyar
Research Management Consultant,
Jaquaranda Tree

Feeling that I have made a difference, creating a path where none existed earlier, making a positive impact on the lives of people.

Lipika Sahoo,
Intellectual Property Professional
Lifeintelect consultancy Pvt Ltd

Making some positive difference in people's life

Ten Iconic Women in Indian Science

E K Janaki Ammal

1957

She was a renowned Indian Botanist and Plant cytologist who contributed extensively to genetics, evolution, phytogeography and ethnobotany and was awarded the Padma Shri in 1977. The Janaki Ammal Herbarium in Jammu is named after her and houses more than 21,500 specimens.

Asima Chatterjee

1961

She was the first woman to be awarded a Doctorate of Science by an Indian University. She made significant contributions in the field of medicinal chemistry and was awarded the Padma Bhushan in 1975. She was also the first female president of the Indian Science Congress.

Kamala Sohonie

1939

She was the first Indian woman to get a PhD in a scientific discipline. She received the Rashtrapati Award for her work on the nutritional benefits of the palm extract called 'Neera'. She was the first female director of the Institute of Science, Bombay.

Rajeshwari Chatterjee

1960

She was the first woman engineer from Karnataka appointed as a faculty at IISc, where she along with her husband set up a microwave research laboratory where they did pioneering work on Microwave Engineering. She has received several awards such including the Lord Mountbatten prize, the J C Bose Memorial prize and the Ramlal Wadhwa Award.

Kamal Ranadive

1982

She was a renowned Indian Biomedical researcher who is known for her research in Cancer. She established the first tissue culture laboratory in India and founded the Indian Women Scientist Association (IWSA). She also received the Watumal Foundation Award for her work in the field of leprosy.

Aditi Pant

1983

She is a well-known oceanographer who became the first Indian woman to visit Antarctica in 1983. She was a part of the third Indian expedition to Antarctica and received the Antarctica award along with three of her colleagues for their contributions to the project.

Darshan Ranganathan

1999

She was an organic chemist from India who was known for her work in bio-organic chemistry. She was an elected Fellow of the Indian Academy of Sciences, Indian National Science Academy and the recipient of many honors including The Third World Academy of Sciences Award in chemistry.

Tessy Thomas

2012

She is the first Indian woman scientist to have headed a missile project, earning her the nickname "Missile lady". She was the Project Director for the Agni-IV and Agni-V missile sin Defence Research and Development Organisation. She is the recipient of the Lal Bahadur Shastri National Award for her work in the field of missile technology in India.

1987

Anna Mani

Known for her work in atmospheric physics and meteorological instrumentation. Anna Mani joined India Meteorological Department in 1948 and worked there until she retired as Deputy Director General in 1976. She has published two books on solar radiation research and worked on several projects for harnessing wind energy in India.

2000

Usha Barwale Zehr

Usha Zehr is the Director and Chief Technology Officer at Maharashtra Hybrid Seeds Company Private Limited, where she has been utilizing biotechnological tools for improving the quality and productivity of seeds and agriculture. She has the distinction of producing India's first genetically modified food, Bt brinjal.

Scientist and Mommy

Shubha Tole

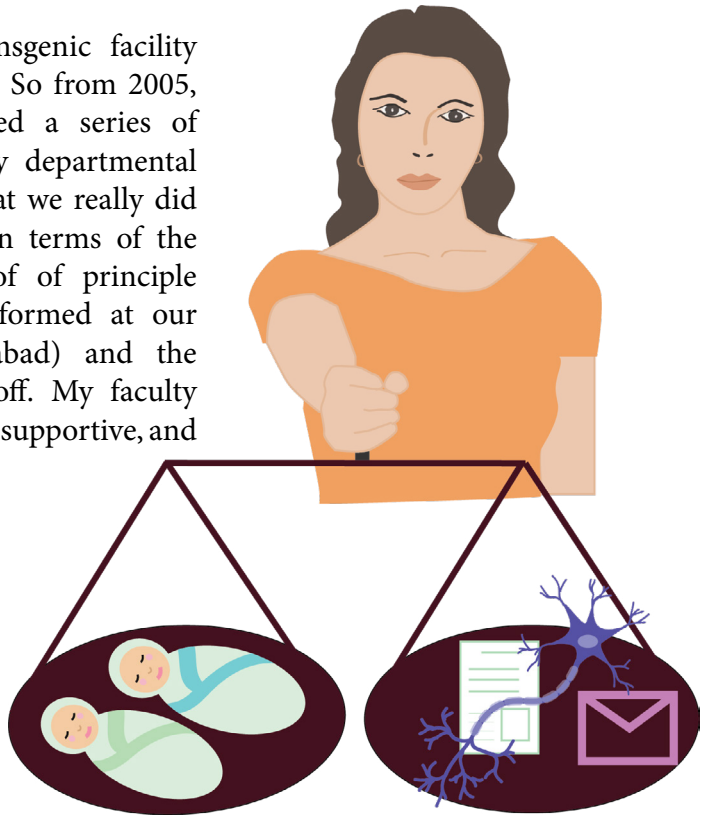
At one point I thought of myself as a scientist who also happened to be a woman. At the end of four long-gestation projects that ran crazily overlapping with each other, two resulting in boys now aged 4 and 7, and the other two resulting in publications in Science and Nature Neuroscience, it is very clear that I've traveled a road only "women scientists" get to navigate. Among my colleagues in this roller-coaster journey were 3 outstanding women scientists: postdocs Vishakha Mangale and Nandini Gokulchandran, who joined my lab out of interest in my work, but also because they needed to be in Mumbai for 2-career reasons, and PhD student Lakshmi Subramanian, who wanted to remain close to home for family reasons. This story will highlight the many facets of a uniquely Indian support system that made it possible for me to juggle the jobs of scientist and mommy, the bumpy road to setting up a lab in India, and a fundamental scientific discovery we were privileged to make together.

> "As every woman knows who's doubled as scientist and mommy, there simply isn't enough time to do it all."

There is no single starting point to this story, but as is often the case, many intertwined strands. My own part in this story began when I returned to TIFR, Mumbai after 11 years of PhD and postdoc in the US (Caltech and University of Chicago respectively), motivated by a desire to contribute to Indian science, to help shape improvements in the education system, and to bring science to the public. Of course, I was terrified at the prospect of setting up in a system I knew nothing of, having done all of my training in the US. Yet there was a good measure of idealism and determination- if I didn't succeed, it wouldn't be for lack of trying everything I could. I began my lab in 1999, with a couple of MSc students, and we had our first publication submitted in 2000. The following year, an unusual student joined my lab. Lakshmi, a Microbiology graduate, applied successfully to our highly competitive graduate program, and proceeded to "interview" me for the job of her advisor before she accepted (!). She was to display this same independence in her research, and make a seminal contribution that drew upon her expertise in understanding the development of the hippocampus, a structure critical for learning and memory.

I had written a couple of ambitious proposals, first for a Wellcome Trust Senior Fellowship just before starting my lab, and a few years later, a DST Swarnajayanti Fellowship, both of which got funded. The aim was to create a chimeric brain in which wildtype and Lhx2 null cells would be intermingled, to test for a cell autonomous role for Lhx2 in the development of the cerebral cortex. Two postdocs, Nandini and Vishakha, took on different aspects of this challenging project. Nandini, an MD who wanted to work with stem cells and displayed seemingly unlimited amounts of energy and resilience in a tricky project- she derived Lhx2-/- ES cells from matings of +/- mice. Finally there was Vishakha, with an intuition that allowed her to see far down the road in terms of her project, an uncanny ability to make good decisions each step of the way, one of which was spending several months in another lab in Hyderabad to bring back a key technique (ES cell-morula aggregations) that nucleated what we called the "chimera project". A young student Satyaki Prasad joined our Master's program, and a postdoc Ben Martynoga from the UK joined us in 2006 and brought in the entire range of transplantation and surgical skills required to produce Chimeras. But this is getting ahead of the story.

Our Institute had no transgenic facility for a project of this nature. So from 2005, my lab members presented a series of work seminars at a Friday departmental forum to make the case that we really did have everything together in terms of the technique (successful proof of principle experiments Vishakha performed at our colleague's lab in Hyderabad) and the background to start this off. My faculty colleagues were fantastically supportive, and emptied out an underused electrophysiology room that we were allowed to renovate to create a tissue culture room for the chimeric blastocysts, with an anteroom for the transplantation surgeries. A couple of years of heroic



efforts at chimera making, after which we began to see the first results. And we were amazed at a double bonus: not only was Lhx2 a fundamental player in creating the cerebral cortex, but also, we were able to establish the identity of an organizing center for the hippocampus. We had actually created a mouse embryo with 7 hippocampi instead of the normal 2! We reported these findings in Science (January 2008)

This high point came after a bumpy few years getting things off the ground. I was 32 years old when I started my lab, and starting a family was something my husband and I wanted to do sooner rather than later. One look at the uphill task of setting up the first vertebrate lab at my Institute, and I panicked: I could only grow one thing at a time! By the time I was pregnant with my first son, Abhay, at 35, our small animal house could no longer meet the needs of the two labs in the department that used rodents for their work. We requested permission to build an annex, and I remember waddling all over the proposed site with the engineer, marking the boundaries of the structure.

> "We also discovered another positive aspect of life as an academic in India: the supportive mind-set of colleagues and the ability of the system to adapt to issues as they are raised."

My lab had its first publication, and the next two were written and submitted during the generous maternity leave my Institute allows- 4 months, during which teams of students would visit me at home, and I would look at the data and write in between the competing demands of training the new nanny, setting up baby things, reorganizing the apartment. Three years later, I had my second son Nikhil at 38, by which time my lab was used to my middle-of-the-night emails that I'd send because Nikhil would wake me up at 3 am and I couldn't sleep right away! In fact, this particular 3 am slot worked beautifully for corresponding with our collaborator in California when writing our Science paper - it's a good bet that Nikhil saved us a month of manuscript preparation time because I could respond to my collaborator's emails the same day he sent them instead of a 12 hour delay. We even mentioned this important contribution in the acknowledgements, by thanking Nikhil for "timely assistance in manuscript preparation" (!).

As every woman knows who's doubled as scientist and mommy, there simply isn't enough time to do it all; we were fortunate in many ways. First, my husband Sandip, also a scientist (a theoretical physicist at the same Institute I work at) took

on his fair share of the workload, so that I could slip off to the lab after dinner, or sleep late into the mornings after a series of middle of the night feedings. I could also travel to meetings as soon as my kids switched to bottle feeding. It simply doesn't "do" to be out of circulation for too long, which brings me to two awesome women without whom I could simply not have juggled it all.

My dear aunt Ushamavashi, wonderful granny and retired doctor, who moved in with us for a few months when I had each of my sons, to provide support, advice, and baby care, who always had a calm assessment of every situation and kept us from panicking at every minor fever or rash or tummy ache. I have had many treasured conversations, and learned many Marathi lullabies. And she would also take a genuine interest in my work, and periodically ask me how one or another student's paper was doing, and I would share with her some of the excitement or frustration or some little detail that we were trying to fix. Even today the kids and I look forward to her visits and she holds a special place in our lives and hearts.

> "Though the system may not be particularly set up in terms of regulations and codes and rights, it's always ok to raise an issue."

And finally, there is our kids' nanny, Rajkumari, genuinely loving, utterly reliable, and resolutely loyal. Perhaps the most amazing part of this story is that Rajkumari comes from a family that observes very traditional rules for women, requiring them to cover their faces behind a "ghungat" in the presence of men, and does not permit them to work outside the home. Rajkumari never went to school. This only served to fuel her determination that her two daughters should not have to grow up illiterate as she did- she wanted to earn so that she could send them to school. So she braved the ire of her in-laws and husband and broke the rule about being house-bound, to take up a job- the only one she was qualified for being that of a domestic helper or nanny. I paid her well enough to make it worth her while, considerably more than going rates for such a job, but Rajkumari turned out to be invaluable, or at the very least, worth her weight in gold. Barely a sick day or two each year, and she loved my kids as if they were her own. She would call on her day off just to speak to them because she missed them so much!

She determinedly learned everything I trained her to do, from sterilizing bottles to

preparing the baby for an outing, organizing snacks, schedules, shopping for small necessities as needed. As the kids grew, she also doubled as a housekeeper, managing household expenses, groceries, laundry, and other household chores. Rajkumari quickly learned how to pack the "doctor's bag" to meet us at the car for a doctor's visit, to dispense medication in the middle of the day if required, and how to keep us informed via phone updates. Because of her, I could begin to travel to meetings, or work straight through a long day without worrying about school pickups or snacks or the myriad little things that need doing when there are young kids at home. Without her I would've not only stressed about everything – an unavoidable feature of mommydom- but I would've had to parallel so many tasks that my science would've suffered.

Another fortunate turn of events occurred just after Abhay was born. A new government regulation required all Institutions to provide childcare, and so our new Child Care Center (CCC) was set up just in time for both my kids to spend a few hours a day there to play with friends, do activities with the wonderfully creative teachers, or just play about in a different environment from home. I served on the Executive Committee of the CCC for its first 6 years, as did several other colleagues and friends, helping to plan everything from teacher/helper interviews, workday schedules, menus, services, even shopping for toys, putting in place medical emergency procedures etc.

> "I LIKE TO BELIEVE THAT EACH TIME I PUSHED THE ENVELOPE, IT CONTRIBUTED POSITIVELY TO THE SYSTEM TOO, MAKING IT EASIER FOR THE NEXT WOMAN SCIENTIST BY INCREASING AWARENESS OF OUR PRESENCE AND NEEDS."

Our collective efforts paid off, and our CCC has now become more than a daycare center - it's a social center, organizing cultural programs, taking charge of ferrying the children to their evening activities (music, gymnastics, soccer, kathak- all available within our campus itself), and even provides Saturday childcare. Both my kids wait for Saturdays when they can spend at least half the day at the CCC because that's where all their friends are! Saturday afternoons are when my husband and I have a weekly "lunch date" by ourselves, since our kids are only too happy to eat at the CCC. The center's hot lunches and delicious snacks- cuisine from all over India- are part of the attraction. And it's all at affordable rates, so we could keep the nanny on full time as a housekeeper and

send first the older, then both sons to the CCC for a part of the day as they grew.

Does all this wonderful support help or add to the guilt that every working mother seems to bear as part of the job? I like to think it has allowed me to manage my professional responsibilities and yet keep the best parts of being a mommy for myself. For example, thanks to Rajkumari, we didn't have to do laundry or fold clothes- but the joy of bathing the kids every evening and letting them splash us, then chasing a wet, shrieking, giggling toddler around the bedroom to persuade him to towel off- all mine or Sandip's! We could come home for lunch, which is how I managed to breastfeed both kids for nearly a year each, and even when they were weaned, a half hour of cuddling or play before their afternoon nap was something they and I looked forward to.

> "India, then, is a place for people- men and women- who want to initiate change, and find fulfilment in being part of this process."

Finally, because I had waited till I was a PI before I became a mommy, this meant that my schedule could be quite flexible since I didn't have to do benchwork. My students knew to reach me by phone if I was at home in the mornings, and lab meetings could happen at home when I was on maternity leave. If a child was sick, Sandip and I could stagger our lunch breaks so that mostly, a parent was at home when the sick child woke up from a nap. In summary, being a PI –mommy meant that even though I was working hard, I could really do it whenever and wherever possible- middle of the night manuscript writing, or handling other departmental duties by email. As an example, in one of my 4AM emails, I came up with the structure for an entirely new course, "Research Methodology" to introduce new students to the nuts and bolts of science, so that they would understand seminars in a wide range of biological topics. This course was largely taught by our senior students and postdocs, and supervised/coordinated by me, and grew to be our most popular introductory course. So I was actually doing multiple things in parallel, quite successfully, and could make the time to be a mommy by prioritizing things properly.

We also discovered another positive aspect of life as an academic in India: the supportive mind-set of colleagues and the ability of the system to adapt to issues as they are raised. Just before our first child was born, Sandip and I met a senior,

eminent physicist colleague when we were walking home in the evening. He said he had some firm advice for us: that at this juncture in our lives, we should take all the possible leave we were entitled to- and particularly encouraged Sandip to stay at home and enjoy the baby! "These years will never come again, work will keep going on," he said. My own department willingly excused me from duties that entailed travel (such as our 4-day PhD interview process which used to happen in Bangalore together with that of NCBS), for several years.

Outside my Institution too I found that people would accommodate my needs. When I was still nursing my 2 month old infant, I was invited to be on a committee that entailed a meeting in Bangalore, and an interview for the Swarnajayanti fellowship, in Delhi. Though each visit could be done in a day trip (i.e. I didn't have to take the baby along), there were other problems- restrooms in India don't have the space or facilities nursing mothers require. So I informed the person in charge that I had just had a baby and would need access to a private room, preferably with an electric outlet, to operate a breast pump (I had to add the detail, because this is just not something one expects others to know- that it is impossible for a nursing mother to hold off nursing or pumping if she is used to providing 3 hourly feeds!). Yes, this took some courage to declare in an email (I didn't know these people - one being a very senior well respected scientist), but I thought, this is something a professional woman needs so I should simply ask, rather than make excuses and not attend. Reassuringly, both times I was easily accommodated – which told me that though the system may not be particularly set up in terms of regulations and codes and rights, it's always ok to raise an issue, and a reasonable request is at least considered, if not granted.

I like to believe that each time I pushed the envelope, it contributed positively to the system too, making it easier for the next woman scientist by increasing awareness of our presence and needs. India, then, is a place for people- men and women- who want to initiate change, and find fulfilment in being part of this process.

After 10 years of joining TIFR, my husband and I we were each able to arrange sabbaticals at Stanford University, a center of excellence in both our fields. We moved with the family, the kids went to school in the US for a year, and we got to see first-hand how mommies and daddies in the US manage the scientist-and-parent jobs. Anyone who pulls this off in the US deserves a medal, no, two or three. My husband and I have had our most productive scientific years after returning to India, and had two children during these years, so I'll end this story with a grateful

acknowledgement of the wonderful support system we have, that draws from modern-day India's many contrasting faces: a supportive Institution and colleagues, a fantastic child care center, and the two women who don't get authorship on my papers, but who have nevertheless been an integral part of my success as a scientist, and to my being able to juggle mommydom and lab at the same time: my retired aunt Ushamavashi, and the determined and loyal Rajkumari, an illiterate but forward thinking mother who dreamed of sending her daughters to school.

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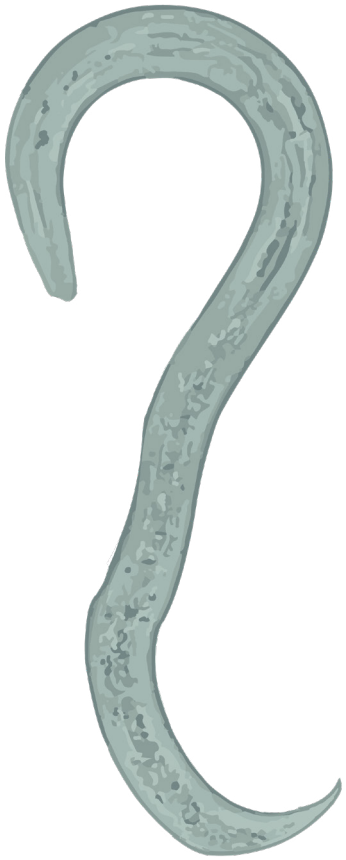
What changes do you believe will help future generations of women in science the most?



Farah Ishtiaq,
Ecologist, Indian Institute of Science, Bangalore

Women need to develop a positive and supportive attitude towards other women. I have seen many senior women scientists who like to talk about this but are not doing enough to support struggling women scientists. There are many fellowships/schemes for women scientists, which is great, but I have seen such opportunities being exploited too, which gives a bad name and experience for other competitive candidates. Change in policies which influence women's career – for e.g. maternity break, supportive working environment and attitude towards career break.

Sarah Iqbal,
Public engagement officer, India Alliance

We must first acknowledge and identify the challenges that women face in science and accordingly develop enabling policies to ensure that more women are able to participate. Since, the underrepresentation of women and other minorities in professional spaces, specially in leadership roles,

is not specific to science, we must take a holistic approach to solve these problems and to retain and nurture diverse scientific talent in science. No stopgap or impassioned measures but well thought-out plans to encourage more young girls to take up science and women PhD graduates and postdocs to successfully transition into science careers that interests them. Our interventions should really be aimed at increasing diversity, inclusivity and equity in the workforce. Finally, we need to create positive and healthy professional spaces that are conducive for both working women and men so that they can work cooperatively towards a common cause – of ultimately making this world a better place.

Savita Ayyar
Research Management Consultant,
Jaquaranda Tree

Our families and institutions need to evolve towards making it possible for women to participate fully in all walks of life, including science. While a woman's way of life and choices might be different from that of a man, she brings her own unique insights and abilities to each profession. A woman should be judged by how meaningful her contributions are to the discipline. Genuine acceptance of diversity will go a long way towards helping future generations of women be successful in science.

Meenakshi Munshi,
Scientist 'G'/Adviser,
Department of Biotechnology, Govt. of India

Charity always begins at home. It is the responsibility of parents initially to support girl child and be a part of her initial journey. A young women in my view needs to have strong belief in one's own self, listen to your own instinct, perseverance and hard work always pay in the long run, so don't lose patience and hope. These are the two things which will keep you going.

Devapriya Chattopadhyay,
Paleobiologist, IISER Kolkata

Change in the outlook of all members of the society irrespective of their gender would greatly help future generations of women. I strongly believe that the children of working mothers of today would make the core of responsible citizens of tomorrow. I expect them to be more sensitive, compassionate and gender neutral in their conduct. Till then, the struggle continues.

Dhanashree Paranjpe,
Ecologist, Abasaheb Garware College, Pune

Gender bias has now become more subtle at least in big research institutes in India. We still need lot of initiatives, efforts from scientists themselves to create a level playing field. Gender

sensitization needs to be discussed on public fora, training workshops/ short modules on identifying and handling workplace harassment and other unethical practices, courses on research ethics taught at Masters and PhD level, refresher courses on "best research practices" for young and experienced scientists, greater transparency in hiring process would be some of the measures scientific community can take to increase active participation of women in scientific research. If institutes and government have clear policies on how to handle cases of unethical behaviour in science, how to "punish" wrongdoers, how to protect whistleblowers, we might retain more promising women (and men) in research. The breaks in career for childbirth, family responsibilities or any other reason are still frowned upon/ held against scientists (women and men alike) in hiring process, promotions. We collectively need to understand that career paths need not be straight and monotonous for a person to be considered as "promising" scientists. There can be detours, breaks in career which may actually bring fresh perspective, new skills to research.

Jugnu Jain,
Entrepreneur, Sapien Biosciences

We need to change the mind-frame that a woman 'need not work' after marriage, or work only if in-laws 'permit' it, or if the family needs money. Women should exert their choices and work for pleasure. Think of science broadly. Women in science need not be in labs always – they can be teachers and administrators, technology transfer officers, lawyers including intellectual property, environmental conservation, instrumentation, policy making, data analytics, patient advocacy, scientific writing and communication, organic farming, politics, forensics, etc.

Smitha Hegde
Educator, NITTE University Centre for Science Education and Research

Flexible working hours. Child care leave. A sick child at home means the most non-productive day at work. Nothing feels good.

Bushra Ateeq,
Molecular oncologist, IIT Kanpur

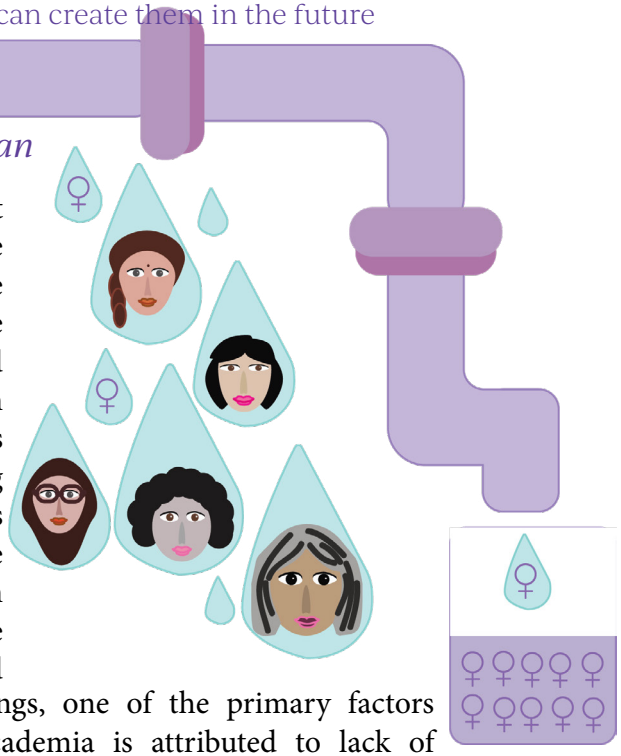
There are many initiatives by the Government of India, for example 'Vigyan Jyoti' scheme by Department of Science and Technology (DST) conducted at IITs and IISERs in its first phase, which provided three weeks residential camp for the brightest girl students studying in class XI, this was to motivate them to choose a career in Science & Technology at a young age. This is a fantastic initiative, but there

is a need to conduct it at mega level so that more girl students could benefit, especially from remote rural locations. The Government should also waive off application fees for girl students for the competitive exams (NEET, JEE, CSIR-JRF, UGC, GATE etc.). This will lead to many more girls to take up these competitive examinations, who unfortunately otherwise don't apply because of the financial burden or family's mindset. Other major problem is the career break, many women suffer because of family responsibilities. We should have more schemes in place for supporting such women, for instance relaxation in age limits for government jobs, certain grant applications and academic awards. Finally, I think any positive change in the society comes from the family (home), therefore, mothers should come forward and get involved in gender-neutral parenting, which will change mindsets. This will eventually support economic independence and empowerment of women.

Plugging the 'leaky pipeline'

Need for women-friendly workplaces in academia and how we can create them in the future

Vaishnavi Ananthanarayanan



The 'leaky pipeline', a metaphor that is commonly used to allude to women dropping out of the academic ladder, starts at the level of doctoral positions and only exacerbates with each increasing rung. The result is that even with women making up 30-40% of the enrollments in science programs across the country, only about than one-fifth of the faculty positions in science at leading institutes are held by women. Amongst other things, one of the primary factors for this gender disparity in academia is attributed to lack of familial or institutional support during the initial years of career building. The commencement of postdoctoral stints or faculty positions typically coincides with other life activities, such as marriage and child rearing. As a result, several bright and talented women are forced to drop out of academia due to inadequate 'safety nets', especially with regards to the latter.

While this phenomenon (and the related 'glass ceiling') has been investigated in great depth for decades, and several remedies proposed to counter the problem, one could argue that the only true fix to this issue is a societal change in mindset regarding the gender roles attributed to women. This would take care of the issue of insufficient family support that was alluded to earlier. The second solution, that of institutional support, is perhaps more easily implementable. By making the measures proposed have little to do with changes in attitude and all more to do with policy and infrastructural changes, perhaps

we can expect quicker turnarounds from ideas to execution. One or more of the measures enumerated below have already been undertaken by research institutes across the country, but making these solutions a part of research policy will help integrate more women in academia in the long run.

Conducting gender sensitization workshops on a regular basis

Every individual has an outlook on gender and gender roles that is molded by their upbringing and environment. However, as the proportion of women in academia increases, it is imperative that both men and women are educated on aspects related to gender equality and prevention of sexual harassment. Several institutes across the country have gender sensitization and sexual harassment awareness workshops that are conducted regularly and are required to be attended by all faculty members, students and staff. Such workshops go a long way in making sure that women feel welcome in academia.

"As the proportion of women in academia increases, it is imperative that both men and women are educated on aspects related to gender equality and prevention of sexual harassment"

Easy access to day-care facilities

A key feature of empowering women researchers is establishing a day-care centre on campus. The presence of a reliable day-care centre in close proximity to the workplace ensures that new mothers can return to work as soon as possible, without having to rely on a support system at home to take care of the new family member. So too, having a centre on campus where regular check-ins on her child are possible affords her some much-needed peace of mind. Again, several research institutes in the country have realized the importance of a day-care centre in retaining women in academia and have partnered with local day care centres to set up shop within campuses.

Tenure-track assessments that take maternity leave into account

Typical tenure-track academic positions in India require tenure applications to be submitted within 5 years from the commencement of the position. Several institutes and universities do not take maternity leave periods into consideration when assessing applications for tenure, thereby unwittingly penalizing women for a natural phenomenon. By recognizing and acknowledging that women need

time out during pregnancy and after childbirth to get back to science will ensure that women are not unfairly put at a disadvantage. In a very welcome move, the Indian Institute of Science has formally amended the tenure policy to extend the duration before tenure assessment for women faculty members by 1 year per child (to be availed twice at most). Other research establishments in the country should follow suit, if they haven't already, in making their tenure process equitable.

Accommodating the schedules of women in academia

Several young women have the inevitable duty of juggling work obligations alongside family responsibilities. Institutions and universities would be doing a great service by being cognizant of the limitations on daily schedules of women (and men) imposed by such responsibilities. For example, scheduling important meetings after regular working hours and on weekends alienates parents who are unable to find a babysitter for their child for the duration of the meeting. While 'skyping in' might be a viable solution in this instance, this author feels that having only a telepresence dilutes opinions on key issues that may be discussed during meetings. Therefore, restricting all meetings to regular working hours will increase participation of women in academic policy.

Access to formal or informal mentoring and support groups

Finally, young women will benefit immensely by identifying mentors who will help them navigate the complex academic landscape – everything from advice on student hiring and grant applications to assuaging fears and keeping themselves grounded. Institutes/universities can aid in this process by formalizing the mentor-mentee relationship and facilitating regular meetings. Online and offline career support groups for women, consisting mostly of peers from various backgrounds, also serves to assist women in academia find a platform to seek help and advice. Institutes and universities can foster such local support groups for women by allocating resources and infrastructure for meet-ups, and by promoting conversations between institute administration and group members when recommendations for policy changes arise from such meetings.

Coupled with increasing conversations around the world regarding gender equality, these measures ensure that equal representation of women in academia is only a matter of time.

Bystander training in academic spaces
Agreeing to Disagree

Sandhya P Koushika

Science needs to identify, attract, nurture and retain talented people, be they students, post-docs, faculty or administrators. The next big discovery could come from anyone. This necessitates giving a fair chance to the most diverse group of people such that finally, the best ideas contribute to the benefit of science and society at large. Therefore we must build inclusive environments attracting participation without explicit or implicit bias, with regard to gender, socio-economic status, caste, prior educational training, disability, language or any of a number of subtle cues to a person's background.

Merely assembling a diverse group of people is insufficient. They should be heard and mechanisms should exist to incorporate their ideas to change institutional culture. Civility in discourse is the first step towards creating institutional practices that are centred in mutual respect and open dialogue. Often communities do not sufficiently appreciate the importance of improving existing norms in dialogue to ensure that all members of the community are engaged. Ensuring this is a way of getting everyone to invest in making scientific workplaces more open and equitable. Such practices will go a long way in retaining talent, rather than bleeding it.

“To build a culture of openness & mutual respect, people should feel free to express their ideas and debate them.”

To build a culture of openness & mutual respect, people should feel free to express their ideas and debate them. In good environments, these ideas will extend beyond just discussing scientific ideas to include thorny issues, e.g. the #metoo movement in academia. The heart of all civil discourse is to be able to express disagreement without denying the positions and perspectives of others. This is particularly important in gender issues but also in other types of inclusivity. The final goal must be for people to be willing and committed to finding solutions (and changing their minds!), even if that might involve compromises from all stakeholders.

Many will agree with the goals expressed above; however, addressing how such changes can be brought about is often a source of debate. Unless we are prepared to confront all aspects of the problem, from everyday conversations to large-scale institutional practices, change will not result. For instance, inappropriate and sometimes offensive statements are made in small groups. Some in the group might extend the benefit of doubt to the person making this statement or simply laugh it off as a joke. Others in this group may view the same statement as inappropriate, and at the very least diminishing collegiality in a working environment. The person/group at the receiving end of such statements as well as those hearing them (bystanders) both hesitate in calling out the individual even in small group settings. A response is frequently stressful and both sides run the risk of being labelled ultra-sensitive or aggressive, decreasing often painstakingly built social capital.

"A QUARTER OF A CENTURY AGO, CONVERSATIONS AROUND GENDER IN INDIAN SCIENCE BARELY EXISTED. NOW, SUCH CONVERSATIONS ARE PART OF THE NARRATIVE."

It is in this space that Institutional policy can set the tone of appropriate discourse. Over time, ensuring that the right tone is set can bring real change on the ground. Institutions do have some procedures for addressing behaviour that is truly egregious, typically through internal complaint mechanisms. Given the overarching goal of attracting and retaining diversity in talent, this alone is not enough.

One approach is bystander sensitization that can benefit both traditionally under-represented groups and their allies, giving people ways to express themselves in groups of all sizes without worrying about how they will be perceived. Sensitization training using role-playing and by working through different perspectives is one means to achieve this end. Such training benefits everyone, particularly the bystander who can learn how to express disagreement or call out inappropriate behaviour in a civil manner, while simultaneously promoting thoughtful dialogue.

The second approach is for institutions to regularly revisit the central barriers that their people face in the workplace. Using anonymous surveys to identify top issues can be useful. One should solicit ideas from the community regarding how to

initiate conversations centred around difficult issues, developing ways of expressing disagreement honestly and building consensus. Well-trained independent external agencies can bring fresh ideas to sensitization and bystander training programs.

Bystander and sensitization training can be an extremely powerful means through which an institution can make a commitment to a more equitable workplace for all its members, thus promoting a culture of working together respectfully. This is not easy to do but it is essential. The role of bystander and sensitization training is one where institutions can bridge the gap between long-term institutional goals and individual ones. Such training allows all its members in a small setting to discuss the issues that they face and contribute directly to altering an institutional environment through an ongoing dialogue. This ensures that the institution does not have a monoculture or one set by diktat only from people at the top, but also values bottom-up participation.

Over time, it has become easier to speak about gender and other types of difficult issues in academic environments. A quarter of a century ago, conversations around gender in Indian science barely existed. Now, such conversations are part of the narrative. In a similar manner, we must educate communities that it is right to not keep silent if confronted with discriminatory or offensive speech or action.

Institutions should encode in their DNA the change that they, and society, want to see. This means gender, socio-economic status, caste, prior educational background, language etc should not impede training opportunities or career paths. This will benefit all: individuals, academic institutions and finally, science itself.

Acknowledgements:
I thank Deepa Khushalani (TIFR), Gautam Menon (IMSc) and Shambhavi Geetha Kulkarni (Bombay International School) for many ongoing discussions as well as feedback on this article

Is there any message that you want to pass on to the young women of tomorrow?

Jugnu Jain,
Entrepreneur, Sapien Biosciences

Women need to come together to help themselves and future generations. It's important to build professional networks where women can share problems and seek help with solutions in a comfortable zone. It's also important for women to contribute time and resources to their alma mater and alumni association to nurture young talent, because without this, the next generation will not have the benefit of their experience and connections. I strongly advise women to be economically independent and financially literate in managing your basic finances so you are never dependent on anyone. Having personal 'rocks and shoulders' whom you can depend on, come what may, are necessary. Things will go wrong sometimes if you choose to create your own path. In those times when most people around you are questioning or criticizing you, it's critical to have people you trust that you can turn to. Women tend to take on everyone's problems. But they need to guard and reserve some 'me' time too to deal with them. Don't be afraid of the unknown. Make change your friend and think how best to use the opportunity that each change brings.

Sarah Iqbal,
Public engagement officer, Wellcome Trust/DBT India Alliance

I would simply pass on the message I have received over the years – pursue what you are truly interested in, don't get distracted by other people's opinions about you or your capabilities. And most importantly, be the change you want to see.

P Hemalatha Reddy,
Educator, Sri Venketeswara College

This is a golden age for women working in science. Women of today come from the second generation of working women in the family. They are more bold, confident and open to new ideas and opportunities. And there are ample opportunities because India has established its position at the global forum. They just have to make the right move at the right time. So, my message to young women is never to lose hope and utilise your time wisely and constructively. Balance work with family time. And most of all, reserve some time for your own self. If you are healthy and happy, everything else will follow suit.

Lipika Sahoo,
Intellectual Property Professional
Lifeintelect consultancy Pvt Ltd

Believe in your dreams. Be resilient. Accept yourself as you are.

Devapriya Chattopadhyay,
Paleobiologist, IISER Kolkata

Don't let others define you or your path. Take pride in your sense of logic, compassion and hard work. Be fiercely independent. This means that you have to struggle through your failures, probably alone. This, however, also ensures that your eventual success would be truly yours.

Suhita Nadkarni,
Neurobiologist, IISER Pune

My personal experience has lead me to understand that you don't always have to make a choice between a career in science and home and other duties and joy associated with being a homemaker. If you are able to cultivate an environment of support at home and at work, choose a domestic partner who is able to contribute equally at home and who understands the nature of your work as much as you are able to reciprocate that support, you can very much be a part of the playing field in science. Also remember to be the mentor that you have had or you would have like to have had. Set an example. Change the levels of acceptability at every given opportunity that undermine the capability of the female gender, stereotypes them and discriminates against them. Young people are always keenly observing.

Smitha Hegde
Educator, NITTE University Centre for Science Education and Research

Success is a scale you can draw for yourself and do not allow anyone else to define it for you, because you are the best judge of your assets and capacities

Sonam Mehrotra,
Cancer biologist, ACTREC

Give priority to yourself (mental and physical health) and your successful career. A successful career in science requires passion, a lot of hard work and perseverance. Be aware of this while choosing science/research as a career.

Dhanashree Paranjpe,
Ecologist, Abasaheb Garware College,

If women internalise the message that they have to choose only one thing- career in science or personal relationships/responsibilities, there is little chance of following one's passion for science. Don't focus on naysayers, don't doubt your ability to contribute to science just because you are a woman. We may have to make a thousand other adjustments to follow our dreams. I have learned it the hard way- believe in yourself, speak up about your struggles, be a role model to others in whatever field you choose. Blaze the trail for others to follow.

Bushra Ateeq,
Molecular oncologist, IIT Kanpur

I want every young woman to believe in themselves. They all have enormous potential and competence, they just need to discover it, don't be afraid in attempting something new and don't get disheartened if you fail. Remember, each failure teaches you something new which contributes towards your success.

Meenakshi Munshi,
Scientist 'G'/Adviser,
Department of Biotechnology, Govt. of India

Stay away from negative people, very few people in life will encourage you to believe in your own self. Take life as it comes because one doesn't know how destiny unfolds, so go with the flow. Don't give up till it is over. Above all, what counts in life is peace within self, so work towards it.

Savita Ayyar
Research Management Consultant,
Jaquaranda Tree

Being successful is important, but so is having a good work-life balance. As Richard Feynman said, "Nobody ever figures out what life is all about, and it doesn't matter. Explore the world. Nearly everything is really interesting if you go into it deeply

enough!" Build a fulfilling career and also savour all that life has to offer!

Farah Ishtiaq,
Ecologist, Indian Institute of Science,

Do what you are interested in and are good at - it's good to give priority to home but there is also a part of you that you need to explore, develop and nurture. Don't lose your focus.

Contributing Authors

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Anitha Kurup is a Professor and Dean, School of Social Sciences and Head of the Education Programme at National Institute of Advanced Studies (NIAS), Bangalore. She leads the National Gifted and Talented Education Program in India anchored at NIAS. Her research interests span the broad disciplines of education and gender studies.

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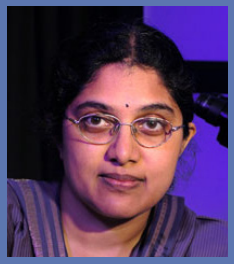
Molecular Biologist, Centre for DNA Fingerprinting and Diagnostics (CDFD), Hyderabad

Rashna Bhandari is Head, Laboratory of Cell Signalling at the Centre for DNA Fingerprinting and Diagnostics (CDFD), Hyderabad. Her lab studies signal transduction in biological systems, with particular emphasis on understanding the role of inositol pyrophosphates in physiology and metabolism.

Sandhya Koushika



Neurobiologist, Tata Institute of Fundamental Research (TIFR), Mumbai

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Sandhya S. Vishweshwariah

Cell Biologist, Indian Institute of Science, Bengaluru

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Neurobiologist, Tata Institute of Fundamental Research (TIFR), Mumbai

Shubha Tole is a Professor at the Department of Biological Sciences, Tata Institute of Fundamental Research, Mumbai. Her research interests lie in understanding how highly specialized brain structures form during development. She has previously written about how societal norms work against women choosing STEM careers, and on the need for gender sensitization in academic workspaces.

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Sreelaja Nair is an Assistant Professor at the Department of Biological Sciences, Tata Institute of Fundamental Research (TIFR), Mumbai. She was an Wellcome Trust/DBT India Alliance intermediate fellow and her research interests lie in understanding maternal contributions to the mechanisms driving the development of a single cell zygote into a multicellular embryo.

Sunil Mukhi

Theoretical physicist, Indian Institute of Science Education and Research (IISER) Pune

Sunil Mukhi is a theoretical physicist and Coordinator/Head of the Physics Programme at the Indian Institute of Science Education and Research (IISER) Pune. He has been vocal about the issue of ethics in scientific research and writes a light-hearted blog called tantu-jaal that addresses general aspects of science .

Vaishnavi Ananthanarayanan

Cell Biologist, Indian Institute of Science, Bengaluru

Vaishnavi Ananthanarayanan is an Assistant Professor at the Centre for Biosystems Science and Engineering in the Indian Institute of Science, Bangalore. A Wellcome Trust/DBT-India Alliance Intermediate Fellow and an EMBO Young Investigator, her lab studies cytoskeleton and associated proteins during various cellular processes.

RESOURCES

Funding & Awards for Women in Science in India

Women Scientists are an important workforce in the field of science & technology (S&T). However, it has been observed that due to various factors, they may not be getting enough opportunities in academics and research institutes. The Government of India and various private organisations have been working on providing gender-specific schemes to women in science. Concerted efforts have been made to give women a strong foothold into the scientific profession, help them re-enter into the mainstream and provide a launch pad for further forays into the field of science and technology.

Contents

Women Scientist Scheme by DST

The 'Women Scientist Scheme' of the Department of Science and Technology, provides career opportunities which include fellowships for unemployed women scientists and technologists, especially those who have had a break in career, for pursuing research in frontier areas of Science and Engineering. There are three major components of the Women Scientist Scheme namely,

i) Women Scientists Scheme-A (WOS-A) for conducting research in Basic & Applied Sciences,
ii) Women Scientists Scheme-B (WOS-B) for S&T interventions for Societal Benefit, and
iii) Women Scientists Scheme-C (WOS-C) that enables women to become Intellectual Property Rights (IPRs) professionals.

The fellowship amount for MSc, MPhil/MTech and PhD categories are Rs.30,000/-, Rs.40,000/- and Rs.55,000/- per month respectively. The total project costs, for 3 years duration of these three categories, are Rs 20 lakhs, Rs 25 lakhs and Rs 30 lakhs respectively. In addition to the fellowship, the total project cost also includes grants for consumables, minor equipment items, travel and contingency. The upper age limit to apply under this scheme is 57 years.

More information can be found here

Women Scientist Scheme by DBT

Biotechnology Career Advancement and Re-orientation Programme (Bio-CARe) for Women Scientists

In an attempt to enhance the participation of Women Scientists in Biotechnology Research, the Department of Biotechnology launched a Biotechnology Career Advancement and Re-orientation Programme (Bio-CARe) for women scientists. The programme is primarily meant to aid the career development of employed/ unemployed women scientists up to 55 years of age for whom this

is the first extramural research grant. The scheme is open for all areas of life science/ biology (including agriculture, veterinary science and medicine).
The scheme includes a Research Grant Opportunity (RGO), under which a 3-5 year research grant is provided. Under this scheme, unemployed women scientists will be provided a monthly emolument ranging from Rs. 50,000/- to 60,000/- p.m, while employed women Scientists will receive an amount of Rs.10,000/- p.m in addition to their regular salary as an incentive. A research grant of up to Rs. 50 lakhs is provided.

More information can be found here

National Women Bio-scientist Award

The Department of Biotechnology, Ministry of Science & Technology (Government of India), instituted the National Women Bio-scientist Award in the year 1999 to recognize outstanding contributions of women scientists in the area of life sciences and biotechnology with potential for application, product and technology development.

The award consists of the following two categories:

National Women Bio-scientists Award (Senior Category)
National Women Bio-scientists Award (Young Category)

More information can be found here

SERB Women Excellence Award

SERB Women Excellence Award is a one-time award given to women scientists below 40 years of age and who have received recognition such as Young Scientist Medal, Young Associate etc from any one or more of the following national academies: i) The Indian National Science Academy (INSA), New Delhi ii) Indian Academy of Science (IASc), Bangalore iii) National Academy of Science (NASI), Allahabad iv) Indian National Academy of Engineering (INAE), New Delhi v) National Academy of Medical Sciences (NAMS), New Delhi vi) National Academy of Agricultural Sciences (NAAS), New Delhi.

The awardees will be supported with a research grant of Rs.5 lakh per annum for a period of 3 years. The applications (two hard copies) need to be sent to the secretary, SERB. The call for proposals is usually notified through the website annually.

More information can be found here

Women in Science lectures by EMBO

Organizers of conferences funded through the EMBO Courses & Workshop programme wishing to invite a scientist speaking about issues related to women in science are encouraged to apply for this lecture grant. Maximum funding: €800 (for European speakers) and €1200 (for overseas speakers), to cover travel and accommodation costs. In order to avail this grant, the filled application form can be sent to the EMBO Women in Science office (women@embo.org).

More information can be found here

Post Doctoral Fellowship for Women

The UGC has initiated a scheme of Post Doctoral Fellowship for Women to candidates who are unemployed holding PhD degree in their respective subject areas, with an aim to accelerate the talented instincts of the women candidates to carry out advanced studies and research. The total duration of the fellowship is five years with no provision for further extension. The number of slots available under the scheme is 100 per year.

More information can be found here

L'Oréal India For Young Women in Science Scholarships

L'Oréal India strongly believes that Science is the source of progress, and the contribution of women is vital to its future. The L'Oréal India For Young Women in Science Scholarship Programme encourages and supports young women who

wish to pursue careers in science. The programme was instituted in 2003 and has consistently helped young women to pursue scientific studies. A scholarship of Rs. 250,000/- each is granted to promising but economically disadvantaged young women and covers college fees for study in any scientific field in a recognized college or university in India.

More information can be found here

Indo-U.S. Fellowship for Women in STEMM

Indo-U.S. Fellowship for Women in STEMM (Science, Technology, Engineering, Mathematics and Medicine) is aimed to provide opportunities to Indian Women Scientists, Engineers & Technologists to undertake international collaborative research in premier institutions in U.S.A, to enhance their research capacities and capabilities in global perspective. DST launched this fellowship (WISTEMM) jointly with Indo-U.S. Science and Technology Forum (IUSSTF).

More information can be found here

National Post Doctoral Fellowship

The SERB-National Post Doctoral Fellowship (N-PDF) is aimed to identify motivated young researchers and provide them support for doing research in frontier areas of science and engineering. The fellows work under a mentor, and it is hoped that this training will provide them a platform to develop as an independent researcher. There is the age relaxation of 5 (five) years given to women candidates.

More information can be found here

UNDERSTANDING SEXUAL HARASSMENT OF WOMEN AT THE WORKPLACE

Alternative Law Forum

Sexual harassment in the workplace has been recognized as a form of workplace violence that compromises the quality of life. It is an assault on dignity and has far-reaching implications on the working conditions and human rights of millions across the world.

As behavior, culture and habitual expression, sexual harassment is entrenched within all social institutions. The existence and extent of sexual harassment in the workplace, up until now, have had a very limited discourse. With a history and understanding as a discriminatory practice, sexual harassment manifests in the social world in a variety of ways.

"AS BEHAVIOR, CULTURE AND HABITUAL EXPRESSION, SEXUAL HARASSMENT IS ENTRENCHED WITHIN ALL SOCIAL INSTITUTIONS"

A history well described by Yale scholar Reva Siegel states that the practice of sexual harassment (defined as unwanted sexual relations imposed by superiors on subordinates at work) is centuries old. Sexual coercion was an entrenched feature of chattel slavery endured by indentured women without protection of law. Within the domestic context, the underpinnings of caste oppression doubly marginalized women at work through the every historical period and much of that reality remains even now, in spite of the #metoo wave.

The foundation for sexual harassment law in India is the Supreme Court's 1997 Vishaka judgement. It is an important case in its facts because of the role caste and gender plays in the unceasing oppression of working women. Unprecedented on several counts, the judgement was the first authoritative decision of 'sexual harassment' realizing the possibility of 'judicial legislation'.

The judgement included at set of guidelines as forming the semblance of both a process and redressal for sexual harassment. Vishaka was also an important iteration of the Indian's Courts' deference to International Human Rights Law. The judgement

references General Recommendation 19 to the Convention on Elimination of All Forms of Discrimination against Women (CEDAW) and International Labour Convention on Discrimination (Employment and Occupation) Convention (No. C111).

In a wretched irony, the original complainant in the case, who survived a brutal gang rape by upper caste men because she tried to prevent child marriage as part of her duties as a worker of the Women Development Programme, lost her own case against her assailants. All of them were acquitted. The outcome is telling of process that realizes legislation but loses justice.

The Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, ("Sexual Harassment Act") was passed on April 23, 2013. The Law replaced the Vishaka guidelines 16 years after they were set down. The Act recognizes that sexual harassment constitutes a violation of fundamental rights of women and their right to life and to live with dignity and carry on any profession, trade, or business in an environment free from sexual harassment. The definition of sexual harassment in the Sexual Harassment Act is in line with the Supreme Court's definition in the Vishaka Judgment and includes any unwelcome sexually determined behavior (whether directly or by implication) such as physical contact and advances, demand or request for sexual favours, sexually colored remarks, showing pornography, or any other unwelcome physical verbal or non-verbal conduct of sexual nature. The law provides a framework for reporting, redressal committees, interim reliefs and the process for complaint and inquiry. The law is its current form is gender specific towards victims who identify as female.

Duty bearers within the Act are predominately employers. Employers are expected to abide by the Act's provisions on the creation of an Internal Complaints Committee. It is this authority that receives and investigates complaints. In case there are fewer than 10 employees in a company, or if the act of sexual harassment has been conducted by the employer himself, the victim must approach the State Local Complaints Committee, which must be constituted in every district by the State Government, or contact the local police station. In theory, the Act provides for a time-bound approach to the process of inquiry and conciliation, where once the committee receives the complaint, they must complete inquiry into the same within 90 days and submit a final report to Employer or District Officer (as the case may be) within ten days thereafter.

> “HOSTILE WORK ENVIRONMENT REMAINS A REALITY FOR WOMEN IN ALL SECTORS OF EMPLOYMENT.”

The Act aligns itself with labour rights conceptualization of ‘world of work’ (an extended workplace), which attempts to consider not only the traditional physical workplace, but other aspects of both the physical and physiological ‘spaces’ of work. A comprehensive approach as recommended by the International Labour Organization includes a wide range of work spaces including technology such as the internet as a ‘venue’ but also including commuting to and from work, work-related social events, public spaces for informal workers. Through the realization of legislation, Internal Complaints Committees have been set up, but there is a question of whether that impacts and actual reduction in the incidence of sexual harassment. The implementations of the Act has become its most critical test for success as both a means of redressal for women who face sexual harassment but also to provide an insight into the contributing social practices that embolden abuse within work sectors.

In education and science a key aspect is gender based discrimination amounting to harassment, which is often under reported or not reported at all. This type of behavior conveys the impression that women do not belong in the workplace or do not merit respect manifesting in ‘put-downs, demotions and isolation’. In a report that examines the issue of sexual harassment in amongst medical and engineering students, 19% more women than men were aware of the different behaviors which can constitute sexual harassment. 70% of that same sample size of men believed that women are responsible for their harassment.

Early advocates Mackinnon and Farley shed some light into the still current realities of gender, sex and labour dynamics. It has been understood the sexual coercion women encountered at work is part of the larger political economy of heterosexuality, a social order that institutionalizes sexual relations between men and women in relations of economic dependency between men and women, an order in which patriarchy and market play reinforcing roles in the reproduction of women's social subordination.

During the surge of global conversations around sexual harassment, work place violence, and gender based discrimination, what is evident is that hostile work environment remains a reality for women in all sectors of employment.

Empirical data has consistently demonstrated that the most vulnerable women has those community populations that endure social isolation and marginalized as a part of their daily existence. Women belonging to lower castes, regardless of their elevation in employment or education, are routinely subjected to conceding their bodies and their agency. If we are to address the problem comprehensively, then the inclusion of the caste and class narrative is imperative. An engagement with the issue of sexual harassment has expanded questions of gender, caste and equality. It demands that the paradigm of productivity that is driven fundamentally by degrees of harassment is questioned. It also raises questions of relations and how we must consciously examine our roles as well as our privileges as passive facilitators to hostile work environments.

[1]Vishakha and others v State of Rajasthan

[2]International Labour Conference, 107th Session, 2018, Report V(1)

[3]Gender differences in perception of workplace sexual harassment among future professionals

[4]Farley, supra note 7, at 49 ("Depression of female earning power reinforces the domestic division of labor, which in turn reinforces job segregation, which in its own turn reinforces depressed female wages").

SEXUAL HARASSMENT OF WOMEN AT THE WORKPLACE – REDRESSAL MECHANISMS

Frequently Asked Questions

Q. What is sexual harassment?
A. Sexual harassment, in simple terms, includes any sexual act whether direct or by implication which is unwelcome in nature.

Q. What constitutes a workplace?

- Workplace premises
- Any place visited by employee arising out of/in the course of employment, including transportation provided for employer for doing the same
- This need not be only the workplace where the woman is employed

Q. What is the law regarding the same?
A. The law regarding prevention of sexual harassment at the workplace developed following the Vishaka judgement, where the Supreme Court laid down basic guidelines to be followed by institutions in this regard. The Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013 provides for an Internal Complaints Committee to be constituted to deal with such acts at a workplace.

Q. What are the redressal mechanisms available for victims of sexual harassment?
A. Lodging a complaint with the Internal Complaints Committee or the nearest police station.

INTERNAL COMPLAINTS COMMITTEE

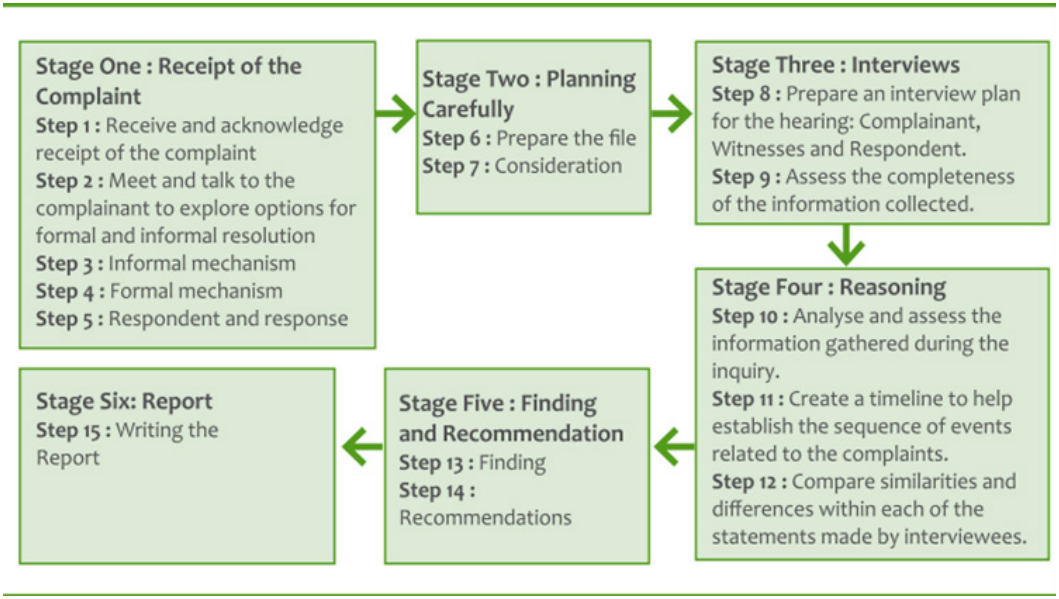
Q. How is the Internal Complaints Committee Constituted?
A. 50% of the members of the committee must be women, and the Presiding Officer has to be a woman. In case the offices or administrative units of a workplace are located in multiple places, each one must have an ICC of its own. Complaints Committee/s members must be free of any conflict of interest with either the concerned parties

or with the outcome.

Q. Is there any other Committee that deals with cases of sexual harassment at the workplace?

A. In case there are fewer than 10 employees in a company, or if the act of sexual harassment has been conducted by the employer himself, the victim must approach the Local Complaints Committee, which must be constituted in every district by the State Government, or contact the local police station.

Q. What are the stages of inquiry under the ICC?

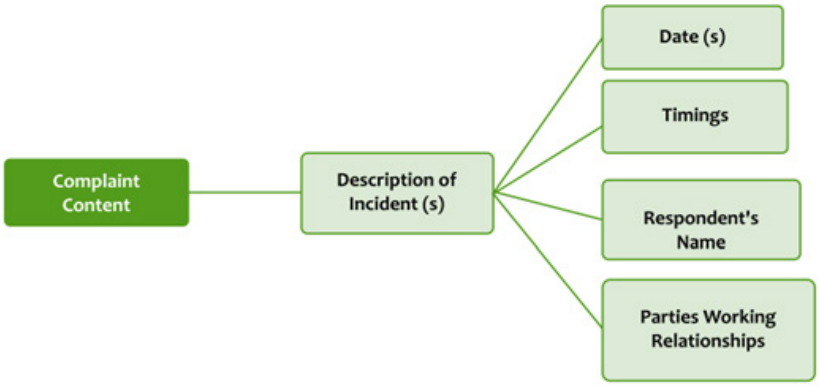


Q. Who can complain?

A. In case the victim of sexual harassment is incapable of filing the complaint, the complaint can be filed by a relative, friend, person with knowledge and the victim's written consent among others.

Q. What must the complaint contain?

The written complaint should contain a description of each incident(s). It should include relevant dates, timings and locations; name of the respondent(s); and the working relationship between the parties. A person designated to manage the workplace sexual harassment complaint is required to provide assistance in writing of the complaint if the complainant seeks it for any reason.



Q. What is the procedure to file the complaint?
A. Complaint must be filed within 3 months of the incident or 3 months of the last incident (extension can be granted at the discretion of the committee)
Six copies of:

i. complaint;
ii. supporting documents; and
iii. names and addresses of the witnesses

Complainant must receive acknowledgement receipt

Q. What is the process of inquiry?
A. Once the committee receives the complaint, they must complete inquiry into the same within 90 days and submit a final report to Employer or District Officer (as the case may be) within ten days thereafter.

Q. What is the informal process of settlement?
A. At the request of the aggrieved woman, the matter can be settled through conciliation. The Committee may advise for or against the same, but the final decision is that of the complainant. Monetary settlement cannot be made the basis of conciliation.

Q. What is the formal process of inquiry?
A. The formal process of inquiry deals with accumulation of evidence, i.e., eye-witnesses, relevant documents, interviews conducted etc., at the end of which the ICC reports whether or not the sexual harassment has taken place and what the penalty will be in case it has been proven.

Q. Will the complainant be granted any relief during the process of inquiry?
A. In the process of the inquiry the Committee may, on request by the Complainant, grant temporary relief in the form of:

i. transfer of the aggrieved woman or the respondent to any other workplace;
ii. granting leave to the aggrieved woman up to a period of 3 months in addition to her regular statutory/ contractual leave entitlement;
iii. restraining the respondent from reporting on the work performance of the aggrieved woman or writing her confidential report, which duties may be transferred to other employees.

Q. What happens if the sexual harassment has not been proven?
A.If the ICC determines that no sexual harassment has taken place, there will be no action taken against the respondent.

Q. What are the penalties in case the sexual harassment has been proved?
A. If the harrassment is proved it may be recommended that the respondent issues a written apology, his promotion, pay rise or increment in salary is withheld, his services are terminated, he receives counselling or is reprimanded.

Q. Can the complainant not receive compensation in case the sexual harassment has been proved?
A. The Complaints Committee may also recommend financial damages to the complainant, while deciding the amount they shall take into consideration:

- Mental trauma, pain, suffering and emotional distress caused;
- Medical expenses incurred;
- Loss of career opportunity;
- Income and financial status of the respondent.

If the amount is not paid it can be recovered as an arrear of land revenue.

Q. Will the report containing the findings be submitted to the complainant and

respondent?
A. The final report will be made available to both the parties.

Q. When will the Employer have to act on the ICC's recommendations?
A. The Employer or District Officer is obliged to act on the recommendations within 60 days.

Q. Can one appeal in case they are dissatisfied by the ICC's findings?
A. If any of the parties is not satisfied with the finding, they may appeal the same in an appropriate court or tribunal.

Q. What are the duties of the employer in this regard?
A. An employer is duty-bound to provide a safe working environment, increase awareness about what constitutes sexual harassment and its consequences, and provide adequate redressal mechanisms for the same.

POLICE STATION

Q. What is an FIR?
A. FIR (First Information Report) is a report that contains all the details of the offence committed against the victim. The FIR is the first step towards investigating the offence.

Q. How can one file an FIR?
A. An FIR is filed at the police station closest to the place of commission of offence, with an officer in charge. It can be done orally or in writing. The particulars of the offence must be recorded by the officer and subsequently read out to the informant.

Q. Can the police refuse to file an FIR?
A. The officer in charge cannot refuse to file an FIR. If the officer in charge refuses to record the information,

i. the same can be sent to the Superintendent of Police in writing and by post;
ii. one can approach the National or State Human Rights Commissions;
iii. approach the National Commission for Women

Q. Does the informant get a copy of the FIR?
A. The informant must receive a copy of the FIR within 24 hours of its filing.

Q. Can a woman having faced sexual harassment request to have a female police officer file the FIR?
A. Yes.

Q. Under which provisions of the Indian Penal Code can one lodge a complaint regarding sexual harassment?
A. IPC provisions under which the FIR can be filed:

1. Section 354 : Outraging the modesty of a woman
Assault or use of criminal force to any woman, intending to outrage or knowing it to be likely that modesty would be outraged.

2. Section 354-A: Sexual harassment by a man

i. Physical contact and advances involving unwelcome and explicit sexual overtures;
ii. Demand or request for sexual favours;
iii. Showing pornography against the will of a woman; or
iv. making sexually coloured remarks.

3. Section 354-B : Assault or use of criminal force to woman with intent to disrobe

4. Section 354-C: Voyeurism
Watching, or capturing the image of a woman engaging in a private act in circumstances where she would usually have the expectation of not being observed either by the perpetrator or by any other person at the behest of the perpetrator or disseminates such image.

5. Section 354-D: Stalking
Following a woman and contacting or attempting to contact such woman to foster personal interaction repeatedly despite a clear indication of disinterest by such woman; or Monitoring the use by a woman of the internet, email or any other form of electronic communication.

6. Section503. Criminal intimidation

Whoever threatens another with any injury to his person, reputation or property, or to the person or reputation of any one in whom that person is interested, with intent to cause alarm to that person, or to cause that person to do any act which he is not legally bound to do, or to omit to do any act which that person is legally entitled to do, as the means of avoiding the execution of such threat, commits criminal intimidation.

7. Section 509: Uttering any word, making any sound or gesture, or exhibiting any object, intending that such word or sound shall be heard, or that such gesture or object shall be seen, by a woman, with an intention to insult her modesty, or intruding upon the privacy of such woman.

8. Section 376C. Sexual intercourse by a person in authority.
Abuse of such position or fiduciary relationship to induce or seduce any woman either in his custody or under his charge or present in the premises to have sexual intercourse with him

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