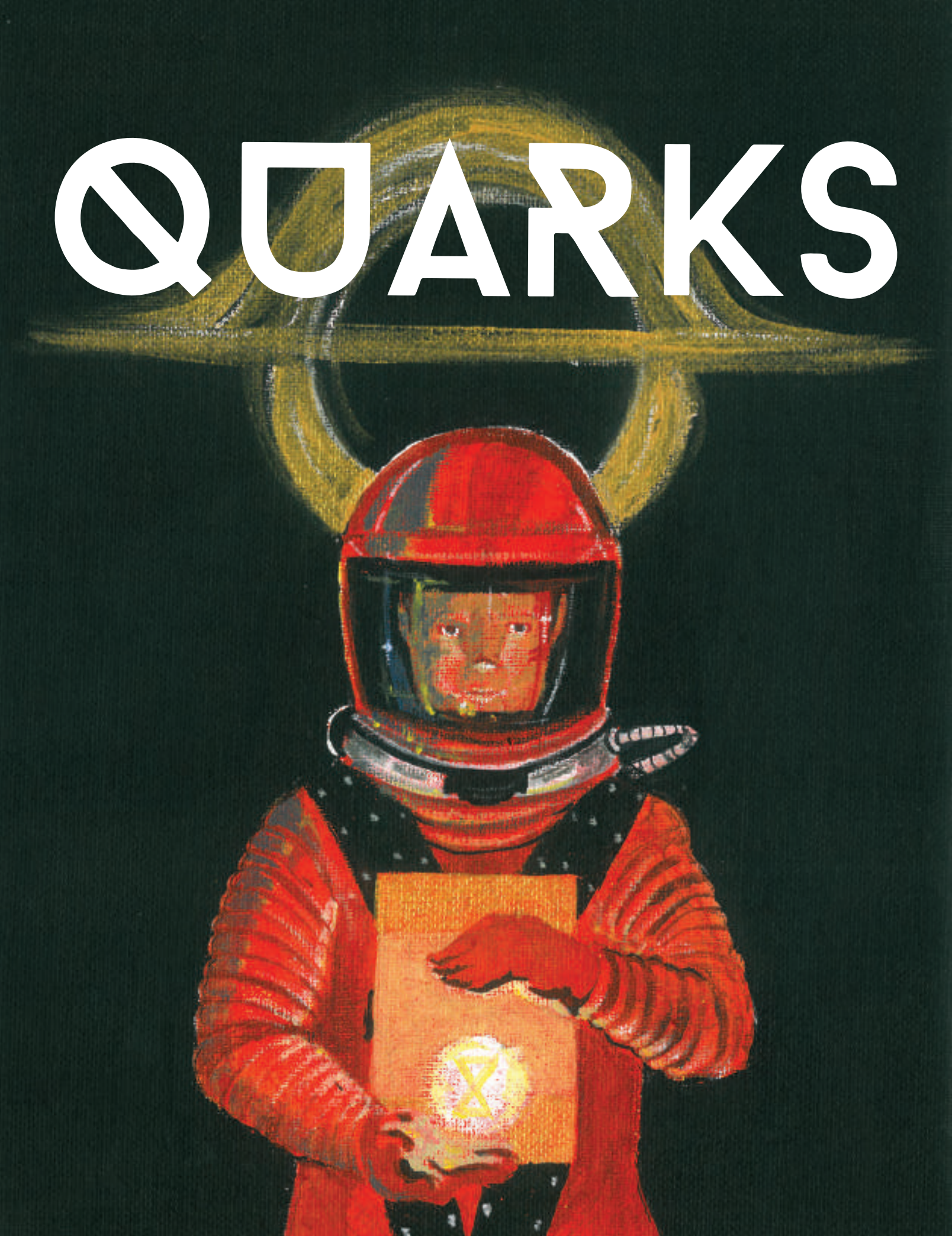
QUARKS



QUARKS

2022-2023

Cover page illustration by Tejas Keswani

From the Dean's Desk

The UG program has been growing from strength to strength ever since its inception in 2011. As we enter the twelfth anniversary year, it is inching towards becoming a flagship program of the institute. I take a lot of pride in associating myself with the youngest and the brightest minds of the campus and working towards making this program, the most sought after program in the country.

The UG program has been witnessing quite a number of changes over the past couple of years, offering a wonderful academic environment and quite a number of opportunities outside the classroom, in terms of extra-curricular activities to hone the hidden talents of the students. The multidisciplinary approach to teaching in combination with just about emphasis on contemporary research exposure, prepares the students in a very holistic manner which makes the program quite unique in the country. The academic curricular changes that were brought in, in the past year, offers more flexibility for the students in terms of the courses that they can take and this hopefully will make the program even more satisfying and wholesome for the students. With the introduction of the BTech (Mathematics & Computing) program in the year 2022-2023, the UG program has been stealing the limelight with a larger group of young, energetic, and bright students and making the campus more vibrant.

The students continue to excel not only in academics but also in many other fields. The students continue to bring accolades to the institute through their achievements in various competitions, both at the national and the international levels. It is not only academics and competitions that the students excel in, but also organizational and also in various cultural activities, which demonstrate the multifaceted capabilities of the UG students. One platform which provides an opportunity for the students to showcase their literary talents which are otherwise latent, is the UG magazine, QUARKS entirely brought out by the students, annually. The QUARKS magazine is a lens through which the UG students could look and perceive and experience what they observe and bring out their hidden talents in the form of an article, a note, a poem, a story, or simply a photograph to the forefront.

I am quite pleased to write this note for the 10th edition of QUARKS, which is the painstaking efforts of the entire QUARKS team. I look forward to reading this issue and am sure that it will make an equally enjoyable reading experience as the previous editions of QUARKS.

Happy reading.

Balaji Jagirdar

Dean, Undergraduate Program

Editor's Note

I am glad to finally present to you the annual issue of Quarks, the undergraduate magazine, for the session 2022-23. Like anything worthwhile, this one took its time. Brewing slowly, crouching and crawling till it rose and finally broke into a sprint. It has been heartening to watch it come together, take a voice of its own like a creature with opinions.

Quarks first came into existence through the generous efforts of some passionate undergrads almost a decade ago. Since then, it has been a sanctuary to the stirring creative voices of our community. Borrowing the name from the fundamental subatomic particle, quark, it's a reminder that our creative expression is just as fundamental to our personal identity as any other pursuit.

Crafting the annual magazine has been an experience this year. From frantic visits to the UG office to spending interminable nights poring over sequences of words, to finding pockets of time together, it was quite a ride. And, of course, the Quarks experience is never complete without pushing, poking, prodding every soul in sight to go indulge in the arts so we could display the fruits of their spirited efforts.

Over months we collected a delightful mixture- prose, poetry, articles, travelogues and some gorgeous artwork. The literary entries are poignant with their compelling voices. We also received some comic entries that had us beating with laughter. The issue also features collaborative work which the team had a lot of fun putting together. As always, we have interviews offering perspectives on a wide variety of things. From the old and seasoned pioneers of their fields to those beginning afresh. An interview with Mrs. Vaishna Roy, editor of The Hindu and Frontline, became a very enriching take on contemporary journalism.

Punctuating all of these are some beautiful works of art and photography that we received over the months. This year's issue has been deeply reflective of the hopes we all harbor, the ones that keep us wakeful at night. The cover itself is an artful nod to mankind's final hope of finding a home floating somewhere in the vast reaches of space, buoyed by our collective humanity.

I would like to extend a vote of thanks to the administrative staff involved in the making of the magazine. Without the office of communication, the magazine would not physically exist at all. I would like to thank the dean, Prof Balaji Jagirdar for extending his support at a time when things were not taking shape.

I am extremely thankful to my teammates and friends for working together on the magazine despite clogged schedules and, at times, 12-hour time zone differences!

Your efforts were instrumental in bringing Quarks to life. Y'all can rest now. For a while, that is.

Most importantly, I am thankful to all the people who submitted entries or contributed in their own ways to the becoming of this magazine. They form the soul of the issue, imbuing it with a beating heart. It's a glowing testament to the vibrant, creative spirit of our community. An outpouring of voices who delve in more than just science.

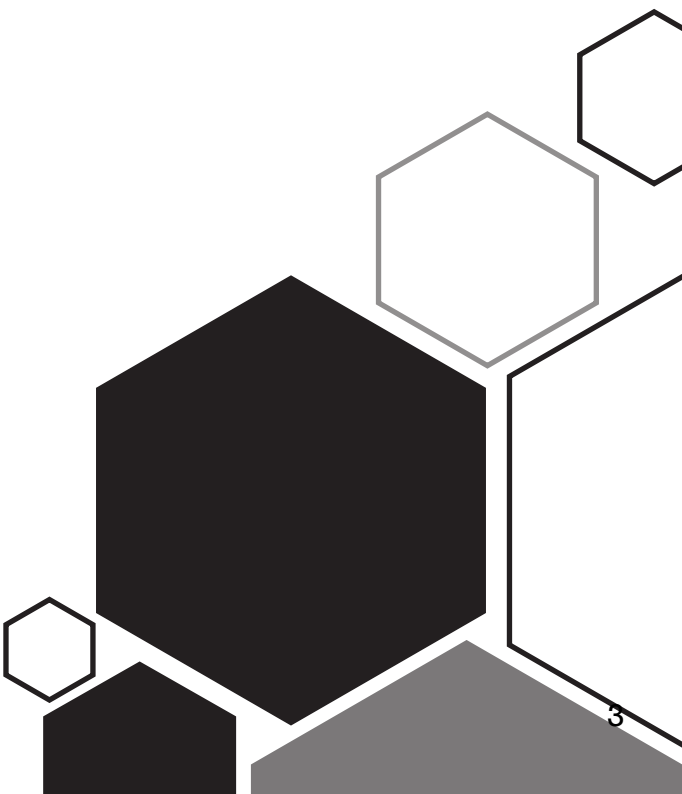
Looking back, I am proud of the fruits our efforts have borne. The process was not without it struggles. We had to canvass for its cause, sometimes hold dear friends at the proverbial gunpoint to squeeze a submission out of them. But when the entries started trickling in, it was like hope being kindled again. Beyond all the chaos that went into creating it, Quarks was always a space worth preserving. It mattered. I am hopeful it will continue to serve as this ledger of creativity in the future.

If this little labor of love inspires you to pick up that brush again, or the pen to ink up your thoughts - to create something however small or big, we would consider our job successful.

Hope you enjoy reading it as much as we loved creating it.

Thank You!

Saakshi Porwal
Editor,
Quarks- 2022/2023



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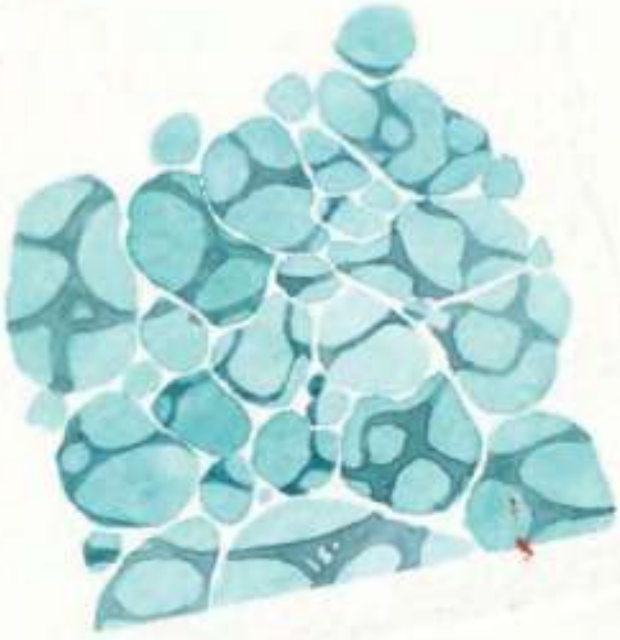

Art by Tsungrojungla Walling

A Longing For Renewal

-Divija Nanavati

Ah, This again!
The frozen clockworks
Of my mind stuck
On the same tick-tocks.
The same old carousel
With lights dimmed out
Takes me around.
Euphoria hits
An illusion of movement
But then I rudely crash into the ground.
The same sky, same sights
Same drag of the day
Taints and tarnishes the youth.
When tomorrow's just today relived.

So, take me.
Show me around
A world anew.
Smell of fresh blossoms
Bathed in dew.
Paint my mind
All yellow and blue.
A Van Gogh painting
I can drink and drown in.

Send me off with a ditsy crew.
Laughing with carefree madness.
Chasing a rainbow tail.
A ludicrous life on emerald seas.
Send me off to chase colours,
Will you?
Or better yet,
Follow me too

অচেনা বসন্ত

-মৌসম বিশ্বাস

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-"কি খবর বল। ফাইনাল রিপোর্টগুলো পেলি কি? আজই তো পাঠাবার কথা ছিল ওদের।"

-"পেয়েছি রে," নিচু স্বরে উত্তর এল।

-"কি এসেছে রিপোর্টে?"

-"আর বলিস না"...মৃদু হাসির আওয়াজ আসে,"আর বেশি দিন টিকব না। কিন্তু জ্বালাতন করবো তোকে ততক্ষণ। অ্যাডভান্সড স্টেজে পৌঁছে গেল । হতে পারে বড়জোর আর পাঁচ-ছ মাস আছে হাতে।"

কিছুক্ষণ নীরবতা দুদিকেই। একটা কষ্ট জমাট বাঁধে, পাথর হয়ে যায় অভির বুক, চিন্তা, চেতনা।

-"তুই শোন, আমি ঠিক করেছি আজ বাড়ি ফিরেই মায়ের সাথে কথা বলবো আমাদের নিয়ে। বিয়েটা আর বেশি দিন ফেলে রাখতে চাইছিলাম না আমি। ধর পরের উইকেই একটা ডেট ফাইনাল করি ?"

."ফালতু কথা বলিস না অভি, একবার আঙ্কেলের কথা টাও ভেবে দেখ তুই। এমন সিদ্ধান্তে কেউ কি আর সায় দেয় ?"

- "কি বলবে আর ম্যাক্সিমাম? মেনে নেবে না হয়তো। আমাকে ত্যাজ্যবলে ঘোষণা করবে হয়তো। আলাদা থাকতে বলবে। তা হোক, তা যাই হোক না কেনো, আমি আর তোকে ছাড়া থাকতে পারছিনা।"

শুধু একটা দীর্ঘশ্বাস ভেসে আসে অপর প্রান্ত থেকে ভেসে আসে।

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বাবাকে চিরকালই ভয় পেয়ে এসেছে অভি। দূরত্ব বেড়েছে মা মারা যাবার পর। তারপর সময় কেটে গেছে আরো, ফারাক এসেছে অনেক। রাতের খাওয়ার টেবিলেই শুধু মুখ দেখা, তখনই সেই ফিজিক্যাল দুরত্ব কমে হয়তো, মানসিক দুরত্ব কমে কি তাও ? ক্যাজুয়াল কথাবার্তা দু-একটা নিয়মরক্ষার খাতিরে, শরীর কেমন যাচ্ছে? সুগারের ওষুধ ঠিকঠাক খাচ্ছো, এইসব। উনি এতটাই গম্ভীর মানুষ, সম্পর্কের মধ্যের হিমশীতল বরফ গলবে না কোনোদিনই হয়তো। কথাই হয়না, একেবারে বিয়ের কথাই বা কিভাবে বলবে ? বাবাকে বললে কি যে রিঅ্যাকশন হবে, তাতো সময়ই বলবে। হয়তো তা ভালভাবেই জানে অভি। তাও একটা চাপা টেনশন কাজ মনের ভিতরে। জীবনের এতোবড়ো ডিসিশন নেওয়ার ব্যাপারে নিজের ইমোশনকেই প্রায়োরিটি দিচ্ছে সেটা মেনে নেবেন না বাবা কখনই। সম্পর্কের আলগা সুতোই একথা বলে দিচ্ছে অভিকে।

রাতে অফিস সেরে বাড়ি ফিরে অভি দেখে বাবা ড্রয়িং রুমে বসে টিভি দেখছে চুপচাপ। সিলিন্ডারের দাম বাড়লো পঞ্চাশ টাকা, বন্দুকবাজের গুলিতে মারা গেলেন প্রাক্তন প্রধানমন্ত্রী, টক শো এসব। ফ্রেশ হয়ে সামান্য কিছু খেয়ে নিয়ে বাবার পাশে গিয়ে বসলো অভি। বাবার সেদিকে হুঁশ নেই, না থাকারই কথা। হঠাৎ কি আর অভ্যাস বদলায় ? এবিপি আনন্দের খবরে মশগুল বাবা।

-"বাবা,"

হয়তো ৮ বছর পর ভদ্রলোক এই ডাক আবার শুনলেন। "কিছু বলবে?"

"বাবা, তোমার সাথে কিছু ইম্পর্ট্যান্ট কথা আছে।"

এবিপি আনন্দ চুপ করে যায়। অভির দিকে তাকান অভির বাবা, জীবনবাবু, ওরফে জীবন সিনহা, প্রাক্তন ব্যারিস্টার। এখন রিটায়ার্ড।

"আমি আমার বিয়ে নিয়ে তোমার সঙ্গে কথা বলতে চাই।"

জীবনবাবু অবাক, এর আগে যতবারই উনি এবিষয়ে কথা বলতে গেছেন, ততোবারই এড়িয়ে গেছে অভি।
"নিশ্চয়ই.....আমি তো শুনতেই চাই, এ বিষয়ে তোমার মতামত।"

"বাবা আমি একজনকে ভালোবাসি," গলার আওয়াজ নিজেরই অন্যরকম লাগে অভির। হয়তো নিজের জন্যই প্রথমবার বাবাকে বলতে গিয়ে বাধো বাধো ঠেকছে। কখনো সে বাবার কাছে কিছু চায়নি, সেইজন্যই কি ?" তাকে বিয়ে করতে চাই।" বাক্যটা শেষ করে কোনোরকমে অভি।

"কে সে?" অভিব্যক্তির অভাব দেখা যায় জীবনবাবুর চেহারায়, "কোনো অফিস কলিগ? না কলেজের বন্ধু?"

"তুমি ওকে খুব ভালোভাবেই চেনো।" খানিক নিস্তব্ধতা, "আমি অনিকে ভালোবাসি, সেই কলেজের সময় থেকে। ওর ক্যান্সার ধরা পড়েছে বাবা। অ্যাডভান্সড স্টেজ। আমি জানিনা আর কতদিন ওকে দেখতে পাবো! আমি ওকে খুব খুব ভালবাসি বাবা।" মনের প্রত্যেকটা শব্দকে আবেগের জামা পরিয়ে যেন সমস্ত কুণ্ঠাবোধের পর্দা চিরে বেরিয়ে আসতে থাকে অভির গলা দিয়ে

কিন্তু একি ?কোনও রিঅ্যাকশন নেই কেন ? কোন উত্তর নেই, কোনরকম আউটবার্স্ট, কিচ্ছু নেই! উনি যেন পাথর হয়ে গেছেন! এটা কি ঝড়ের আগের নিস্তব্ধতা ? মনকে শক্ত করে অভি 'নাঃ, বাবা কখনোই মেনে নেবে না এই বিয়ে।

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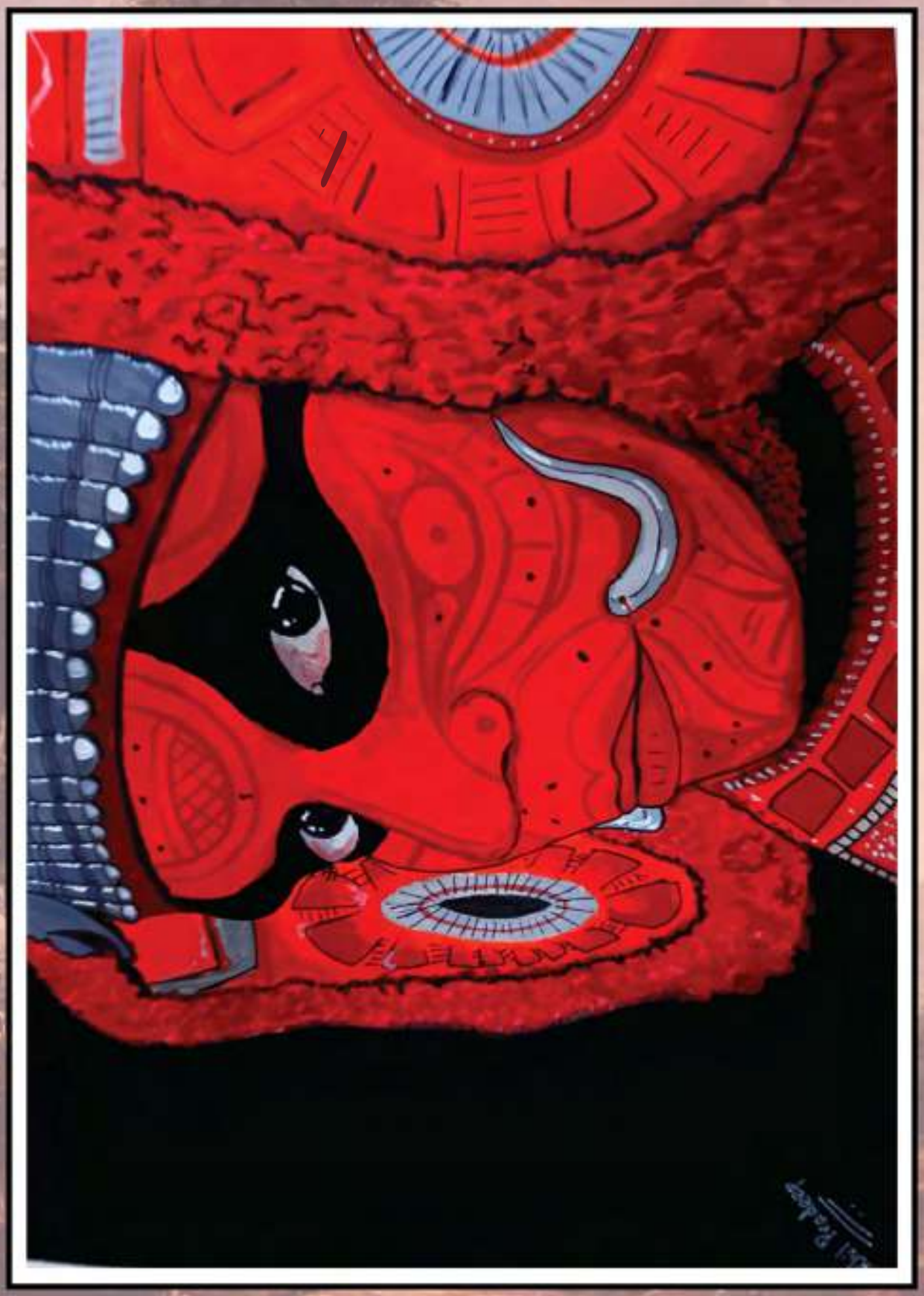
উঠে দাঁড়ান মিঃ সিনহা, শান্ত অথচ দৃঢ় পায়ে এগিয়ে যান বেডরুমের দিকে। কে জানে মনের ভিতর কি চলছে কি দুঃসহনীয় এই নিস্তব্ধতা। অভি কোনরকমে ডেকে ওঠে,"বাবা..." পারে না আর বলতে, আবেগের জামার গলার জায়গা ছোট হয়ে আসে।

"বিয়ের পর অনিকে এই বাড়িতে নিয়ে এস, এখানেই থাকবে ও। ক্যান্সারের চিকিৎসার অনেক খরচ, আমার সম্পত্তির অংশ আমি তোমার নাম লিখে দিচ্ছি। সেখান থেকেই ওর চিকিৎসার ব্যবস্থা করা। গরিব ফ্যামিলি, পারবে কি হসপিটালের খরচ ওঠাতে ?" দরজা বন্ধ হয়ে যায় বেডরুমের। জীবনবাবুর আউটবার্স্ট হয়নি, অভি কেঁদে ফেলে। ড্রয়িং রুমে এসে ফোন লাগে অনিকে ভেজা চোখেই," হ্যালো, অনি? ...

দরজার ওপারে চোয়াল শক্ত হয়ে ওঠে ভদ্রলোকের। চোখ দিয়ে আর জল গড়াবে না ৩২ বছর আগের সেই যুবক জীবনের মতন। চোখের জল যে বড্ডো হিসাবি। একটা বয়সের পর কষ্টগুলো তরল থাকে না, জমাট বেঁধে যায় যে। ৩২ বছর আগে সংবিধানের ভয়ে, নাহঃ, সমাজেরই ভয়েই খুন করেছিল দুজনের ভালোবাসাকে। গলা টিপে শেষ করেছিল সেই অনুভূতিকে সে। যুবক জীবন পায়নি তার প্রথম ভালোবাসা অজয়কে। কিন্তু কখনোই বিফলে যাবে না অভিষিক্তা আর অনিতার ভালোবাসা, যেতে দেবেন না। একে অপরের হয়েই থাকবে চিরকাল। হয়তো।

Photograph by Aman Goyal



Art by Nikhil Pradeep

Photograph by Siddharth Bothra

Art by Aman Goyal

ENTROPY

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In 2022, Prof. Deepak Dhar became the first Indian to be awarded the Boltzmann Medal, the highest recognition in statistical physics. In an interaction with Quarks, he gives us an insight into what statistical mechanics means to him and his aprroach to a research career.

The Boltzmann Medal is a highly recognised award in the field of Statistical Physics. How do you feel about receiving this honour? Did receiving this award bring any changes in your life?

The Boltzmann medal is undoubtedly a great honour, and I am happy to be selected. I would say that there are people who got the award earlier, like Wilson and Fisher who are giants in the field. I am sure I don't compare to them in any way. So all the people who get the award are not equally good.

How much change has it caused in my life? Not very much! I don't feel awfully different. I think the only difference is that my name has come in the newspapers, and some more people have heard my name, but I'm sort of assured that the public memory is short, and they will not remember for long.

Science is getting increasingly interdisciplinary. Physics, for example, is finding applications in many different fields, leading to new innovations every day. How does Statistical Physics shape your thought across domains?

Everyone who looks upon a problem comes with some history, and how we look at something depends on what we have encountered before. When I look at a problem, it has some perspective that is sort of like a statistical physics perspective because that is what I have been trained in. So, it is inescapable that there will be such a thing. However, it is not necessarily the best way to look at it, but that's the way we do. So, one can look at problems from several perspectives, and statistical physics has provided me with a helpful way to look at problems in economics, networks and maybe problems in traffic as well. Maybe also in biology.

During your school years, what motivated you to take up science?

When I was a child, my father encouraged me to study science. He used to bring me the "Understanding Science" magazine to

help me appreciate science. They were a semi-popular or popular account of science, which was helpful for me. In the beginning, it was a little difficult for me as it was in English, and I didn't know it so well, but I managed to read it and learnt to appreciate science outside the textbook.

Academia often gets quite hectic. How do you maintain a healthy work-life balance?

I, of course, have to maintain a balance as there are several responsibilities and different things one has to do. I'm not sure if my family members will agree that it is the right balance, but I give them time; I give time to my work and other things. Everybody has the same problem, and they have to come up with their own solutions. I don't think my perspective on this will work for someone else.

You have written about the relationship between mathematics and the real world and how it sculpts our perception of reality. Could you elaborate more on your views?

I think the point about reality is that it's a challenging word to describe because reality means different things to different people. I use reality in the sense that it should be a physical object; for example, an idea is not a reality. An idea lives in a different world of ideas. We work with both: real objects and ideas of variables like x, but one must keep the distinction clear. It is just a slightly different way of seeing the same thing. The notion of a nation called India is an idea, but it is not a physical object. It doesn't mean it's not useful, but it is an idea and must be considered as such. There is no geographical entity called India; as you know, you can draw the boundary where you want.

"Statistical physics has provided me with a helpful way to look at problems in economics, networks and maybe problems in traffic as well. Maybe also in biology.

The framework of Physics is incomplete without imaginary numbers. An imaginary number is something which we cannot observe in reality; however, the theories describe real, measurable quantities. So, what do you think about the nature of reality in Physics and Mathematics?

I think complex numbers are no less real than real numbers. They are at the same level of abstraction. For example, I can imagine a number like the square root of two, which is not directly observable; it is defined in a complicated way. The square root of -1 is defined more or less in the same, some abstract and complex manner.

Unfortunately, the word real number suggests that they have something to do with reality. In my article, I have questioned whether the centre of mass of a moving body is a real number. It is hard to tell! You cannot be sure of that point. We choose to represent it as a real number in theory, but it is a theory, a construct, an idea. It is not necessarily in the real world. Suppose someone throws a ball; you can catch it without any calculations using real or imaginary numbers. However, if you want to do a sophisticated job, such as firing a cannonball and hitting the right place, then using intuition is not a good idea. You can maybe then calculate the parabolic trajectory and use it, but whether the trajectory of the cannonball is actually represented by the parabola is something that is not clear to me. It is a parabola in theory, and you can test the theory, but that is not the same as reality.

On a lighter note, I read an article in the Hindu newspaper in which Prof. Gautam Menon refers to you as a magician. How do you feel about it?

I would say there are magicians of all levels, from street magicians to Houdini. Some people can do something, but some can do it better. I wouldn't put myself at a very high level of genius. All research and science involve some degree of originality and you can call it magic, or you can call it something else. Nothing is automatic though. It's not like all people could have done this. Maybe, they could have done it if they had adequate training and you know, luck.

Statistical Physics has an interesting, albeit sad, history of how it treated its pioneers. Quoting a line from a well-known textbook, "Ludwig Boltzmann, who spent much of his life studying statistical mechanics, died in 1906, by his own hand. Paul Ehrenfest, carrying on the work, died similarly in 1933". They were led to their tragic fate because the scientific society failed to acknowledge their work and ideas. Today, the award carrying Boltzmann's name is considered one of the greatest honours in the field. Why do you think it took so long for the scientific community to recognise the early works in Statistical Physics?

In the 1900s, when these theories were proposed, the idea of atoms was not accepted. It was then a hypothesis, and not everybody was convinced that they existed. Atoms only became fairly convincing after Einstein's explanation of the Brownian motion. It was like quarks: nobody has seen quarks but we still think they exist. Some people, however, thought that physics only involved real observables and didn't believe Boltzmann's work. It was not anybody's fault; it was just that things weren't sufficiently well developed at that time.

> **“All research and science involve some degree of originality and you can call it magic.**

Do you think the scientific community has evolved now? For example, if someone proposes a new theory, are they more inclined to believe it if it seems mathematically sound despite a lack of experimental evidence?

No, I don’t think so. I wouldn’t want it to be this way. I don’t want people to become gullible. Only when there is adequate evidence should you believe something. Nowadays, as more people work in science, the progress is faster. For example, many people now claim that there is dark matter, but nobody has seen dark matter yet. It is a hypothesis, but maybe in 10 years, people will be able to see some evidence of dark matter. Otherwise, it is just an interpretation of some complicated situation. Earlier, it would take maybe 30 years before they could find an experiment to test the atomic hypothesis.

Based on that, what is your opinion about concepts like string theory, which are currently based on purely mathematical and theoretical perspectives?

As of now, I would say there are some ideas which some people like to pursue as they seem interesting, and these sometimes eventually find use somewhere. I think some people should be allowed to pursue such theories purely because they are interesting. I would say that having an experimental application is not the only possible reason for studying something. People look at paintings or novels. And it’s not clear they have any direct application, but it doesn’t mean that they, you shouldn’t write novels,or you shouldn’t have paintings or some such thing, right? I think some part of science has cultural value and, in that context, people should study string theory. On the other hand, whether strings exist or not is a different question. I think people don’t mind if you want to study some very abstract theory, but if you also would like the government to support this project with 1000 crores of rupees, then questions may be raised by people, as to why they should pay.

We found out that you have worked with Richard Feynmann. Can you tell us about your experience working with him? Any anecdotes you would like to share with us?

When I joined Caltech, I took his course on advanced quantum mechanics. So every week I would hear him twice or so. It was very useful. It is hard to explain. Your view of the world changes when someone explains something to you from a particular perspective. He had his own philosophy, which would have influenced some of mine for sure.

I recollect an incident. This was shortly after I joined Caltech. I was in a graduate dormitory. I had been there around a week, and didn't know many people there. The dormitory was small, with around twenty people. One of them came and said "Let's go to Feynman's house for a party. I did not know what was going on. So, Feynman had gone to Japan for an academic visit, and left his house to a postdoc who was supposed to look after the house. He had the keys and he was supposed to go there every week or so to check on things, his girlfriend was also there. They had permission to bring a few guests around sometimes. We went to his house, we didn't do anything big, just had a few snacks and came back. So, we had a party in his house in his absence.

Another time, I was in the cafetaria having breakfast, while he was sitting nearby. He called me and asked, "What are you doing now a days?" I described my work to him; I was just a second-year student at the time, describing my work to him. Another well-known professor was waiting to speak to him, sitting at some distance. So, after a few minutes he became impatient and said "Excuse me Feynman, I want to talk to you". Feynman replied, "Don't you see? I am very busy." I found it quite kind of him to give time to me, and I liked how he believed in treating the students with respect.

Roadblocks are quite common in research. How do you think one should deal with such a situation?

If you find that you are stuck at some place, you should not be disheartened. If everything was very easy throughout, then perhaps it was not an interesting problem in the first place. If you can find a solution in three minutes, it's okay, but chances are that the problem was trivial. On the other hand, I would say that if you have been working on the same problem for five years and you can't make headway, then you should work on a different problem. There are some problems which are so intractable that they don't have an easy solution, or at least you are not the person who will figure it out. What I do is, I work on three different problems at any time, one of them works and I stop working on the others at some stage. Someone else will deal with them.

Five years is a long time. In that duration, what should be a point at which one decides that it will not work out?

For any problem, there should be some intermediate results to keep you working on it. Else, it is better to let go of the problem after six, or even three months.

Have you ever been in such a situation?

There are many problems which I worked on and didn't get anywhere, so even I have forgotten ever working on them. I tried, and it didn't work, that's what it is. Then, I try something else. You don't hear of all the problems I didn't solve.

You have worked in many different places. How do the student-faculty interactions compare across the places you have been?

I have not worked abroad in a very strict sense. I visit places at times, where I interact with people. I don't think it is very different. In India, one good thing is that we don't have to write too many research proposals. Some of my friends abroad spend all their time writing research proposals to procure money for supporting students. A lot of extra administrative work is involved writing periodic reports on all your ongoing projects. A lot of this extra work is spared here in India. It can be comfortable to not be in a hypercompetitive environment all the time.

In India, there are not many students who aspire to get into research. Why is there an inhibition according to you, and what changes do you believe are necessary to address this?

I believe there should be people working in all sectors. If everyone decided to work in statistical physics, or high energy physics, or astronomy, it certainly will not end well. In India, unfortunately, there is a mentality where if you see other students doing something, you will also try to do the same thing**.** One should remember that if there are a lot of people working in a field, success will only come to a smaller number. If ten people work on something, maybe all of them can get some interesting result. But if there are a thousand, not all of them will get something. Maybe thirty, but certainly not a thousand. Highly populated fields are highly competitive, and I generally prefer to work in less competitive fields.

There is also a general tendency for parents and family to discourage their children from pursuing a career in research. What are your views on this?

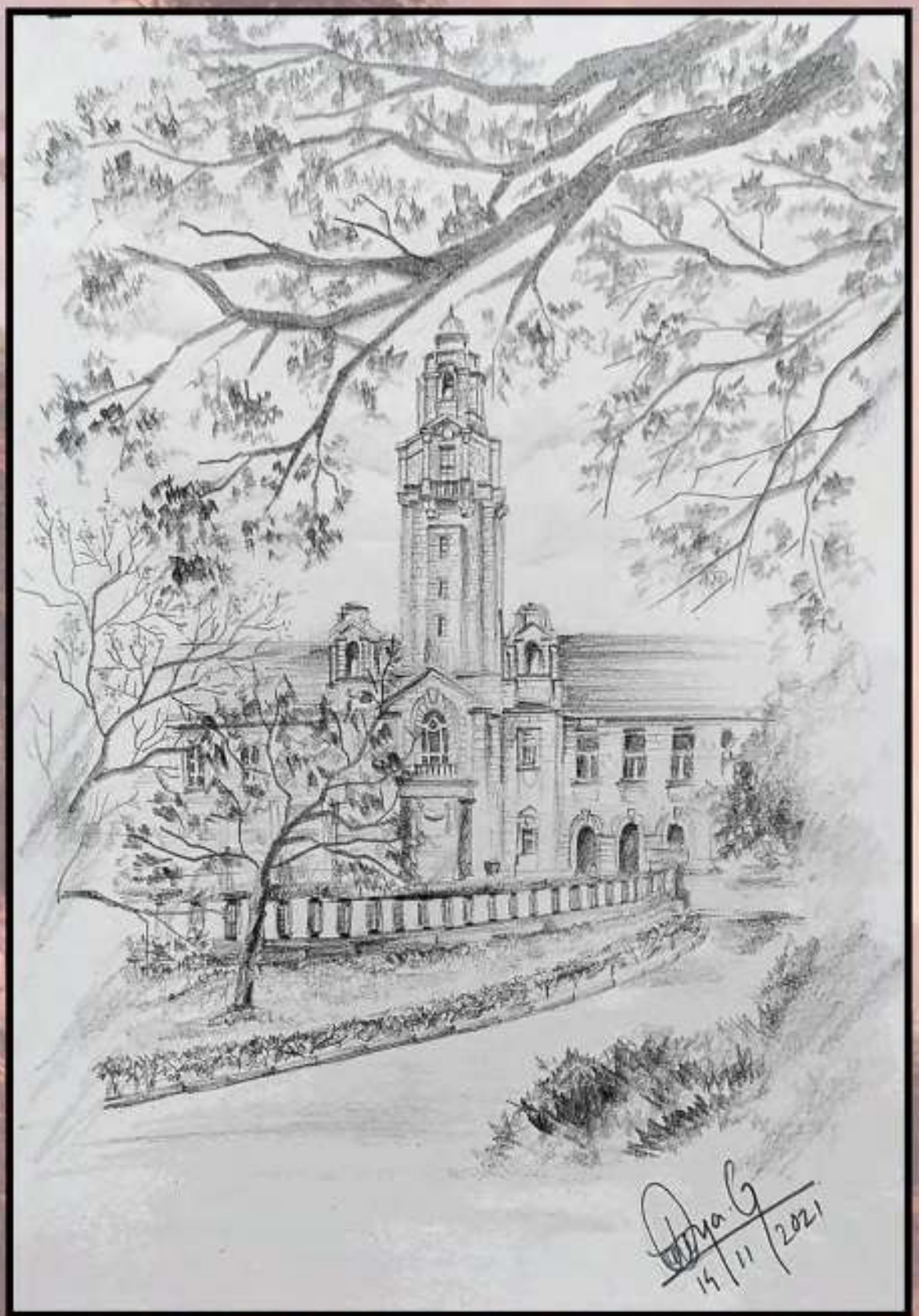
I would say parents are generally well meaning, but sometimes they believe that for your good, you should not do science. So, they have a certain mindset, which can take time to evolve. Certainly, parents now think differently as compared to parents 50 years ago. But it may never be that an adolescent person has the same perspective as their parents. Of course, a child can't always be supported, a child would want to eat too many candies and the parent has to step in and say no. A parent's job is to teach their child, and in that process, sometimes, they impose their will. But they are not always right, even though they are usually well meaning.

To conclude the interview, what is the one piece of advice you would like to give young students in research?

A piece of advice I would like to share is that that to do well in science, you have to work hard. Listening to popular lectures is inadequate. You have to read textbooks and original papers. One should work beyond a narrow speciality. For example, a student working on thin films keeps track of literature by reading archives.

They would look at it every morning and scan titles. If they see something interesting to them, they will read it, else, they will not look. This ends up causing one to have a very narrow understanding. Even in theory this happens. I once asked some students at a renowned institute, "How many papers do you read each month?" By read I mean not just reading the abstract in two minutes, but rather downloading the paper and at least spending one hour on it, and if honest they usually come up with a number like three or four. I told them that papers are typically three to six pages each. Which means around thirty pages a month. The numbers are no secret. I was then saying that it implies the government is paying them 1000 rupees to read a page. This is no joke. The point is you are spending taxpayers' money. They support you quite well. Students believe that if they read four papers a month they are doing quite well. I say that no, they should read ten. If you read more, you will do better work.

In April 2023, Prof. Deepak Dhar was presented the Padma Bhushan by President Droupadi Murmu for his contribution to physics and building a vibrant community of researchers in India.



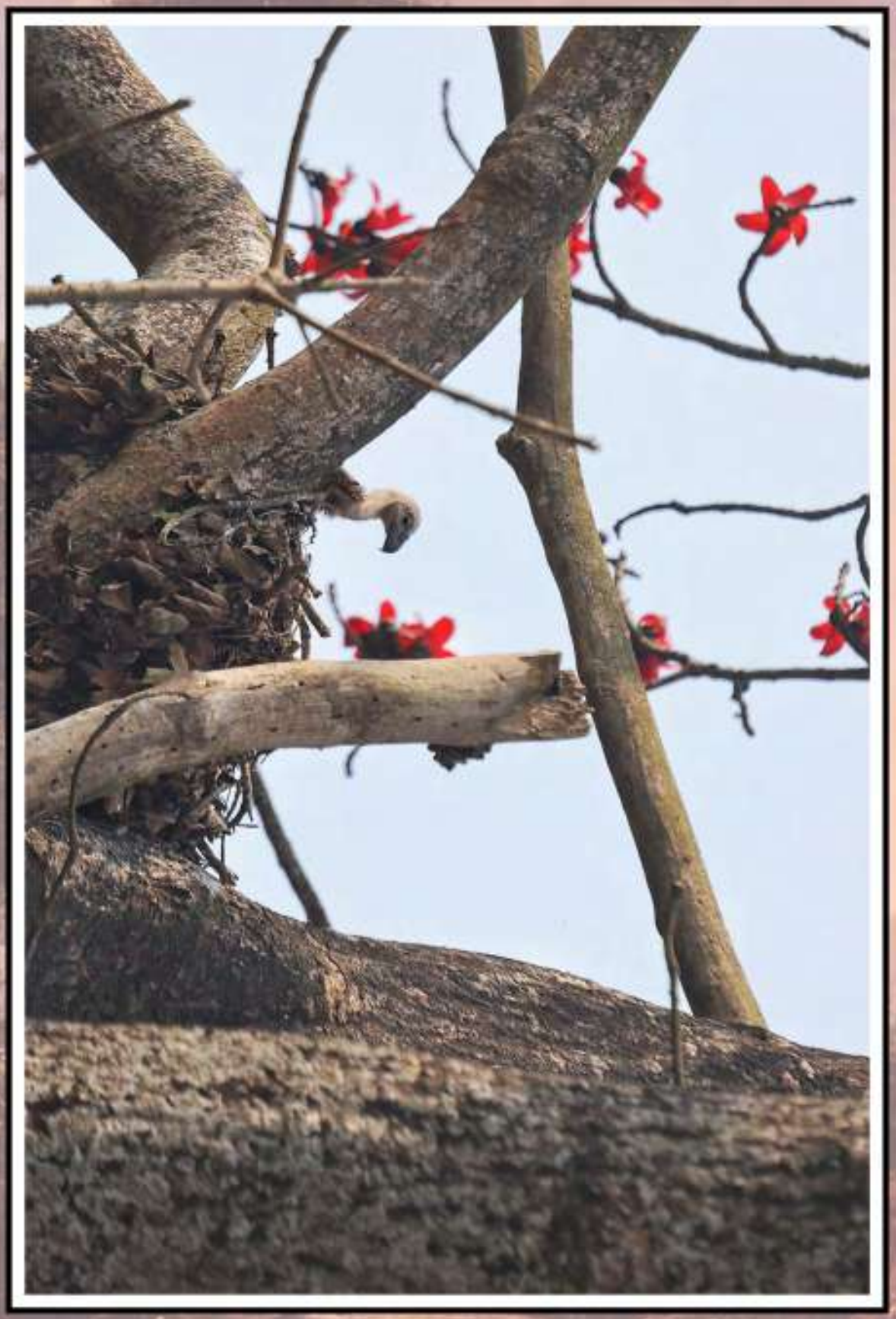
Art by Oviya G.

Photograph by Siddharth Bothra

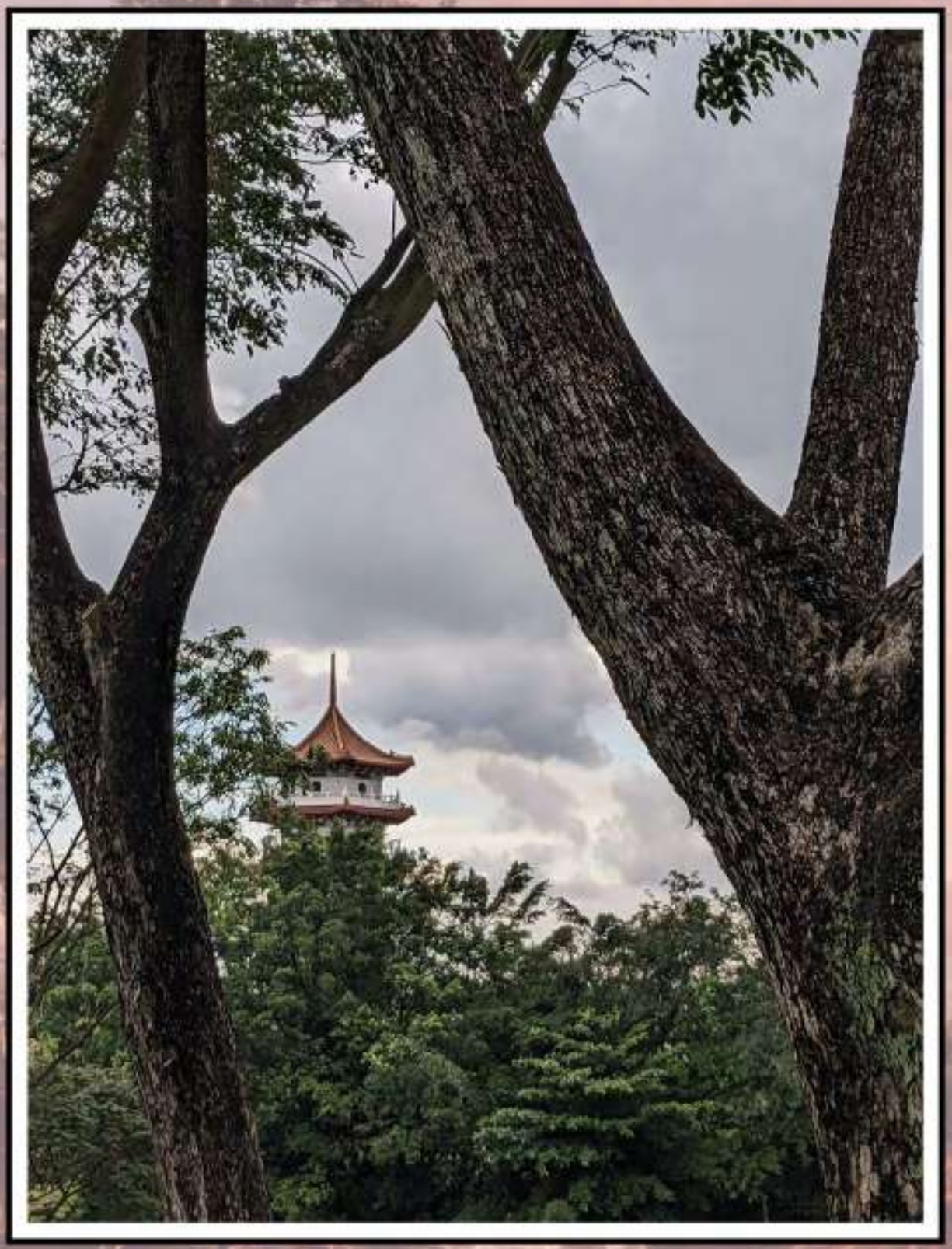
নেশাতুর প্রেমিকা

সার্থক তালুকদার

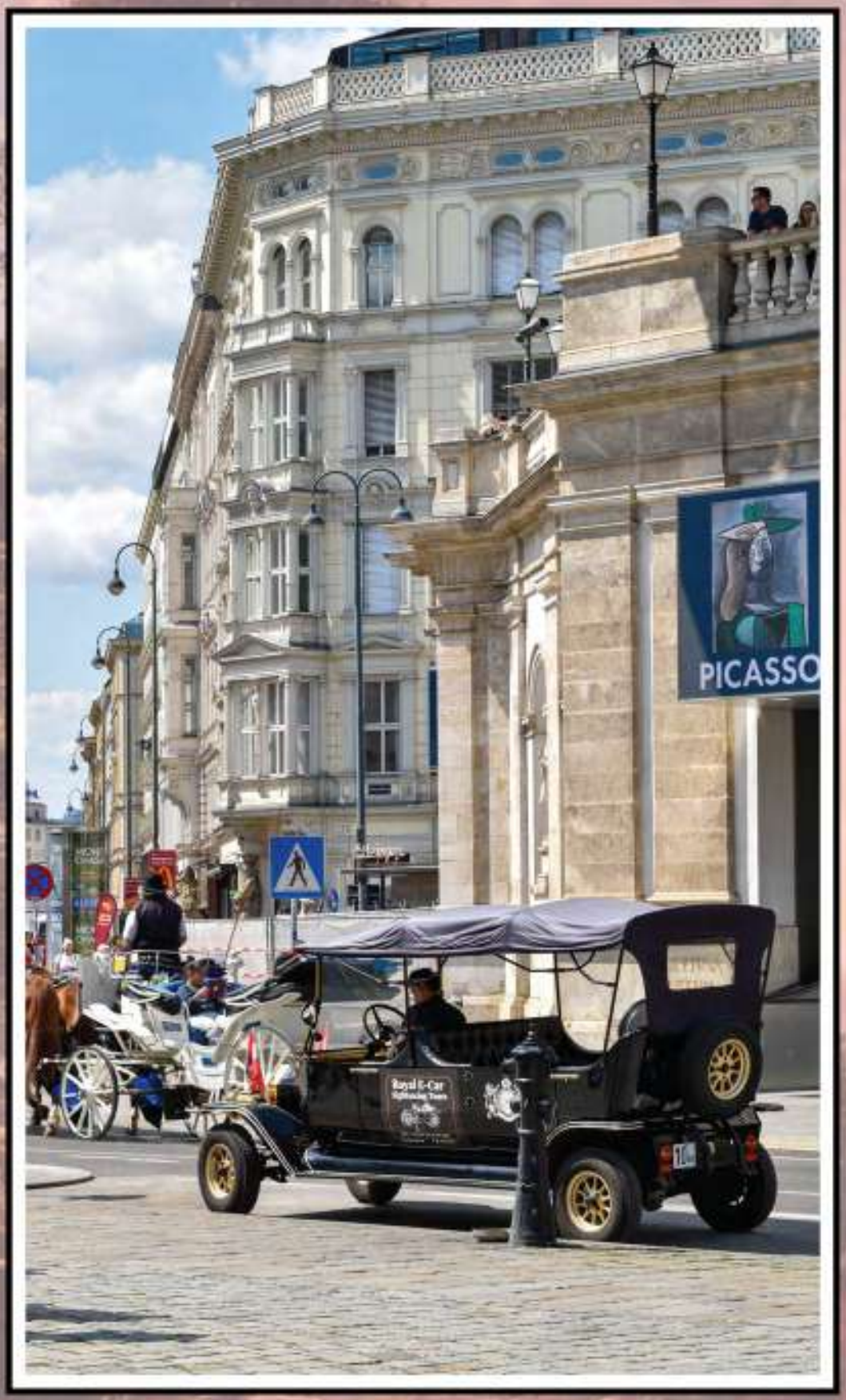
রিক্ততায় রক্তিম তোমার বুকে নেমে আসে সন্ধ্যা,
উদাসীন শাঁখের শব্দ যেমন,
ঘরে ফেরার গানে লাল আবীর ছড়িয়ে দেয়, তেমনি।
ল্যাম্পপোস্টের সন্ধ্যাপ্রদীপ জ্বেলে আলো দাও তুমি-
হারিয়ে যাওয়া ঘোড়াদের জন্য,
ময়দানের পাশে যাদের উত্তরসূরীরা আজ সাজগাড়ি টানে।
গঙ্গার জলে তখন কাঁচা রক্ত মিশছে অস্তরবির,
এগিয়ে আসছে ঘাটের দিকে, কালো হয়ে আসছে চারপাশ।
ছটফট করে কালো পর্দা সরাবার চেষ্টা করতেই,
দেখলাম, তোমার পিঠ বেয়ে নামছে সহস্র ঘামের ধীর রেখা,
সমস্ত দিনের জমা উষ্মতায় তুমি এখন বাষ্প হয়ে আসছ,
সময়ের অপেক্ষায় যখন সন্ধ্যা পূর্ণযুবতী,
তুমি শরীর ছেড়ে হবে ধূমকীনী, মায়াবীনী-
রজনীগন্ধার সুবাসের মত নিজেকে ছড়িয়ে বেরাবে,
আর মিশিয়ে দেবে ডিজেলের গন্ধে-
তোমার ঘ্রাণ নিয়ে গুণমুগ্ধ মাতালরা অস্ফুটে বলবে-
নগরী, আমার রাত্রিটাও মাতিয়ে দিয়ে যাবে?



Photograph by Akshay Bharadwaj



Photograph by Ayushi Gupta



Photograph by Siddharth Bothra

অভিযাত্রিক

সব্যসাচী প্রামাণিক

ভাঙ্গনদাঁড়ি জংশন আসতেই ভিড়টা একেবারেই হালকা হয়ে গেল। প্রায় সবাই নেমে গেল। এখন আমার উল্টোদিকের সিটে বসে থাকা এলোমেলো চুলের ছেলেটিই একমাত্র সহযাত্রী-স্থানীয় বোধ হয়। ভাঙ্গনদাঁড়ি স্টেশনটা বিশেষ একটা বড়সড় নয়, মানে জংশন বলতে যেমন ফিল হয় তেমন তো নয়ই। এতক্ষণ ডবল লাইন ছিল- স্টেশনে ঢুকে তিনটি লাইন হল।

একবার লম্বা হর্ণ বাজিয়ে ট্রেন ছেড়ে দিল। ট্রেন থেকে নেমে যাওয়া যাত্রীদের সমান্তরালে ট্রেনটি চলতে থাকল, একসময় তাদেরকে অতিক্রম করে গেলো। যদিও ট্রেনটির ত্বরণ কম, মানে অন্য স্টেশন ছেড়ে যাওয়ার সময় যত দ্রুত গতি বাড়ায় তেমন নয়। সহযাত্রী ছেলেটা বল্লে লাইন এর কিছু joint আছে আর সামনে একটা ব্যাক ও আছে তাই এই জায়গাটা আস্তে চলে ট্রেন। স্টেশন থেকে বেরিয়ে তিনটি লাইন এর ভিতর কয়েকটা সংযোগ রক্ষার ব্যবস্থা আছে যাতে এদিকের ট্রেন ওদিকে যেতে পারে আর কি! সেই joint গুলোর ওপর দিয়ে ঘটাং ঘটাং সটাং সটাং শব্দ করে ট্রেন চলতে লাগল।

আস্তে আস্তে অন্য দুটি লাইন আমাদের থেকে একটু ওপরে উঠতে শুরু করল,খানিকটা উচু বাঁধ এর ওপর দিয়ে -ওদের লাইনটা উঠতে থাকল, কি আমরা নিচে যেতে থাকলাম, পরিষ্কার নয় যদিও। এবার ট্রেনটি একদিকে হালকা কাত হতে থাকল, অন্য লাইনদুটি দূরে সরে যেতে আরম্ভ করলো। ওহ! সহযাত্রী এই ব্যাকটার কথাই বলছিল বোধ হয়। অন্য দুটি লাইন কোথায় যায় জিজ্ঞেস করতে ছেলেটা বললো, "কিরণপুর যায়, ওটা নতুন ডবল লাইন হয়েছে, এখন অনেক দূরপাল্লার ট্রেন ও ওই রাস্তা দিয়েই যায়"।

রেললাইন এর ওপরে বাঁধ এর পিছনে আড়াল হয়ে যাওয়া পর্যন্ত অস্তগামী সূর্যের দিকে তাকিয়ে থাকলাম। লক্ষ্য করলাম আমাদের লাইনটিতে বিদ্যুৎ সংযোগ নেই-ডিজেল ইঞ্জিন এর ঝুক ঝুক আওয়াজটা মনে করিয়ে দিল। সারি সারি বিদ্যুৎ এর খুঁটি সমেত লাইন দুটি দূর এর মিলিয়ে যেতেই এবার একবার ট্রেন এর হর্ণ কানে এলো। একটু গতি বাড়িয়েই ট্রেনটি ঢুকলো পাহাড় এর টানেল এর মধ্যে। পুরো অন্ধকার। ইঞ্জিন এর ঝিকঝিক শব্দ কয়েকগুণ বেড়ে গেলো। যেনো অন্ধকার গুহায় ট্রেন এর বুক ধুকপুক করতে আরম্ভ করলো।

হঠাৎ মৃদু আলো দেখা গেলো। আর কিছু নয়, সহযাত্রী ছেলেটা একটা সিগারেট ধরালো। নিকোটিন আর পোড়া ডিজেল এর গন্ধ মিলেমিশে এই যাত্রা আরো ধোঁয়াটে করে দিলো।

Serendipity

"Katniss, honey, should we ask him?", Catherine whispered his name superstitiously, "Behemoth".

"Worth a shot", Katniss said.

"If he refuses to, I'm afraid we'll have to find a different hole."

"I hope that butt-sniffing drooling mongrel son-of-a-bitch dies".

The curses are in vain, but it brings some comfort to them, as they stare despondently at their previously spacious cat hole, now usurped by a dog.

There is a bar right at the end of Jackson Avenue, a popular haunt of all the wealthy humans who are looking for booze, cigarettes or company in chilly fall nights. Beside the bar is a dark alleyway, a popular haunt for all the cats looking for catnip, second hand smoke and rotten fish, and Behemoth is found there every night.

Behemoth is a black Maine Coon, shaped colossally, and moves like a thunder cloud slowly wafting through the sky, ready to burst. His meows sound like thunder roars and his stares are steely and lightning sharp. There are rumours that he murdered his owner in cold blood, feasted on her remains and assumed a vagrant lifestyle, thus the name the cats have anti-christened him with.

Katniss and Catherine enter the alleyway at dusk, approach Behemoth, and clear their throats. Katniss nudges Catherine with her belly.

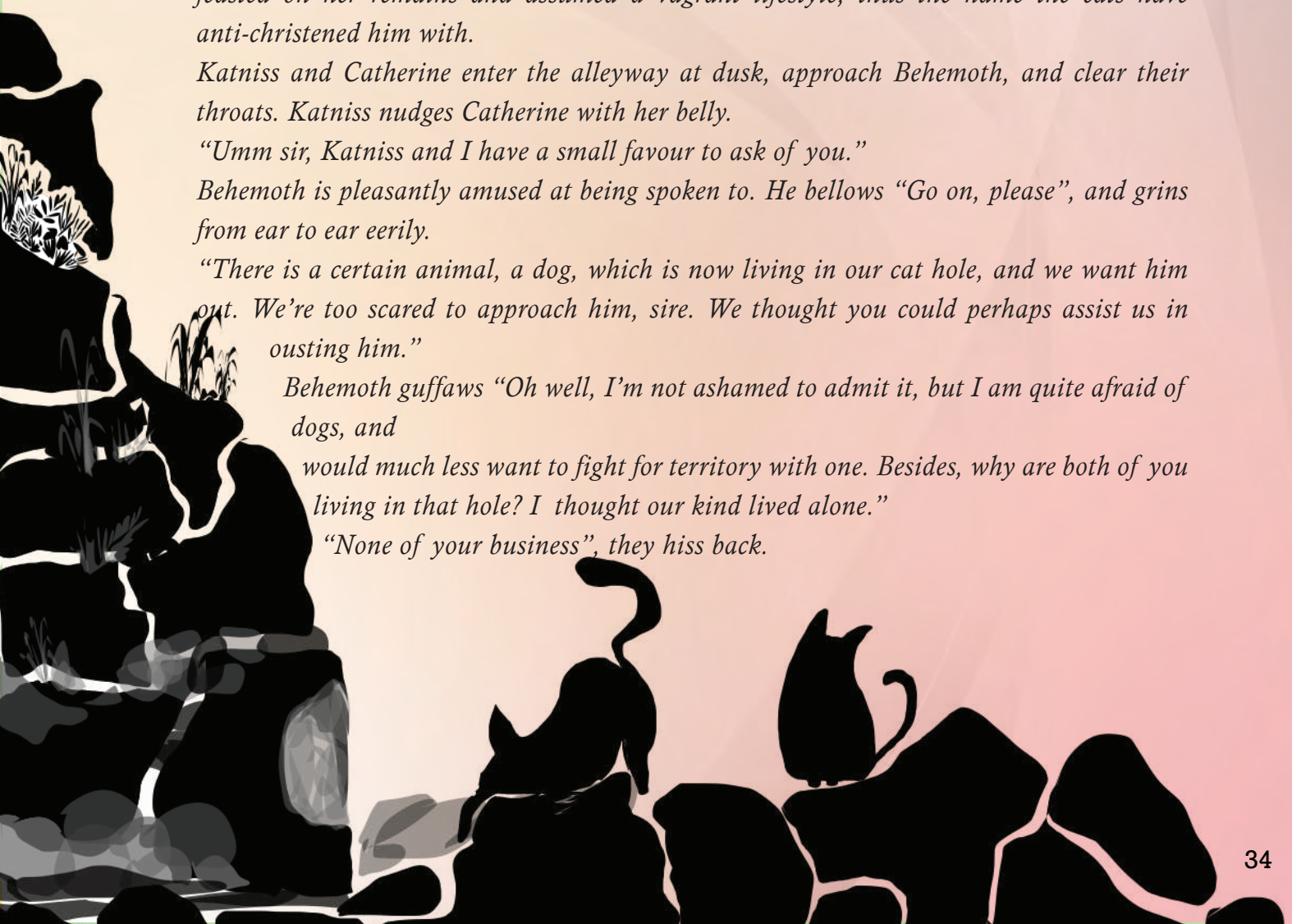
"Umm sir, Katniss and I have a small favour to ask of you."

Behemoth is pleasantly amused at being spoken to. He bellows "Go on, please", and grins from ear to ear eerily.

"There is a certain animal, a dog, which is now living in our cat hole, and we want him out. We're too scared to approach him, sire. We thought you could perhaps assist us in ousting him."

Behemoth guffaws "Oh well, I'm not ashamed to admit it, but I am quite afraid of dogs, and would much less want to fight for territory with one. Besides, why are both of you living in that hole? I thought our kind lived alone."

"None of your business", they hiss back.



Catherine says, "The dog is smaller if not the same size as you are".
Behemoth laughs and replies "I'm sorry. I cannot Boo Radley you out of this one. I hope the dog leaves, or that the both of you find a different hole. Have a good night. But is it squawking possible have a good night with those shrieking birds!"
The shrieking birds on top of the expansive Tabebuia tree are fighting. They are garden finches, and they are fighting over a leaf, the last leaf. Every fall, the Tabebuia stows its metabolites away in leaves which are inevitably shed, a fall-cleaning garbage disposal, a chemotherapy leaf-loss. These metabolites are potent hallucinogens for the garden finches. Finches report a foggy sense of calm, a vision of early spring, infinite wisdom, and sexual happiness. Tweedle dum and Tweedle dee are fighting for the drug. Alas, the leaf holds enough for just one, and the other leaves have either perished or been consumed.

What started as a civilised debate, with tallying of the amount of LSD – leaf-ily sourced drug, across the season (turns out both have done 40 leaves), a list of pros and cons (identical), and a singing contest (both ear-numbingly bad), they are now wing-fighting on the branch above. Tired, they back off.
Dee says, "What if I just take the leaf and fly away?"
Dum counters "I will fly with you till eternity. I'll also make a joke out of your nest privacy".
"You keep my wife and children out of this. How about I take a shit on the leaf right now and make it mine? Huh?"
"Go ahead. I'll see you try. You have to eat your own shit then, you do realise"
"I don't care. Watch me".
Dee poises his derriere squarely towards the leaf and prepares to eject his guano.
"You know what, I can't watch this. I'll turn again when I know you've decided not to."
Dee releases his goop of uric acid and paraphernalia, but just before Dee does the deed, a gust of wind moves the leaf askew. The projectile misses the leaf and lands squarely on the mouth of the gleefully yapping dog at the edge of Catherine and Katniss' erstwhile cathole. The acid, combined with the undigested toxins of the digested drug is acrid enough to burn a hole in the tongue of the dog. He screams his last scream at his kennel and flees with the might of a tornado.

The deafening bark invigorates the neighbouring dog diaspora as they proceed to move helter-skelter and join the howling spree, to make their voice heard and their presence noticed. One dog, the only one that can fit, a small chihuahua, makes its way into the alley. At the sight of the chihuahua, which was only one third the girth and one-eighth the weight of Behemoth, Behemoth cries and flings himself onto the tree bark and holds onto it for dear life with his knife sharp claws. The bark of the tree begins to bleed sap. Tweedle Dee and Tweedle Dum follow the familiar scent to be treated to fountain of liquid happiness oozing out of the tough tree hide.

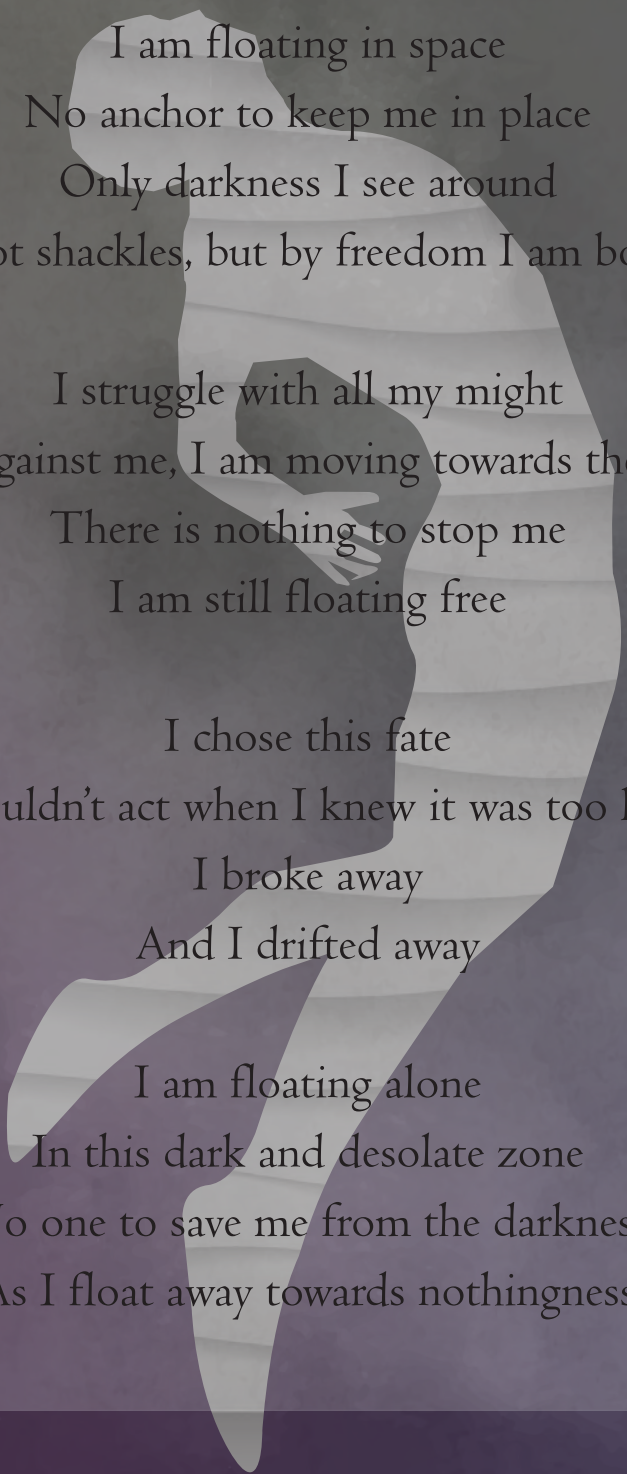
Kindness does arrive, but mostly from an unexpected source.

-Sudhanva KV

(Submitted as an entry for the offline story writing competition at IICM. Prompts: A cat, a leaf, and an act of kindness.)

Floating

-Antony James



I am floating in space
No anchor to keep me in place
Only darkness I see around
By not shackles, but by freedom I am bound

I struggle with all my might
With against me, I am moving towards the night
There is nothing to stop me
I am still floating free

I chose this fate
I couldn't act when I knew it was too late
I broke away
And I drifted away

I am floating alone
In this dark and desolate zone
No one to save me from the darkness
As I float away towards nothingness

from the journalist's desk

interview with the editor of Frontline, Vaishna Roy

With an illustrious career spanning over 25 years, Vaishna Roy stands as a prominent figure in the print media industry. Currently serving as the Editor of Frontline, The Hindu's premier fortnightly magazine, Vaishna opens up to Quarks about her remarkable journey in journalism and the ever-evolving path of the field in recent times.

Over your career, your pieces have spanned a vast breadth of journalism, from recording passionate stories in art and culture to reporting at the political frontiers. How has your experience been traversing through the genres?

It's been an incredibly rich and varied journey. Whichever genre I pursue, I tend to immerse myself totally in it, so that reporting and writing about each area becomes not only a fulfilling but also a learning experience. Journalists like me who are not beat reporters in the traditional sense — and even more so when we become editors — are generalists in the best sense of the word — we are philomaths. We tend to be curious about a zillion things and want to share that thrill of discovery with our readers. Whether I am reporting from a cruise ship in Singapore or from a tsunami wrecked Nagapattinam, interviewing a mridangam maestro, or writing an op-ed, I begin by arming myself with all the facts, then absorbing the story and the milieu, only then begins the journey of writing.

How has the content of print media transformed from your early days as a journalist to now?

Except for a few exceptions, most print media is foregrounding entertainment, lifestyle and soft features and deprioritizing stories from the margins or from fields such as health, nutrition, and education. The coverage of politics, communalism or sectarian violence is marked by self-censorship. There is extreme trivialization of the media function. Vital space is wasted on who wore what at a social event. Somebody posted a tweet about how he eats dosa and within a few hours it had become a headlined story in a mainstream news outlet. Fewer media outlets are asking how their news or feature stories will impact or inform readers, preferring instead to distract or amuse readers. If a news outlet begins to entertain, then what are cinemas or clowns for? The media then no longer serves its original purpose. The biggest change I would say is the slow disappearance of a culture of meaningfulness and fearlessness that once drove newsrooms.

“ The biggest change I would say is the slow disappearance of a culture of meaningfulness and fearlessness that once drove newsrooms.

True, once independent and fearless, journalism is visibly becoming more profit-driven by the day. Have you had to adjust to the evolving priorities of the industry?

I am lucky to be the editor of Frontline, which continues to be nurtured by its publishers as a space for free and fearless journalism. We occupy a protected and rare space where it is not profit that drives our journalism but the quality of stories. In the one year since I have taken over the magazine, I am adjusting to evolving priorities only to the extent of ensuring that the magazine becomes contemporary, smart, and relevant for the digital generation.

Have you ever taken a risk with publishing an article that you believed was right and necessary, but which might have sparked public outrage?

Several times. I have written columns and op-eds that have challenged the status quo or have refused to follow the popular discourse. I have published articles that have challenged the majoritarian stand. I have been trolled, abused, and threatened. I remember once publishing a piece on how Iskcon's Akshaya Patra Foundation, contracted by the Karnataka government to provide mid-day meals in schools, would not add onion, garlic, or eggs to meals. The article's central argument was this: the students were from onion and garlic eating cultures — only 15% of Karnataka is vegetarian — so why had the government organized bland veg food which the children didn't like and therefore wouldn't eat. Ultimately, the kids suffer. The right-wing ecosystem, not to mention luminaries associated with Akshaya Patra, descended on the reporter, on me, on the publication. Trolling us, abusing us, etc. It was a sustained campaign. But well, it's part of journalism. One simply endures it. One backs an article that stands for truth, justice, citizen rights. The midday meal scheme is a right, it's not charity.
I like to recall George Orwell in 1984: "Being in a minority, even in a minority of one, did not make you mad. There was truth and there was untruth, and if you clung to the truth even against the whole world, you were not mad."

Tell us about some of your favourite books or written works that have greatly influenced your perspective or way of thinking?

Difficult question! There are so many one doesn't know what to list. As a woman, one clutches Woolf's A Room of One's Own like a bible! Alexander Frater's Chasing the Monsoon is a great example for journalists on how to make an exciting book out of a weather phenomenon. And look at how that young Manu Pillai handles history! Ed Luce's In Spite of the Gods was something I read when I began my career and I enormously enjoyed his style. I think one should read Nassim

Taleb if only to learn to question accepted wisdom.

In a world riven with information overload and misguided opinions, many young people can feel overwhelmed and develop a sense of distrust towards the news media. What advice or message do you have for this audience to help them navigate the current media landscape and form a more informed perspective?

It is important to first realise that the distrust of news media has been deliberately cultivated. It is not as if readers woke up one day and began to distrust the media; it was drilled into them that legacy media is compromised and should not be trusted; that social media will fill in the gap and play the role of journalism. A concerted campaign of misinformation, lies, half-truths, and slander resulted in discrediting traditional journalists. While there is no denying that legacy media had, and still has, its faults — like any other institution — the fake news factory that has replaced it is enormously more dangerous and destructive. Once young people realise they have been played, they will receive legacy media with more openness. They need not believe anything blindly, but a little research and comparative reading will soon show them which news sources invariably publish factual news items, well-informed views, and well researched articles. I would urge young people to distrust WhatsApp completely. It is a breeding ground for fake news. Subscribe to fact-check websites like Alt News and Boomlive. They are good faith operators whose aim is to inform, not evangelise. Young people today inhabit a vastly complicated world, made more so by AI, deep fakes etc. I can do no better than share an old journalistic adage with you. "If your mother says she loves you, check it out".

Photojournalist Shahidul Alam and Dr. Prakash Amte present the Mumbai Press Club's RedInk Award to Vaishna Roy for her reports on art in 2019. Image credits: The Hindu

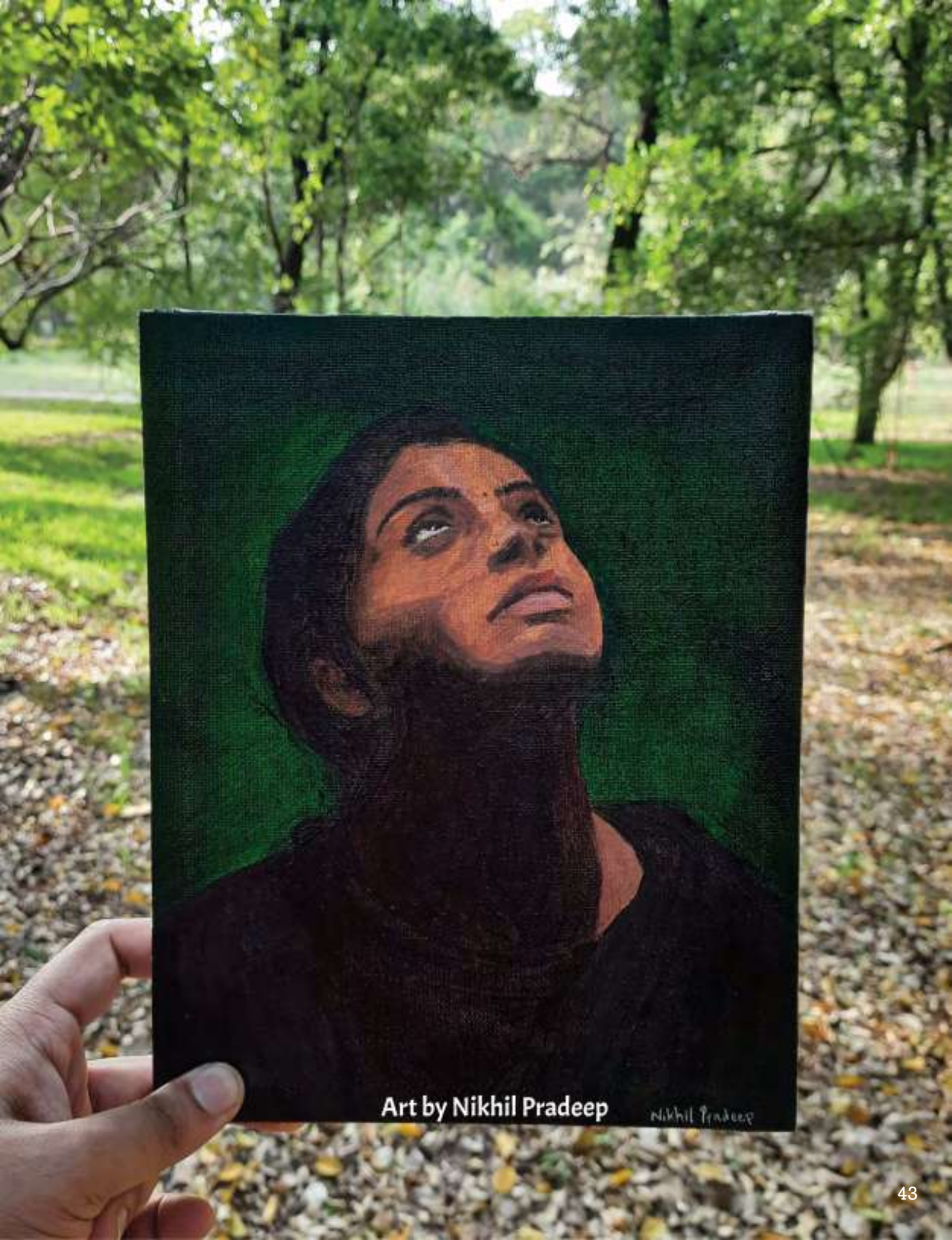
লাল কালো

রাহুল অধিকারী

ঘোর যুদ্ধের আভাস। লাল পোষাক পরা সৈনিকের দল ঝাঁকে ঝাঁকে নেমে আসছে পাহাড়ের ওপর থেকে। কালো পোশাকের সৈনিকেরা এদিকে ভীত, সন্ত্রস্ত। কালোদের রানী চিন্তামগ্ন; তাদের কাছে সৈনিক হয়তো বেশী, কিন্তু যুদ্ধে যে সেনা বেশী থাকলেই চলে না; কৌরবরা ৪ অক্ষৌহিনী বেশি নিয়েও কি জিততে পেরেছিল? যুদ্ধকৌশলটাই সব, আর কালোরা ভালভাবেই জানে যে সন্মুখসমরে তাদের জেতা একরকম অসম্ভব। লালেদের গায়ের জোর বেশি, আর তা ছাড়াও তাদের বর্শার আগায় মাখানো থাকে তীব্র বিষ, যা মুহূর্তে প্রতিপক্ষকে চলচ্ছক্তিরহিত করতে পারে। তাই নূতন ও অপ্রত্যাশিত রণকৌশল ব্যতীত যুদ্ধ জেতা অসম্ভব। যুদ্ধে পরাজয় মানে গণহত্যা, এমনকি শিশুরাও রেহাই পাবে না , সদ্যজাত শিশুদের ভবিষ্যতে হতে হবে দাসত্বের শিকার, কারণ এ হল ভূমি দখলের লড়াই; এখানে লালেরা নিজেদের সাম্রাজ্য স্থাপন করবে, কিন্তু কালোরাও সহজে পরাজয় স্বীকার করবে না।

ওদিকে লালেদের শিবিরে উঠেছে শোরগোল; বহুদূরের পথ পেরিয়ে তারা আক্রমণ করতে এসেছে কালোদের রাজ্যে। শীতে, খাদ্যাভাবে পথ এ খুইয়েছে অনেক বন্ধুবান্ধব, পরিবার-পরিজনকে। তাই এ সুযোগ হাতছাড়া করা যাবে না, শীঘ্রই দখল নিতে হবে প্রাসাদের যাতে খাদ্যভান্ডারের ওপর কবজা করা যায়। লালেদের রানী ও ব্যস্ত যুদ্ধপরিকল্পনায় নিজের সেনাপতিদের সাথে। দুপক্ষই জানে যে এ যুদ্ধে দুপক্ষই হারাবে নিজেদের অগুন্তি সেনা ও নিরীহ রাজ্যবাসীদের; এ প্রশ্নও মনে ওঠে যে যুদ্ধে যাবার কি সত্যই কোনো প্রয়োজন ছিল, প্রাণ দিয়ে যার দাম দিতে হয় তার কি দরকার জীবনে? কিন্তু মনের কোণ থেকেই উত্তর আসে, "এ হল বেঁচে থাকার লড়াই; খাদ্যের জন্য, বাসস্থানের জন্য, টিকে থাকার লড়াই। ভবিষ্যত প্রজন্মের বেঁচে থাকা সুনিশ্চিত করা নিজের প্রাণ দিয়ে মূল্য চুকিয়ে" লালেদের সেনা সদর্পে এগিয়ে আসতে থাকে, যুদ্ধ যায় বেঁধে। দুপক্ষের সেনাদের মাথাই ছিন্ন হয়ে লুটিয়ে পড়ে মাটিতে। রাজপ্রাসাদ ভেঙে তছনছ হয়ে যায়। যুদ্ধশেষে কালোরা বিজয়ী হয়; কিন্তু তা তাদের সংখ্যাধিক্যের কারণে, না বানের তোড়ে লালেদের সেনা ভেসে যাওয়ায় অথবা কেবল ভাগ্যের কারণে তা কেবল বিধাতাই বলতে পারেন।

বারান্দায় বসে লিখছিলাম। সামনের বাগানে লাল-কালো পিঁপড়ের সারি, বর্ষার জলে ভেসে গেছে কিছু, কিছু মরে পড়ে আছে, কালো পিঁপড়েদের বাসাটা জলে গলে গেছে। ভিতর ঘর থেকে টিভির আওয়াজ আসছিল, ইন্দো-পাক যুদ্ধে উভয়পক্ষের শতাধিক সৈনিক মৃত, বহু আহত। ছবিও দেখাচ্ছিল, মায়ের কোলে মৃত শিশু, মৃত সৈনিকের দেহ ঘিরে পরিবার কাঁদছে, দাউদাউ করে আগুন জ্বলছে বাড়ি-ঘরে। আমি অপেক্ষায় থাকলাম আমাদের বৃষ্টি কবে আসবে ।


Art by Nikhil Pradeep
Nikhil Pradeep

Art by Nikhil Pradeep

I Still Write Decent Literature

Tanmai Reddy

I sit back and stare at my screen in deep despair. Every ounce of poetic complexity had escaped me, and what's left of my mangled brain was a few synapses firing up at the thought and mention of every Gen Z word ever. I am what the wise call 'ruined'.

Organs erupt, playing Toccata and Fugue in D minor. I fall to the ground. I'm shrieking. I look up at the ceiling and there's no ceiling. Instead, I see a disgruntled Cro Magnon man gathering berries; he stops to look back at me. He sneers and runs away. This dude can't even speak!?

I am then faced by the ancient Aryans writing the Vedas; they look at me and immediately turn to light up their Cannabis; they look traumatised. If they could stop Aryabhatta from inventing the zero, they would. The Sultans decided not to invade India after reading what I wrote as a consequence of generational fad.

Fast-forward to British India – R K Narayan quit writing Swami and Friends. The Bri'ish just committed another massacre. Sarojini Naidu looks at her newest poem and rips her manuscripts apart; the Bazaars of Hyderabad see her no more. Women in the eighties and nineties were asked to stay away from literature, lest they write like me.

My mother in her prime twenties gets a glimpse of my writing and decides to stay away from marriage altogether. I weep. I sob. I roll on my floor and cry for comfort. Nobody can save me. I am a victim of nugatory modernisation.

सुख़न

-अनुभव श्रीवास्तव, 2021

निर्मोही वन की हरियाली से सतत सरिता निकलती है।
शीतल चंचल तरंगों पर कोमल विभा चमकती है।।
मग्न चिड़ियाँ उदग्र नभ से मधुर गीत सुनाती हैं।
अविरत बहती धारा की ध्वनि मन को सुहाती है।।
शुष्क विरल मेघ फ़लक पर मंद -मंद खिसक रहे ।
सहर्ष पर्ण विराट वृक्ष के ज़रा-ज़रा सिसक रहे ।।

शांत मंद हवा के तरंग दीर्घ तृणों को सहलाते हैं ।
तुष्ट मुग्ध जीव वन के, थकान देह की मिटाते हैं।।
प्रकृति के तत्व सौंदर्य को इस प्रकार सँजोते हैं।
जीव-निर्जीव इस नगर के समान प्रतीत होते हैं।।
क्या है यह किसी स्नेही की कल्पना का साया;
या लेने सुधि धरती की, नीचे है स्वर्ग उतर आया?

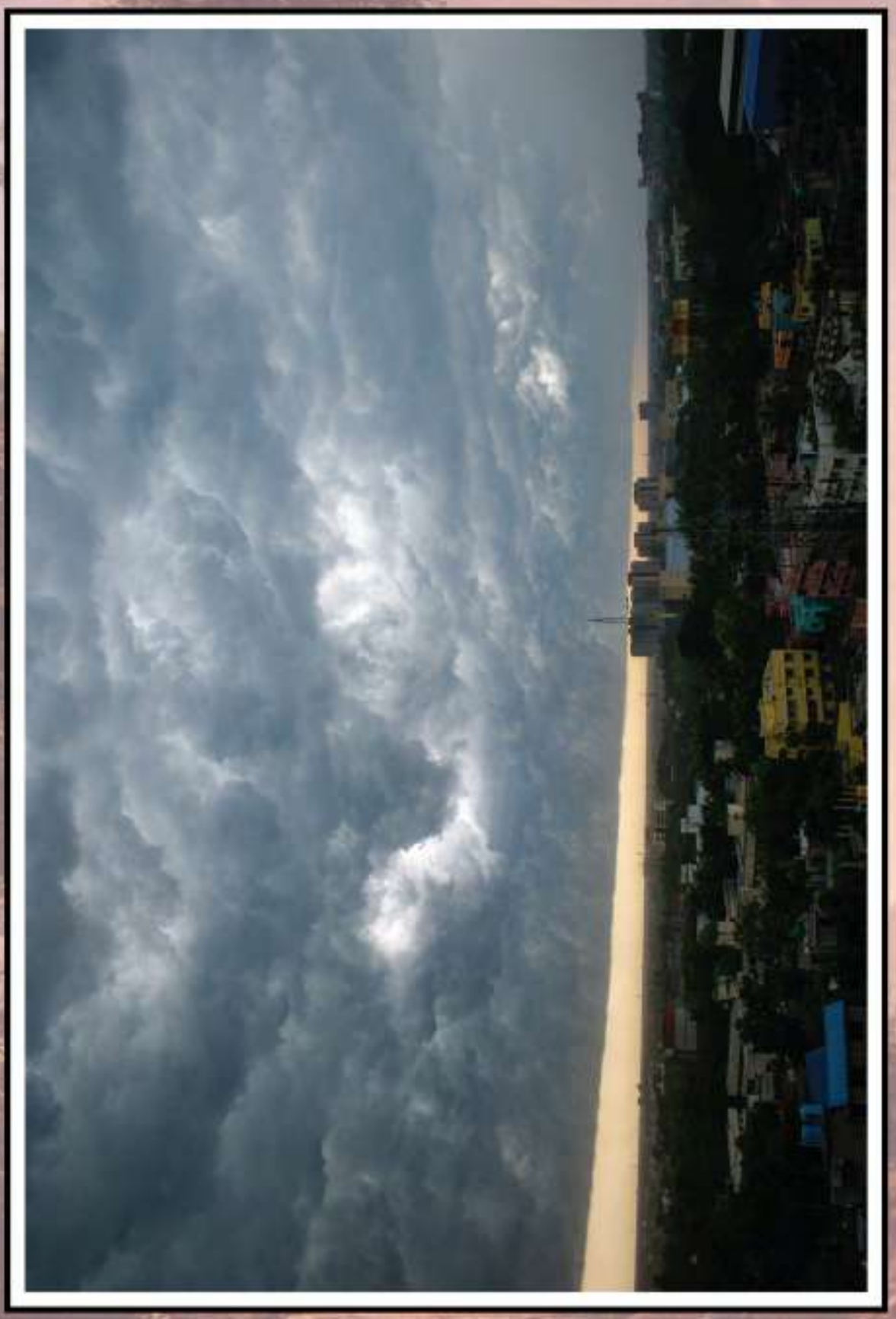
प्रकृति की इस मुग्धता में एक उत्तल वृक्ष अवस्थित है।
बाहर से तो निश्चल लगता पर भीतर बहुत प्रफुल्लित है।।
हैं यहीं प्रसूनों में बैठे दो जन लिए नैन में सुख ।
वर्तमान में हैं संतुष्ट और भविष्य को ले उत्सुक।।
इनकी मंजुल नयनों में है अव्यक्त सा आकर्षण ।
अखिल विश्व इस युगल के लिए जोबन का आंगन ।।

इतने में उठा इक प्रश्न अनूठा सुकन्या के मन में।
अनिश्चय सा छा जाता है विस्तृत नील गगन में ।।
कहती है इस दुविधा में वह बोल चिंतन के स्वर का ,
"है क्या नियति अपने इस जीवन के प्रीत सफर का?"
सुन प्रश्न हम-नफ़स के, युवक ज़रा सा मुस्काया।
कर भूषित पुष्पों से जुल्फ़ें उसकी भाव मन के बताया ।

"ख्वाब में तुम, हकीकत में तुम, हर पड़ाव में शामिल हो,
बात करूँ किस नियति की जब तुम्हीं मेरी मंज़िल हो।।
उत्पन्न होती हिम से नदियाँ सिंधु में मिल जाने को।
शमा छोड़ भला क्या नियति भा सकती है परवाने को ?
वासनाओं की निर्दोष कौमुदी मुझको अब नहलाती है।
सामोद अश्रु की मद्धिम गंगा स्नान मेघों को कराती है ।।

"समेटकर शत पथ अपने प्रमुदित-प्रेम विलासों में;
बिता दूँ हर क्षण जीवन का इन्हीं सुवासित साँसों में।
महकेंगे उल्फ़त के निशाँ चमनज़ार के गुलाबों में।
दोहराई जाएगी ये दास्तां सदियों तक निसाबों में।।
बैर-द्वेष से दुनिया लथपथ ;है ज़र्रे-ज़र्रे में दोष;
बाकी सब तृष्णा है, प्रेम - प्रसंग ही मोक्ष ।।"

कहा एक स्वर में दो दिलों ने वही भाव दोबारा,
"कांपे मूल अटल पर्वत का या बुझे अमा का तारा,
अमर रहे यह रीत हमारी ;और अटूट बंधन हमारा।।"
प्रेम - प्रणय बड़ा ही अद्भुत ;अद्भुत इसकी माया।
दर्शन हेतु इसके, स्वर्ग सच ही धरती पर आया।।



Photograph by Siddharth Bothra

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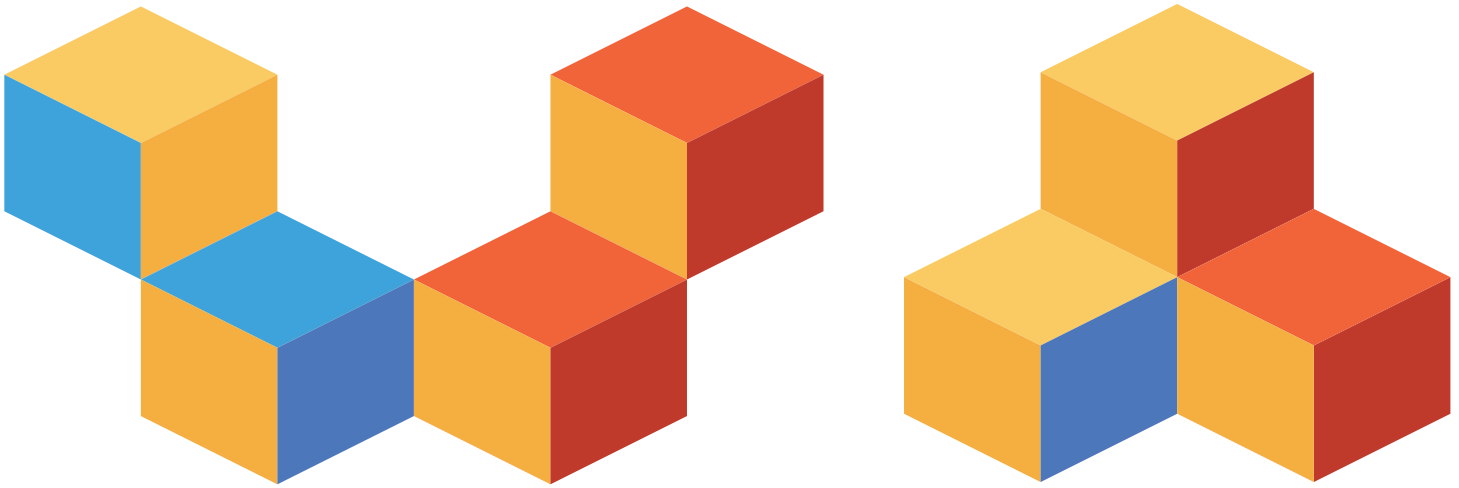
Photograph by Siddharth Bothra

Photograph by Siddharth Bothra

SCIENCE AND SOCIETY: PERSPECTIVES



The inaugural edition of Pravega's journalism competition, Untanglement, saw spirited participation from budding talent across the country. For the finale, the participants interviewed Dr Ramray Bhat (Associate Professor, IISc) and Dr Arnab Rai Choudhuri (Retired Professor, IISc) on how science and people's perspective about the field have evolved over the decades. Quarks brings to a you a lovely chapter penned by the winner, Aindree Chatterjee.

On the supernumerary seats for women in top Indian science colleges and its importance given the historical discouragement women have faced in STEM.

Dr Ramray Bhat had conducted the MERCK STEM for Girls workshop at IISc in June 2022. He elaborately explained how in semirural and rural areas, women are often discouraged from science. This continues somewhat even in the urban areas, and the problem of skewed gender ratio in education institutions and jobs is the result of a social construct, that often tries to enforce a “stay-at-home" mother’s role on a woman. “One cannot make laws or take policy measures based on personal problems” he remarked while commenting on people’s criticism of IIT’s policy of including supernumerary seats to increase representation of females in engineering. “One has to look at society as a whole and take measures at a societal level to address inequalities.”

"When there are two students of comparable merit, one male and one female, some preference should be given to the female student," Dr Arnab Rai Choudhuri said, suggesting a system of affirmative action, instead of adding seats, specifically for females. Though the addition of seats does not affect the general seats, Dr Rai Choudhuri pointed out how the concept of “supernumerary seats" would be treated as reservation, leading to many people discrediting the achievements of women in science.

On the shifting paradigm where science is written and communicated only in English compared to the inclusion of regional languages for scientific literature during most of the last century.

Dr Rai Choudhuri, who has written a fair share of scientific articles expressed his remorse at the fact that he seldom gets the opportunity to write in Bengali, and how lack of practice has made writing a page in Bengali 3 to 4 times more time-consuming than writing one in English. But he hopes to write more articles in Bengali in the future. Sharing anecdotes from his University of Chicago days, he tells us how scientists had to know a foreign language like German, French, etc in addition to English due to the vast reserve of content written in other languages. While he feels that English gaining popularity has bridged the gap in science considerably, many nations still adopt local languages, like his popular books being translated in Japanese for being made available to advanced learners there.

“Regional efforts have a large and important role in terms of how attitude can be built about the world around us" Dr Bhat stated, while explaining how in today a lot of scientific works and sometimes even papers are being translated into local languages for the sake of reaching global appeal. An avid lover of movies directed by the likes of Satyajit Roy, Mrinal Sen, and Shyam Benegal, he remarks, “Films by such filmmakers

allow us to question the world and not be contended by what we see around us. It is only through the interaction of question and answer that we get to know the world around us, and that is how we know what science is!" He believes that regional works pave way for diverse interactions and instil this rationale in us, allowing us to pursue science judiciously.

On the exposure that students get through research programs and online educational resources and their importance in scientific fields.

As an Indian Academy of Sciences scholar, Dr Bhat shared "This fellowship, which exists even now, allows students in their first few years of bachelors to spend their summers at a research institute." Through this fellowship, he had spent some months at the Cancer Research Institute in Mumbai and hence believes that any such program which helps keeping students' aptitude and interest towards science alive, has a place in modern society!

"Certainly, students nowadays have more exposure than, say, when I was a high school student," shared Dr Arnab Rai Choudhuri, who had grown up in an age where books were the sole source of information. However, he also voiced his concern about how, with the world becoming a global village, students tend to become addicted to social media. "If social media and the internet are used judiciously, it opens up more people to the world!" he pointed out.

On the MCQ based entrance test system in Indian science colleges that is often criticised for failing to take students' interests into account.

Dr Bhat suggested the addition of a filter post an MCQ based test to analyse the student's aptitude for STEM, rather than opting for a replica of the American system of admission, which is time consuming. Dr Rai Choudhuri however said that while our system does not take extracurriculars and other factors into account, it is still more transparent due to the ranking system acting as a concrete indicator of acceptance into colleges by streams. The US colleges have a selection panel who decides the applicant's eligibility. Sharing anecdotes, he informed us about how legacy admissions and a diversity quota often gets in the way of a merit-based system for admissions.

On the relevance of scientific history sections in textbooks of the current curriculum.

Dr Arnab Choudhuri has himself been involved in works concerning the history and philosophy of science, with works like Practising Western Science Outside the West: Personal Observations on the Indian Scene (published in Social Studies of Science), under his belt. Having attended a recent conference on the history of science, he was mesmerised

by the speakers from universities in Iran and other countries. However, he is deeply saddened by the disappearing history of science departments in Indian universities. Prof Deepak Kumar, who recently retired from JNU was one of the last pioneers in this field in India. However, the eminent physicist also believes that despite the cultural value of this history, its role in making one an established scientist is next to none as there are several scientists, who are extremely well-versed in their research, but not as much about the history of STEM.

Dr Bhat hopes to start his cancer biology workshop with a history of the subject and the necessary innovations and discoveries that paved the way for it. As a biologist who deeply respects the history and philosophy of science, he also finds it necessary to indulge in the research of the past to properly appreciate the current discoveries and works.

On the way societal stereotypes or peer pressure pushes students into STEM rather than their interests being the drivers.

Dr Bhat believes that if a student finds interest in STEM due to something exciting in a particular field that a friend shared with them, it is a good thing. While peers can often be helpful in giving a student a push in the direction in which their interests lie, this influence may be harmful if a student has absolutely zero interest in STEM.

Dr Rai Choudhuri, who was initially himself a history and philosophy aficionado, was pushed into physics because of societal pressure, in a way like many Indian students. He deems that going into unchartered fields is necessary for the development of science at a holistic level. However, he believes that younger students like us would be better suited to answer this question as we are the ones more in contact with our peer groups.

Dastangoi

The sun slathered in its light the hundred or so chilies that lay curing on the old hand-sewn cot. They shone like rubies in the pleasant golden glow of the morning. The sun would soon become ruthless and the peppers would parch in the summer heat, acquiring that scorched note they are so famous for across the neighbourhood.

His Amma sat by the cot, feet crisscrossed, kneading dough in a giant pan. Her fingers worked swiftly and masterfully through the flour hill as the gooey mess began to take shape. The preparations for the food to serve a family of twenty had already started. Amma, among many other women, worked with a coordination that could rival the army. Soon, the giant dough sat neatly massaged in the middle of the pan, soft and plump like a baby's bottom.

Amma stood up and began to dust the chilies to spread them farther apart. She had a metal can beside her whose water was used to make the dough. She took the remnants and poured them into a small earthen chalice that hung from the rooftop. Birds had roosted near the roof for as long as one could remember. They made their business every day to herald the dying of the dusk and welcome the fresh beams of earliest sunlight with their ceaseless cooing and caw-cawing.

Some of them swooped down to have a sip from the water pail. The water was their invitation, and soon enough, a fresh fleet of birds darted across the skyline, wheeling and flitting about the sky. Some of them, however, swerved and started to make a beeline, one by one, for his disembodied figure that hung adrift in midair. He had only begun to feel their pecking on his bare flesh before he woke up with a jolt.

He sat ponderously at the edge of his bed, wondering what to make of those disjointed visions. In the dimly lit cavern, the den that had become the bane of his existence – the low-rent studio apartment at the unregarded edge of the city, these vibrant visions of a previous life felt like a bolt from the blue.

With the onslaught of these memories, he was reminded of the choices that had brought him so far away, choices that he was still trying to contend with. He loved art, read books with a passion, and, with an even fiercer passion, dreamt of writing one of his own. All was splendid till he kept out of trouble, stuck to the corner and went to the occasional movies. But then he grew enough for his opinions to no longer concur with his father or grandfather or any men of the house. He felt disgust for the idyllic town while the world raved beyond. In the heady anger that young men are wont to

feel, he sought no reconciliation – it was beneath him, and ran away from his home of twenty years. Amma wept but it did not matter; this was the only choice he felt he had.

The streak ran in him for long before it doused. There was something about dying for your craft that stoked him, the lofty ideal of never compromising. Like Caravaggio who died of lead poising, because he wouldn't have it any other way with his paints. Or the miniaturists who become blind from years of straining their eyes. The Scheherazade who must regale tales every night or risk beheading. The writers who would take back a bullet but not their words. The comedian who persists against blacklists. Even the graffiti artist running away from the national guard stood, in his eyes, on no less a ground.

His dreams of writing, of cinema and all things theatrical had driven him to the city. But within a month he recoiled from the reality of his decision. He tried finding a job with a publisher and was made a measly writer of adverts for local products. It paid enough for his hopes to return to him. He picked up his books and began to record ideas about his future novel. He started to go watch screenings of the cinema of the world with a friend he made at the city's film college. He started circling close to the men of arts, flocking to events where they communed, even borrowing their ways and manner. He was like a moth attracted to the splendorous light of what they symbolized. Like any aspirational man of art, he frowned upon his birthname – so effusive of the love of parents. He looked at it with disdain till he cast it away entirely, in a wave of sheer artistic nihilism.

The city consumed him with her desultory lights, singed him with the warmth of her pleasures. The further he descended into artiste spirals, the more he became aware of the dual lives of men. So many of them had been awful beings or lived in awful strife. Masters of their craft but duplicitous morals. Hedonistic hunters pillaging off some newcomer's work. A disregard for women that could make your entrails recoil. He read of the fraudulence that drove Gibran crazy, for the man could never live like his poetry, wasn't quite the prophet. Picasso was unspeakable of as a human being. Art was nothing like their artists – it sickened him. It all came to a precipice with one single thought:

Is this what Amma would want him to be?

She had always seen through him. She was the only person he respected truly; in a way she was already living in a manner he aspired to. The staunch matriarch who lived for her food, brewed her own flavors, perfected her own condiments and swore by the recipes she had devoted a life to – she was an artist of her own right. She was a sight to behold when cooking, brows furrowed in focus but breaking into a smile every now and then at the gulab jamun that came out right.

She would have seen through him and sighed. And this he could not bear.

He had poisoned himself. He was coaxed by the wrong ideas and nurtured the wrong seeds. A soulless submission to ideas not wrought from his own anvil.

Driven mad with the messy ways of the bohemians around him, he sought refuge in discipline, a maddening streak to keep places tidy, in absolute order, and in total control. He had read somewhere that discipline was the antidote to the tortured, uninspired artist. The idea comforted him and he had come to observe it rather religiously. But art is in the letting go of things, having them meander and concoct meaning of their own- was also something he had read and kept churning in his mental backburner.

He collected trinkets because they delighted him, he bought more books than he could ever read, had more subscriptions to daily newsletters and podcasts and substacks than what was possible to consume, and even collected vinyl records in the hopes of owning a record player one day. Yet, he went about it, his trinkets neatly decorated, books adorned like trophies on his only shelf and the old Mackintosh desktop he kept organized to the letter.

He might be the most organized hoarder to be found.

Today, however, all these inanimate things he had tried getting control over took to rallying against him. He hurt his gums while brushing his teeth and bloodied his jaw when the razor fell off. His alarm clock refused to shut up, and in all the noise, a bird flew in through the open windows, looming dangerously close to the fan. In an attempt to shove it out with a broomstick, he flipped against the cabinet too hard and stubbed his toe, while the dosa batter charred on his watch.

Seething with emotions, he sat down to write, taking one last refuge in the certainty of routine, but was decisively defeated when the pen rolled down too deep under the bed. He let out an expletive under his breath and sat cursing his fate. After a while, when things did not telepathically bring themselves in order despite him desperately wanting them to, he decided to take a stroll outside and, possibly, find something to eat.

...

He cut across gravel laden path with long strides, avoiding puddles of water. The sky had cleared after the rain but remained dreary from lack of light. The smell of must and decay gently filled his nostrils as he took in the surroundings that had come undone in the rain. Despite his care, his feet entered a giant puddle and water sloshed up to his trousers.

He remembered the pond he used to run to everyday as a kid.

The pristine water with kids gleefully swimming in the neighboring lake. He preferred to sit by the pond, on a path that cut across the cattails. It had been built to catch the occasional trout, but there weren't many in the pond. He kept his feet inside, letting the water soak up his canvas school shoes, the water gushing in an out like waves on the sea. Tiny minnows hovered round the novelty that visited them daily. He loved it. It was his favorite respite after school. The sun glinted off the water like a million sequins on a party dress and he could dream on and on of his chocolate empires. He could watch the leaves of the water lily bobbing endlessly, like a metronome chiming to the ripples of the idyllic, luxuriant lake.

The croak of a giant frog brought him hurtling down to his dreary reality. He had come close to the commercial area. The only palatable shop that stood in sight was that that of a book peddler on the street. He decided to leaf through some random titles.

He had been struggling to write something for days. There was no dearth of ideas but he struggled with melding them together in a manner that pleased him. His middling form haunted him as he compared himself against the greats. He made his prose dense with words, each wordier than the last. He thought it improved him - only worse. Unhappy, he had slashed and burned through his work faster than Californian wildfires.

He decided to pick up Walden, and began to flip through the pages.

...Our lives are frittered away with detail, simplify, simplify, simplify.

He snapped the book close in displeasure.

...

He decided to turn to the street for food. He could hear the sizzle of butter being slapped in a large wok from the nearby canteen. 'Sweety's Tea Shop' had become a regular haunt for him and many others looking for a cheap morsel, buttered no less, at this end of the city.

"Just tea," he said to the shop owner.

A young boy in tattered clothing poured him some hot fluid from a metal cannister

and added some biscuits along with it. He welcomed the addition.

The dour morning had made him weary and he regarded depressingly the prospect of yet another fruitless day. Slowly, he began to sip the tea in which he had soaked some biscuit. The hot liquid coursed through his system in slow gulps, warming the palate and with it the cold that had nestled within. The crumbs of the toast in his mouth yielded easily, like pliant grass. Something seemed to change in him. Visions of gay times, early mornings with Amma's tea and toast in winter, pervaded him with a pleasurable intensity. A shudder ran through his spine as he sat intently, his senses heightened, aware of a balmy, idyllic sensation making waves through his body. In that moment, his troubles seemed to dissolve, the yoke of his mediocrity did not torment him; instead, he delighted in existing, mortal and with middling form. If only, for a moment.

The flashes of reverie waned with subsequent gulps. The drizzle regained some intensity. The clamor of the world returned to him - people chatting away their tribulations over pakoras and chai, the familiar clatter of cooking and the hissing of gas on burners.

He began the walk back home in slow, measured steps. Somewhere, he felt, a kaleidoscope was shaken. The same parts but a completely different pattern.

...

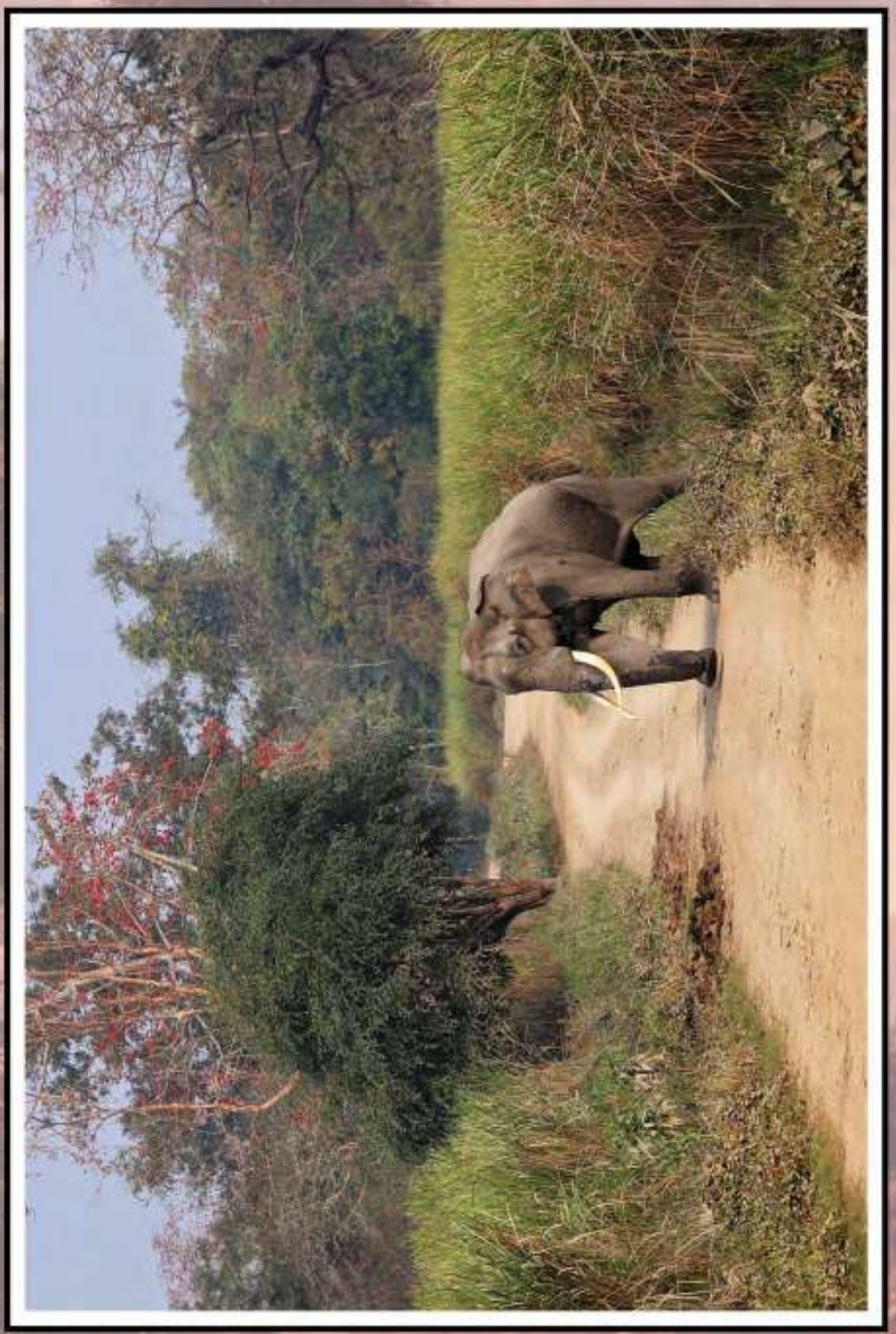
Later that day, he felt peaceful wielding the pen again. The disquiet gave way to a warm surge of forgotten memories. He wanted to dance and sing and tell his stories. Dastangoi. It was like floating, the sound of his own body finding ground against the muted sounds of everything else, being stripped of details and reduced to the barest. Snatches of a poem his Amma used to sing sometime, came to him

आ गए तुम?
द्वार खुला है अंदर आओ...!
प्रेम और विश्वास की मद्धम आँच पर चाय चढ़ाई है,
घूँट घूँट पीना,
सुनो, इतना मुश्किल भी नहीं है जीना...!

(So, you have arrived?
The doors are open, come inside
I have just put up a tea on boil,
It simmers in the mellow heat of life's love and trust

-Saakshi Porwal

Art by Nikhil Pradeep



Photograph by Akshay Bharadwaj

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Photograph by Akshay Bharadwaj

Photograph by Akshay Bharadwaj

Art by Nikhil Pradeep

Art by Nikhil Pradeep

Art by Tsungrojungla Walling

Name: Keshav Agarwal
Roll no.: [redacted]

HOW TO:

REACH CLASS ON TIME

Either you are an absolute bouncing ball of joy of a first year, or you have one of those lovely caring professors who make sure you are present in every lecture and even give reserve part of the evaluation on attendance percentage (sometimes post-hoc) to make sure you learn (certainly not for any ego related reasons),[citation needed] or you have convinced yourself that instead of going to therapy, attending lectures will resolve every woe you have. In any case, for some reason, you want to reach class on time. Sure, let's make some strategies:

I. Wake up on time:

Good old standard strategy, to make your parents, relatives, neighbours, and virtually every member of a certain demographic happy. In fact, comes with the bonus of:

- Eliminating diseases like allergies, nutrient deficiencies, common cold, diarrhoea, diabetes, hypertension, and reportedly, death as well.
- Alleviating depression, anxiety, ADHD, BPD, and of course, homosexuality.
- Granting superpowers like flight, invisibility, shapeshifting, and outcompeting a certain neighbour's son who is at a certain engineering college.[citation needed]
- Doubling your GPA in 30 days. (I Promise!)
- Guarantees replies to your emails, except if it's for a project (come on, we are being realistic here).

Sounds amazing, sadly though, this is made impossible, as one must deal with:

- Lack of discipline and respect in our specific generation as compared to every generation before.[DO NOT see Rhetoric Part 12 "On Youthful Character", Aristotle]
- Junior batches sharing your hostel not making enough noise to allow you to sleep peacefully on time.[citation NOT needed]

- That one conversation that ran till 4 am since both of you were stuck in lab or stuck with an assignment that definitely had a very reasonable deadline.
- People waking you up at 3 am due to mature WhatsApp related drama. [too direct of an attack?]

Even if you do wake up on time, you still don't know if you will be able to make it, considering how someone may just come up with the brilliant idea of locking all the washroom stalls from the inside, delaying you anyways.

It has been proven that either of these scenarios can and (almost surely) will exist given enough time.

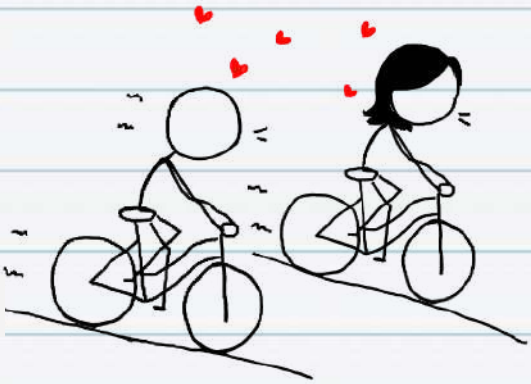
Anyways, this won't help after the first lecture. Let's try something different.

II. Go Faster:

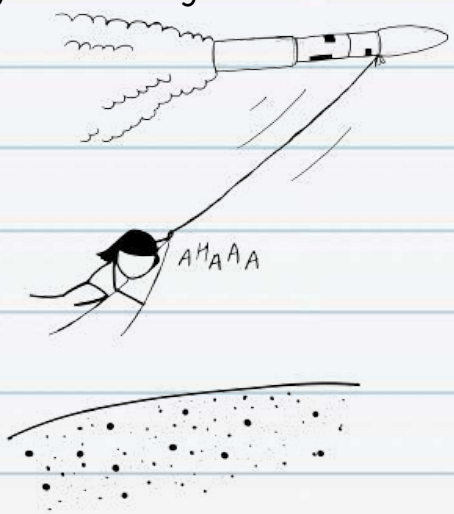
There is a certain interesting issue one must deal with:
Thanks to the extremely considerate course scheduling that happens each semester,[dubious, discuss] one must go to each of these locations (map in the next page) several times a day. Of course, as one can see, they are not exactly close to each other. Not to mention bonus issues like 2 people blocking the entire road going to DBS from hostels because of their need to romantically cycle side-by-side on the narrowest road they can find , having less than 15 minutes to eat/swallow mess food (this is actually for the better), and having -15 minu-

-tes (yes, negative) to travel between 2 departments. This is looking pretty hopeless. But fear not! Let's find a solution.

Exercise: Generate the shortest path a student must take from DBS to OPB which avoids all road blockages caused by romantic cyclist couples.



- Walking: Takes around 15 minutes to go a kilometer. Too slow.
- Cycling: If you are lucky to get clear enough roads, maybe halves that time. Seeing you are here, let's not rely on luck.
- Driving: Even faster. Also allows you to show solidarity with altruistic multi-billion-dollar corporations in causing global warming.
- Ballistic Missile: Assuming a launch velocity of 1000 m/s (Please, don't make me work beyond order of magnitude), ignoring air resistance (not being paid enough to consider it), you should be able to reach your destination in approximately a second. Sounds pretty optimal. As an added bonus, gives you more leverage in demanding extensions for your deadlines. You will have to deal with any unwanted government attention though.



- Flight: With a combination of the antigravity package in python and a mix and match of every medicine you can find, you should be able to fly. On the other hand, if you can fly, I doubt you'd care to attend lectures.
- Time-travel: At least more realistic than asking professors to finish the lectures on time. And it is rather immature to hope that the next lecture could start a few minutes late. One normally stops believing in Santa early enough, this should be easier to accept.

But what do we do when the previous lecture runs into the next one?

III. Delay Class:

Of course, once the previous professor has decided that their class is the only one you should bother with, they will overshoot. All the previous ideas fail here. Time travel seems a bit dodgy, and no one is giving you enough funding to get a time machine anyways. So, let's stall the next lecture! Of course, we'll have to do it while you are in the previous lecture hall.

- Stink bomb the lecture hall the day before: Sounds pretty classic. Of course, likely to get the lecture cancelled altogether. Also, pretty cruel to the people who will have to clean later. Let's not.
- Tip off the security of the presence of a bomb: Again, not very creative. Likely to be dismissed as a hoax. Plus, even if they do all evacuate, will you be able to live with yourself if you ruin some poor soul's experiment that worked for the first time?
- Offer the Professor a prize at that time: Most professors would be smart enough to sense the hoax. But not too bad maybe?
- Convince everyone that the lecture is later: Of course, there will be one heroic good student to thwart your nefarious plans, you fiend.
- Besiege the department: Travel the lands and find kindred souls. Build your army one follower at a time, sweeping them with your charisma and impeccable anime derived swordsmanship. Slowly, become a legend across the worlds, pulling challengers from far and wide, besting each of them and making them a part of your elite guard. Discover your bloodline and lay claim to an ancient kingdom with its immortal legions. And of course, in all this, you find your match. You duel seven days and seven nights to no result! You find your love, and in this you make an alliance with foes with whom your people once swore feud. And once you have amassed your armies, march upon your foes, besiege their lair until they yield to your will! Of course, they shall come upon their terrible drakes, massacring your army by the thousands... But...

But then you call upon your ancestors to aid you! The newfound power courses through you and you slay their beasts under the ancient flag... only to be fatally wounded with your lover. You die in each other's arms... Wait... what were we doing again? Sorry, I guess I got carried away.

RAINWATER

Barnopriyo Dutta

I can change
like water does
take the shapes the currents want me to
im fluid, trickling down, rushing through,
maybe that's why you fell in love with me
it's not wrong to want someone who can change your pain for you

was it the way I talked, looked or the way I kissed you
I didn't bother knowing, I was like rainwater
I walked on with gentle feet
like dew water that pooled on the window sill

but I would change,
like water does, even without you.
it would be nice of course, if you sat
 and watched, like a boy watches a stream.
but don't hurl pebbles at me though,
you're the favourite face my bank has ever seen
dip your feet or dive in if you feel like.
the water will change, but you'll always find
 a new current to surround you.

Art by Tejas Keswani

FREESTYLE

Parth Deshpande

There is a room, a wall of stone, and a cot beside. I lay on the bed listening to noise, till a heaviness settles in my being. I tune out. I drift asleep. A thousand open their eyes.

I am on the other side, surfing upon a sea of writhing, squiggling black lines. I go under, and chase dying stars, impossibly close in the firmament. I swim unconstrained, by clothes, flesh, nature, words, notions, the trappings of exist ence.

I am alone here. None but those thousands stare at my utter nakedness, amorphous and unbound. I stand stoic beneath the firing squad of a gargantuan waterfall in time, the river infinite with finite curl, no source, no sink. Bouncing erratically from state to state in defiance of ergodicity. I am a quantum being in the truest sense, a million things at once. A sudden chill filled me. A ghost? Stone.

I am alone here. None but those thousands stare at my utter nakedness, amorphous and unbound. I stand stoic beneath the firing squad of a gargantuan waterfall in time, the river infinite with finite curl, no source, no sink. Bouncing erratically from state to state in defiance of ergodicity. I am a quantum being in the truest sense, a million thin--gs at once.

I resurface, and gaze at the darkness above, wishing I lacked enough awareness that I could pierce the dark blue. Unfelt worlds await beyond that curtain, and perhaps dea--th.

I am alone here. I wish to be not. I wish to entangle with another, without collapsing, a print upon a wall. I have come close, and often. Ghosts wander the scape, fading.. Some pass through. An unstoppable force, an immovable mountain.

A sudden chill filled me. A ghost? Stone. No. I deny that feeling. I try to remember being in that boundless... sea? Or was it a meadow? If my hair is still wet, then it must have be--en a-No. I do not have hair. I do not have form. I must focus. I shut all senses. I ignore t--he weight of my... body. My forehead upon the edge of the pillow, I stare at the bed bel--ow. Light seeps through the side, illuminating the tapestry. I remind myself. Sights are seen. Sounds are heard. Flavors are tasted. The walls recede. I breathe. There is some semblance of freedom. Beauty is here too.

Art by Tejas Keswani

Art by Oviya G.

On math and beyond

with Prof. Siddhartha Gadgil

Siddhartha Gadgil is a Professor in the Department of Mathematics at the Indian Institute of Science, Bengaluru since 2012. Currently, he works on Automated Theorem Proving. He was involved in the PolyMath 14 project. His earlier research work includes (Low-dimensional) Topology and related areas.

He occasionally blogs his experiments with automating mathematics on his blog "Artificial Intelligence and Mathematics". Besides doing maths, you can find him cycling on the roads of IISc.

What was your first memory of mathematics, one where you recollect discovering something new?

Oh, you mean of doing mathematics? Well, I didn't discover any mathematics in my childhood; I learned mathematics in my childhood.

Anything you thought was interesting or enjoyed working on it?

There are many, but I distinctly remember one incident. One of the things I found fascinating in my childhood was a time when I learned this bit of combinatorics, of which I had not done much elsewhere, where you must count things up to symmetry. There were two ways of counting the same thing. You have to count up to equivalence, but the two ways of counting were equal, which gave an excellent way of solving things.

I would say the time I really got into mathematics would be my undergraduate days, and even then, it's hard to pinpoint. In my third year, I found a nice proof of the Jordan-Brouwer separation theorem using differential topology. Though my teachers did not know, I subsequently learned that this had been discovered many times before and came under Surface theory. I was thrilled because I constructed first, a two-fold cover, then the next day an infinite cover and obtained some results. At that time, in the department that I was in, people thought it was a new proof that I discovered myself. I did not read the theory until some years later, so that was satisfying.

Did you always know that you would be doing research in this field? What were your next steps?

I did continue. The starting point was pursuing the B-Stat degree under my mentor Koli Mukherjee at ISI Kolkata. During that time, there were limited options for individuals interested in mathematics, and most people in my generation pursued either B.Stat and M.Stat programs at ISI Kolkata or an integrated B.Sc from IIT. Institutions such as BMAT, CMI, IISER, and IISc hadn't been established yet; they came into existence a little later. Both programs had their limitations. My mentor taught us algebraic topology informally, and it was him to who I went and showed my proof. It was a nice construction, and I've used that same construction many times ever since, except that I know it's not mine alone. I was maybe the 100th person to discover it, not the first, but still, it was satisfying.

So, at what point in your life did you decide to pursue a career in mathematics? How do you look back at the decision now?

This is a bit tricky because it was in school, but it is a question I always answer with a great deal of care, especially because younger people read this. Looking back, I would say that choosing mathematics was the right decision, but it was made in ignorance. Even if I had been more informed, I would still likely have pursued mathematics. However, it is important to note that the world was different back then. It was the 80s and early 90s when in India, skilled jobs were scarce, because people graduating from

engineering institutes mostly emigrated or went into management. There was not much scope for mathematics, but even in today's world I would be happy with the choices I made. I had a decent rank in JEE, but I had given my first choice for Integrated MSc in Kanpur. Nevertheless, I decided to go for B.Stat.

I once received an advice that not all decisions we make are inherently right, but we have the power to make them right. While this statement may be an exaggeration, it holds some truth. No decision is purely right, and we must work to make the decision a right choice for us. However, in this case, I can genuinely say that I am content with the decision as it was, without needing to justify or rectify it. As an undergraduate, once I started taking mathematics courses, I did very well and, although, I did not discover new stuff, but it was quite clear to me that I was suited to doing mathematics.

But the course was designed for B-Stat right, how do you get the opportunity to work in algebraic topology?

A lot of people with a B-Stat degree have gone on to do other things. ISI had a stronger mathematics department when compared to the Integrated M.Sc program in Kanpur, so you received a degree in statistics with a stronger math background. Hence, I chose B-Stat. I left after three years and went to do a PhD at Caltech. This is not to say that I dislike statistics, I always had a bit of a soft corner for probability, and still do, and could have drifted in that direction instead of topology, but at a point one has to make a choice.

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Focusing on algebraic topology was very much a choice. When you consider branches of mathematics there are many differences and dimensions to think about before you make the choice. One of them is the level of abstraction; there are people who work in arithmetic geometry which is an extremely abstract form of mathematics that goes tower after tower after tower. I do not like that. At the other extreme, you have branches like combinatorics where each piece is more or less a separate problem, and that too I do not prefer. Algebraic topology hits a nice balance between theory and actual questions.Geometric fields are more tangible because we have a visual cortex. To me, number theoretic problems make no sense at all. I can understand them, but I do not feel motivated to try to understand, say, the distribution of primes. I will completely acknowledge that it's very important for mathematics, but it's not a tangible thing to me. It's the combination of both geometry and theory that I like.

So how did you find your transition from statistics to topology?

I was never into statistics; I was in a bachelor of statistics degree. During my degree, you had mathematics courses – analysis, linear algebra in the first year and probability in the third semester (like here, you have

three semesters of solid mathematics and then you have light semesters). People who stay on for M.Stat start getting more serious probability and statistics courses. By the time I finished B.Stat, I did not have the same solid base in mathematics that someone with a bachelor's from here would have, but a perfectly strong mathematics background regardless. When I went to graduate school, there were people from China, Russia, etc in Caltech, and Caltech was quite selective, but I was perfectly well-suited for them. I never transitioned from statistics; I went to B.Stat intending to do mathematics, went out of B.Stat ready to do mathematics.

How much do you think the undergraduate syllabus differs from the daily, day-to-day research work of mathematicians?

In mathematics, you learn most things as an undergraduate. In this way, mathematics is a bit unusual. All the linear algebra, analysis, algebra that you learn, even the electives, might not be immediately useful, but at any time you may have to use any of them, and they should become a routine. If you are working on a research problem, the bits of whatever group theory you learn in a course, say, will be useful. It's almost like a child learning addition and, in the future, if they ever have to add numbers, they just add it automatically and don't think back, thereby turning into a tool that you assimilate. I would say that this is not true for all branches of mathematics. Algebraic topology is one where you do use everything.

It's not knowing a lot, but knowing the core of it very well, for example, proof techniques and how they work that will come in handy. The results and concepts continue in research. Manjul gives nice examples of how it's not a theorem you use, but rather a key idea in the proof of the theorem. One of them involved writing the exponent (I might get this slightly wrong). He said, roughly, that you break up the definition of expectation of probability distribution into the zeroth term and make some obvious bound that you use. I may never use Egorov's theorems, but any sort of modern proof of Egorov's theorem would use group actions and I use that a lot.

I would say for most of mathematics, you just need undergraduate mathematics, and a little beyond. That is why you have a graduate school system in the US, and Masters in Europe.

What do you think people should keep in mind when they are in doubt, while trying to change their career path?

It depends on what stage of life you make the change in career. While in your undergraduate years you should not be specializing, I would say. I mean, of course, you can specialize between mathematics and biology, and the like, but you must make sure you are broad enough. It is too early, and as things advance, it is more important to be strong across many things, not in the sense of knowing a lot, but knowing it with a certain effortlessness and command that you need over basic things.

For the change being much later in life, I can quote Eric Lander, who spoke here at IISc in

the cell press series where people in biology have given many talks in J.N. Tata. Eric Lander was one of human genome project leaders. He did his PhD in combinatorics and then he became a biologist in the human genome project.

It takes some years to make a transition, you obviously need to eat and live somewhere, you need to support yourself and, in some cases, your family at that stage. Eric was in the process of transitioning from his field for about five years. During this period, he taught mathematics in a business school, so he could save some funds. He said that it's not so much that you're an expert in something, but that you're an expert in being an expert. I don't know if this is true or not, I'm just quoting Eric Lander here.

In IISc, SP Arun, a good friend of mine, and 3-4 other people in neuroscience have engineering degrees, and Arun for example, has an electrical engineering degree from IIT Mumbai. Another friend, a bit younger than me, Vikram Gadhakar, did an integrated PhD from here, but he went off abroad for his PhD after taking a master's. He has a degree in physics, but in his postdoc, he did both physics and neuroscience. Now, he studies zebra fish. There are people who switch, especially into biology from other fields.

Francis Crick was a physicist, and maybe the greatest biologist of the last century. In fact, his history is interesting because he lost a few years in his career because of World War II, where he did work for the military in physics. And then when he was 33, he decided to focus on biology because

"In mathematics, knowledge always builds on knowledge."

the most exciting advances were happening there. He, along with Watson, discovered the structure of the DNA.

In mathematics, knowledge always builds on knowledge. It's very difficult to switch into mathematics unless you are in an area of engineering where you have already picked up quite a lot of mathematics on the side, or an area of physical science. But if you pick up mathematics in parallel, it should be feasible to switch.

Did you know math people who have a degree in physics?

Yes, Arvind Ayyer's PhD is in physics, and the work he does is on the borderline between physics and mathematics. Arvind works in statistical physics related combinatorics and some representation theory. Vamsi has completely switched, and he does differential geometry. Someone from biology can't switch into maths easily because there is too big a leap to be made in terms of what you learn early on in your studies.

Currently your work focus has been automated theorem proving and polyline project. How did you manage a project online with such a stellar ensemble of mathematicians and how was the experience behind-the-scenes?

It was very interesting because nothing was behind the scenes, which is pretty nice for someone who works in automated theorem proving or even for undergraduates. The discovery of a theorem happened fully in the open, and you could see the stages in which the development occurred.

It all started when Apoorva, Arvind and Terry Tao were having lunch at UCLA. They have been collaborators and have two good papers together, and more. Apoorva told them a problem, which he had been discussing with many people based on different results. Terry Tao posted it on his blog, saying this is a question which seems very suitable for crowdsourcing. He posted it on a Saturday, and it looked like such a simple question that I thought somebody will say that it's well-known or that it's either true or false. So, I had decided I will wait till Monday morning and only think about it if nobody has claimed it yet.

Nobody had. People were trying, and everyone was going through the comments on the blog. Every time people had an idea or advances, they would post the comment on the blog. It was quite remarkable, people were in different time zones, and it was fast and exciting. On Monday, a conjecture was posted asking whether there was a length function on a free group which had certain properties. By Tuesday morning, I was trying to prove that there was such a length function.

This happened because, many years earlier, I had constructed a length function which was optimal for RNA folding. You needed to show this length function to have a positivity property. People were convinced from general mathematical knowledge that you would need to show that the length of the commutator alpha, beta, alpha inverse and beta inverse is 0. So, either there is a length function or for all length functions, the commutator will be 0.

So, people started trying to find bounds driving that towards 0 or tried to construct the function. My construction broke down on Tuesday morning. I realized that and fixed it. More bounds would keep getting posted.

Importantly, there was a sort of intellectual leader, Tao. Periodically, he would summarize what was happening on the blog post, the best bounds, etc.

On my side of things, I had been working on automated theorem proving for a while. Initially I was basically doing geometric group theory, but I realised it was time to switch to computer proofs. I got computer bounds, and I thought just in case these bounds turned out to be good, I'll output a computer proof and not just a bound. As it turned out, I got a better bound and by Thursday morning, I posted a human readable proof. Some of my collaborators were geniuses like Pace Nielsen and Tobias Fritz, who took this long computer proof, understood the pattern that was there and generalized it.

Tao felt something is going on and he managed to abstract it after a few conversations. Tobias Spritz said "If this is the abstract version, I'll plug in this" and got a very good bound which gave way to a

lemma. As soon as Tao saw that lemma, it reminded him of random walks. I had fallen asleep on Thursday night and woke up at 4 am on Friday because there was too much adrenaline in general, and I found that the problem had been solved. Apoorva had returned home by that point; he said that Tao, when he saw the equation said, "Oh now I can use the heat equation and solve it" because of a well-known parallel. Apoorva told me he told his wife that if Tao says he can do it with heat equation it means he can now peacefully go to sleep. When people woke up in India, the proof was there fully in public view.

So how did you decide who all would publish this proof in the paper?

As soon as this thing was solved, Terry Tao proposed on his blog that we make this a Polymath project. In Polymath, it is normally announced in the beginning that we are all going to work together on this problem, but this was post-facto. So, it was written collectively, as Polymath goes by an honour system. Technically, there are six authors; in another sense, there are no authors but it's anonymous under the name of imaginary D.H.J. Polymath, who is the author of all polymath papers. The journal has six names, however.

The theorem was proved, but we declared that this was Polymath win as it was an open collaboration operating on that model. Writing in collaboration is so easy because of Overleaf.

Why is there a need to formalize math?

"Apoorva told me he told his wife that if Tao says he can do it with heat equation it means he can now peacefully go to sleep."

Well, I wouldn't say there is a need, but rather an opportunity to formalize math. Let me take a practical view on this. In every field, be it medicine, vaccines, websites, or machinery, there's always a balance between the risk of error and the effort required to prevent those errors. In life-critical situations, we demand people to make a lot of effort to minimise risk. However, in math, nobody would die if a theorem turned out to be wrong. The reality is that as mathematics has got more complex, a certain amount of it is wrong. This includes theorems published in the Annals of Mathematics, which is one of the top-most journals. Kevin Buzzard always gives this example that you will always see two papers published in the Annals; one proving a result, the second proving that the result of the first one is wrong.

Let me give you an example. A paper was published in the Annals about a complex structure on a group. This problem was related to another famous problem about complex structures on a related group, and so it caused a lot of excitement. The sequel to the paper considered a family of such structure on a group. This problem was related to another famous problem about complex structures on a related group, and so it caused a lot of excitement. The sequel

to the paper considered a family of such complex structures on the group. But the referee of the second paper found that the space on which these structures were constructed, including the structure in the first paper, was on a different group. So, this paper is wrong. I realized this when I saw authors make arguments like it is still important because this is a space where you did not know the structure existed. But it's wrong.

Yet another case centers around the Tarski Conjecture, a very important problem. There are two groups. Zlil Sela has proved the first Tarski Conjecture. Experts in the field tell me he's correct. In another group, Kharlampovich and Myasnikov also claim to have proved it. On the archive, they keep pointing out each other's mistakes. For years they have kept on battling trying to prove the other wrong.

Because mathematics builds upon itself, if you use wrong mathematics, your consequences will also be wrong. So, there is an extra danger. This is how you had Peter Scholze having his liquid tensor experiment.

So, what can we do in this situation? One might argue that we should simply be more careful, but there are limits to how careful humans can be. However, with computer-verified proofs and automation, we have an opportunity to achieve a level of correctness that surpasses human capabilities. Proofs verified by tools like Lean Theorem-Prover, Coq, or Isabelle provide a degree of certainty that far exceeds what humans can achieve through careful checks alone.
Mizar was one of the first automated proving software where if you had checked the proof with it, you could be sure it was correct. Computer verified checking is so disproportionate to the amount of effort that goes into proving it, so you end up living with a little error rate. That's why I use the word opportunity.

"You will always see two papers published in the Annals; one proving a result, the second proving that the result of the first one is wrong."

Now the gap between the effort to prove a result and to computer verify it has narrowed a lot. In some cases, it has narrowed enough to almost vanish. The question is, are we willing to put in that extra effort to attain a superhuman level of certainty that would otherwise be impossible? I hope that in certain cases, we can demonstrate that the modest additional effort leads to a level of correctness that is worth it. Of course, there will be social inertia and barriers to formalization, perhaps for a couple of decades, until the balance between effort and certainty tips the scales completely in favor of formalization.

I heard this story about one student in an RU camp came up with a wrong proof of a theorem and presented it to his professor. The professor realized what was wrong and used that discovery to find even more beau tiful things. So, making errors can some-

times lead us to better results. This also happens with interactive theorem proofs and programming. When you try to provide Lean with a wrong statement, it will point to what is wrong in a precise sense. You can go back and think about it and come back.

Personally, when I formalized things like Kaplansky's conjecture that I had known for 15 years, I found that I understood them even better. It forced me to question which hypotheses were relevant to which conclusions. I always tell my students to think beyond just formal steps in a proof and consider the details, like asking how the proof changes if certain elements are dropped.

Questioning exactly what piece of the data goes where in a construction, and what helps the hypothesis. If you work with a formal proof theorem at first, you might think, "oh, you are giving it boring details," but if the optimization is good and you don't have to give it too many boring details, you give it these kinds of interesting details to understand the piece.

Take a note here that I keep formalization and automation separate. Today, only a few mathematicians resist formalization, and I believe that resistance will be proven wrong in a few years when formalization becomes much easier. However, we still don't know if automation can reach the level of research mathematicians. Assuming it can, mathematicians feel that you should resist automation because part of doing mathematics is learning. I think that's a reasonable objection. I would say one more intermediate point, and this is something that I think those involved in automation and formalization should keep in mind, that computer-generated proofs will push humans out of the loop because we can't learn from them. Interestingly, the Polymath project showed that humans can indeed learn from computer-generated proofs, but that's just one example.

I feel that as we go ahead with automation, it is quite important to take into account that that proofs you can learn from are extremely important. I'm quoting Patrick Massot, who has written an article called "Why Formalize Mathematics." I think it provides the best summary of the various reasons I've read to formalize mathematics.

His point was that formalized mathematics might be easier to learn from than traditional mathematics because you are allowed to collapse the details. Imagine reading a theorem. It's broken up into steps, and to an advanced reader, each of these steps may be obvious, as they read it. A beginner reader looks at a step, doesn't know why that's true, expands it out, and you can expand it all the way down to the answers because that is always present in principle.

What is your opinion on the B.Tech in Mathematics and Computing that we have started this year?

Well, as one of the designers of the B.Tech program, I can say it's an excellent program. One of the things that all of us on board the PCC felt is to try to have maximum flexibility. The program acknowledges that you may have an interest in mathe-

matics but may not be entirely certain, or perhaps your parents want you to pursue a degree that offers diverse career options and job prospects. In such cases, computer science acts as a good backup.

There is a modest amount of computer science that is part of the course. If you're really interested in computer science, the kind of core mathematics you learn will help you a lot, whether you are working in algorithms, machine learning or programming languages. The mathematics courses are just right to give you that maturity of logical thinking. You will come across a lot of proofs and would not need extensive background knowledge to follow.

You also see linear algebra, which has become a must-have skill these days. It's at the core of things, whether you go into a range of computer science-related stuff, mathematics related stuff, or you're going to be using computers for automated theorem proving. We have tried our best, and I really feel it will succeed as a program. Given the fact that IISc has resources in all fields (including biomedicine and medicine), it leaves a lot of room to explore a wide range of subjects without having to commit early to a specific area.

I would like to finish off with this series of questions. Anyone who has ever lived in IISc has loved the campus for its natural beauty. What is your favourite memory about the campus? I ask because it is well known that you are quite a cycling enthusiast.

I compete in cycling events, and I was excited to compete in the Pravega finals and the Spectrum Cycling event, this year. It's quite exciting to have such a beautiful campus in the middle of the city. I lived in Malleswaram during my childhood, and I used to visit this campus then as well. It's even more wonderful now that I live on campus, as my home is also located here. It's a completely different life being on campus versus not being on campus. Of course, during the pandemic, this took an extreme turn.

On campus, you are free from the noise of traffic, and you can easily get around everywhere by bicycle. I rarely go out from campus, but when I do, it's nice to be able to cycle towards the Hesarghatta area without encountering much traffic. The journey is scenic and beautiful along the way.

I have also been a part of a cycling group. I cycled a lot with the group of students who started it but they have all graduated now. Recently, post pandemic, I haven't cycled with the group that has become active now.

There are over a hundred bird species on campus, so one can go for a walk every day. It's peaceful, mostly because there are no traffic sounds. And the other thing I should say, of course, this is not for younger people, but for resident families, it's a wonderful thing that the kids can go to school, go swimming with their friends on a bicycle. Now ideally, this should be true everywhere but unfortunately, in India, it is not. No traffic means that that level of autonomy that kids get being out in the sun, and the automatic exercise that kids get by being able to just

go by cycle with their friends is not lost within this campus, I think.

We have all this large area and yet we're not cooped up. If you have a small campus like some of these institutes, you'll get cooped up even if it's nice. We have the luxury to be right in the middle of the city because we're 100 years old, so any conveniences that you need whether it's a bakery or a a restaurant, you don't have to go far.

IISER Pune is the only other campus I know which manages to have both . Being older however, our campus is more beautiful than IISER Pune. Some of the new IISERs are quite beautiful as well. The one hill near IISER Trivandrum is fantastic, but you're two hours away from the heart of the city.

We are indeed very lucky, but the airport is still 20 km away from the city. Although, it's quite fast, the commute is very expensive.

I agree that students may find the distance expensive, but in terms of time, the distance is effectively not much, because there is a fast highway, and we are already close enough to the edge of the city that we hit the highway quickly. New airports are always away from the city, and I think only Chennai has a close airport. Although Mumbai's airport is technically within the city, it will still take you 3 hours to get from there despite the bridge due to poor traffic. Delhi airport is effectively close to the city if you are in North Delhi, not if you are in the South.

So, do you have any plans to compete in any big sports events for cycling? Last year Anna Kiesenhofer, an Austrian mathematician and cyclist won a gold in the summer Olympics which created great excitement in the math community.

I did not even qualify for the Spectrum final, so, I am not likely to participate in any sports events. I am not an athlete. I have no chance of competing even in the age group events. I have no illusions about it.My only motivation is that it helps me to relax, it gives me pleasure and it will keep me healthy. But nowadays, a lot of athletes and people from other areas are also excelling in mathematics. For example, there was an American football player called John Astell who did his college studies and then jumped to American football. After some time, he switched back to finishing his Ph.D. He completed it last year and the thesis is very well known. People do change fields naturally.

I am knock-kneed, so my flat speed is well below average for a person. I would probably not even qualify for anything which has any sort of strict physical criteria like the army. Knock-kneedness doesn't matter while cycling, fortunately.

In Europe, when I was visiting Grenoble, everybody in the department was sporty. Grenoble is in the mountains, so there is a selection bias. That's where I realized how unsporty Indians like me are. For instance, I play football casually. I can claim to play some defense and occasionally run down the wing, but I am far from being a compete-

tive player. If I were to play football in France, for example, I would find that everyone is so fast that I would feel helpless trying to keep up. I'm referring to French mathematicians who also participate in football. In Europe, it seems that being sporty is more common. I wouldn't
be able to match the typical European's level of athleticism. While most of them may not be competitive sportsmen, there are some exceptional cases like the Olympic mathematician you mentioned.

You know the story, right? All these team coaches keep track of what they perceive as their competition, leaders of the other teams, and so on. Because she was an amateur, she broke away early. The coaches simply lost track of her. Obviously, that's not that why she won, she won because she was so good. The person who finished second started celebrating thinking she had won the gold medal.

There might be a notion of making mathematicians engage in sports instead of solely focusing on math and computing, but personally, I prefer the European style. I believe in doing mathematics and playing sports for pleasure, independently of each other. If someone happens to excel in both areas, then they can pursue both with no problem. Many mathematicians are indeed highly skilled in chess, which is a common combination. I remember this case which struck me.

One of my fellow grad students used to play chess quite seriously. He was playing against a German, and they discussed their rating, and the German visitor decided to handicap himself. He took his knight and kept it away from the board. I don't know what happened to that game, but the mathematician was grandmaster level despite not having a FIDE rating (because he did not play chess seriously).

One interesting case is that of Marie Louise-Michelsohn. She is a well-known mathematician (differential geometer) in StonyBrook. Her husband Blaine Lawson also used to run, and they were quite sporty. She had run in her college days, and then had not run for a long time. Then it turned out their daughter got cancer and she was very stressed. She started running for stress relief and then discovered that she had extraordinary natural talent for running, and started competing in her age group events and winning medals.

But then as I said, I am not an athlete. I will not win Spectrum, maybe next time I will make it to the final, just for fun.

Apart from cycling what other activities do you do to get away?

Not much. The other main hobby I have is reading, I suppose. I should cycle more. I do swim, but not often enough. Do you not need one more sport to compete in triathlon?

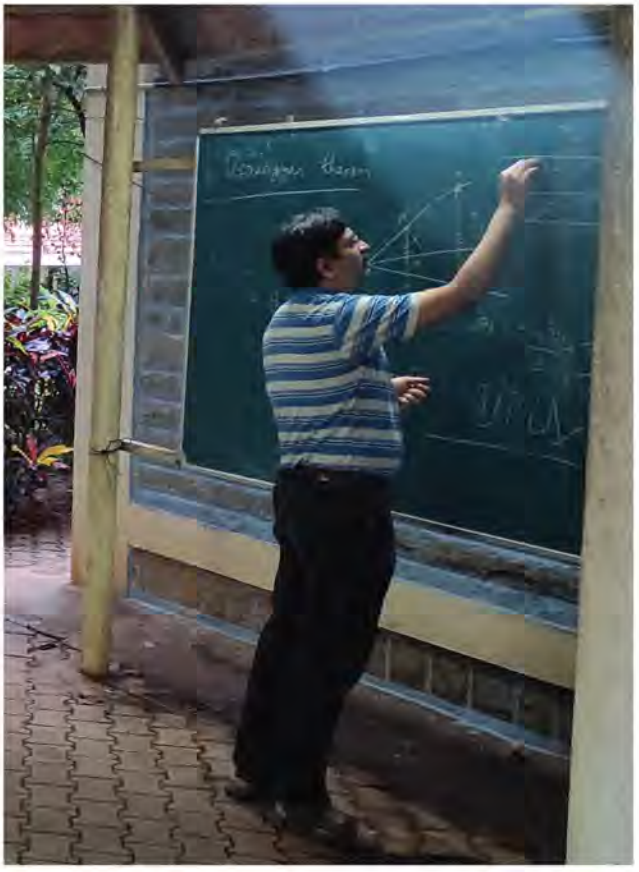
Yes, I can't run, as I told you. I am not sporty anyway, but specifically running would be my worst sport because of being knock-kneed. If I stand straight, my knees touch right before my heels touch.

I don't play many sports now. I played

basketball quite a lot in my school and undergraduate days. I once joined an Ultimate Frisbee game when they invited people. It was nice. It is a light and enjoyable game, but even there you need an athletic body to be competitive, yes, but not to enjoy it. But here realistically, my main recreation would be reading, or of course walking in campus.

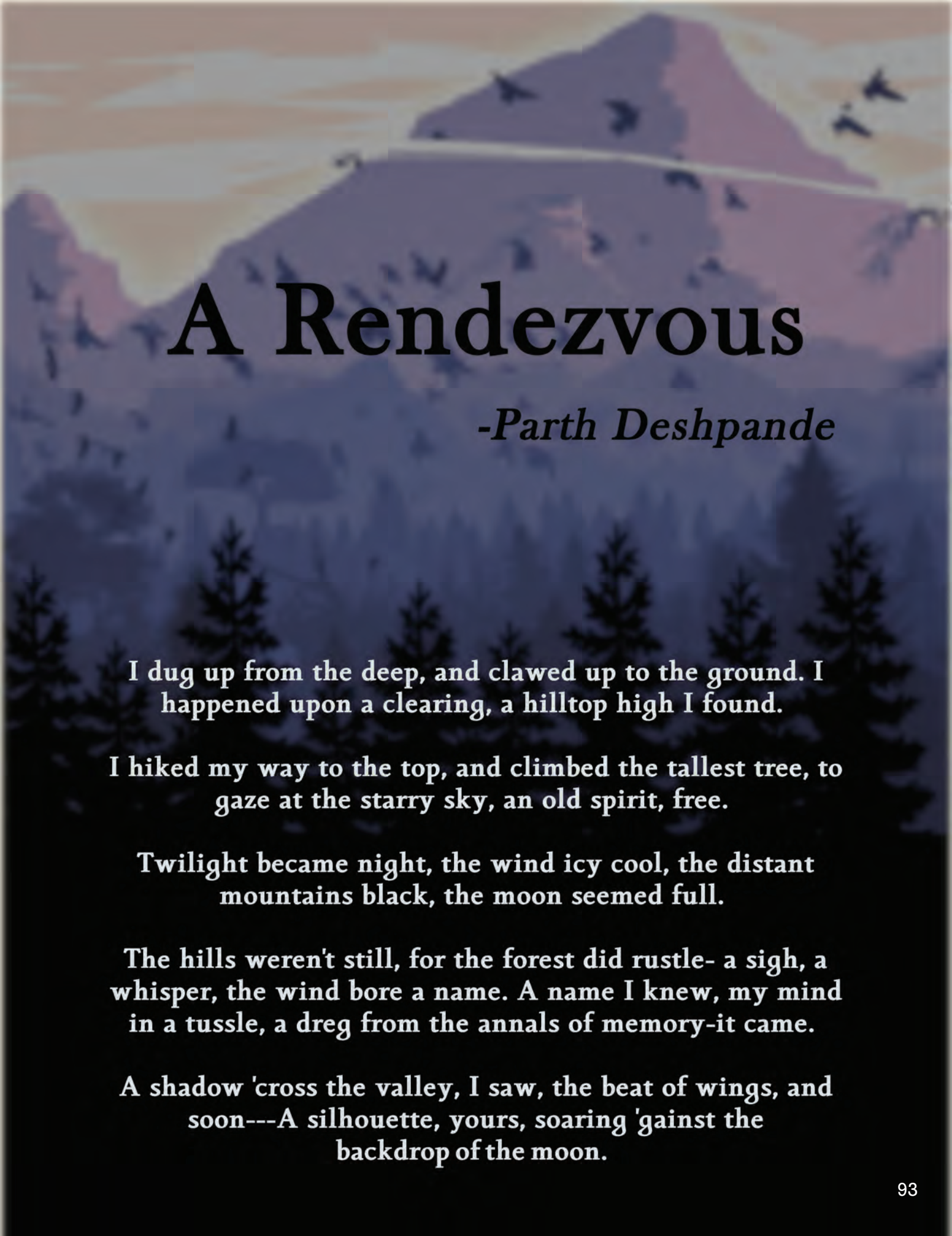
Do you have any message to give to the undergraduate students?

Not much. The only thing I would say is, make sure that whatever you do, you are solid in it. It is most important to be so. Have a command over your basics. My main academic message is always this: command over what you can do effortlessly is more



"Command over what you can do effortlessly is more important than a lot of things that you can do and not so well.."

important than a lot of things that you can do and not so well. Also, try to be as broad-minded as possible. I do not have to say this strongly because I think, in this culture, it already is. I have not known narrow-mindedness to exist within students here at IISc. Be open-minded, be broad-minded, and learn many things. Be open-minded towards other students who do different things and be generous towards other students who might be different.



A Rendezvous

-Parth Deshpande

I dug up from the deep, and clawed up to the ground. I happened upon a clearing, a hilltop high I found.

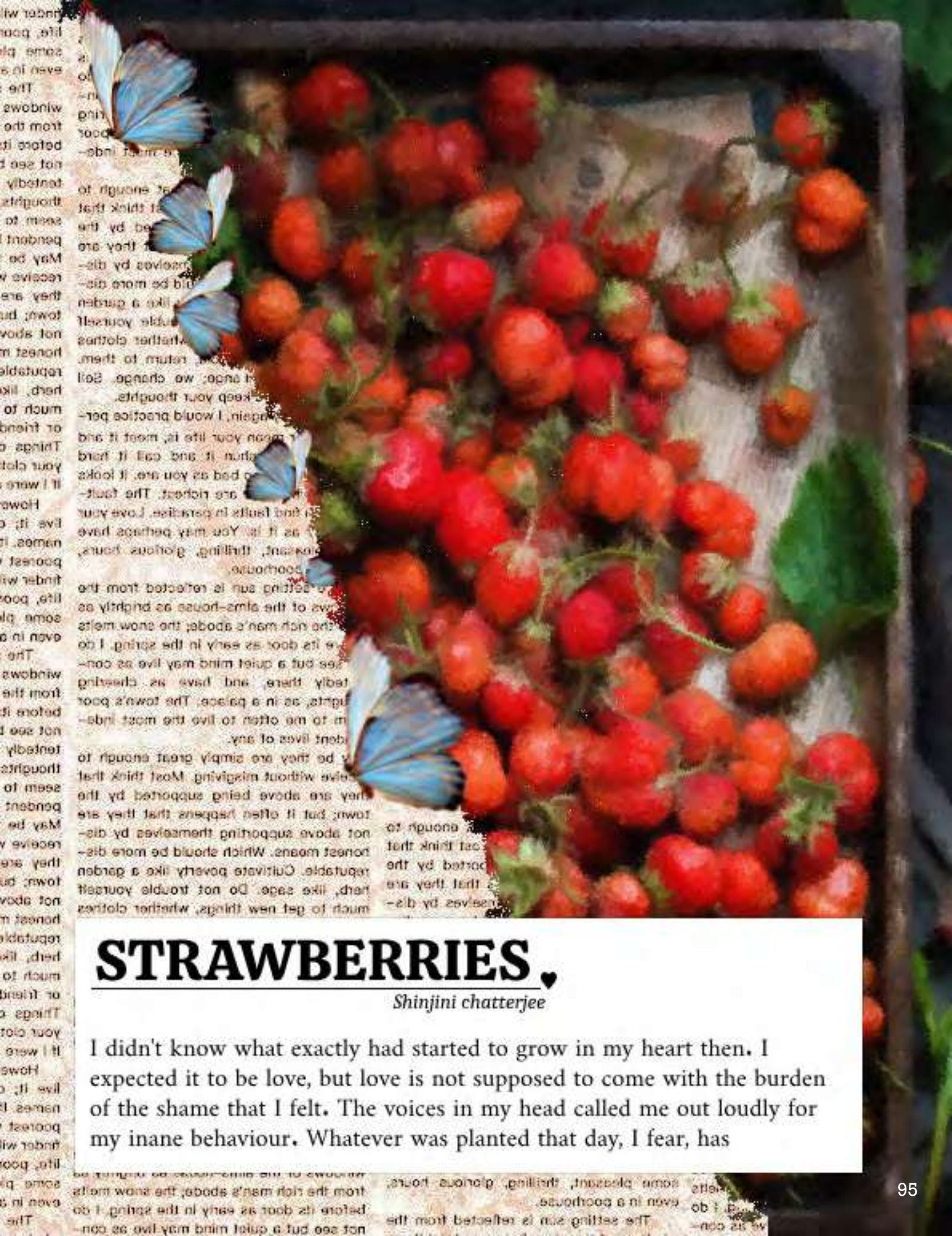
I hiked my way to the top, and climbed the tallest tree, to gaze at the starry sky, an old spirit, free.

Twilight became night, the wind icy cool, the distant mountains black, the moon seemed full.

The hills weren't still, for the forest did rustle- a sigh, a whisper, the wind bore a name. A name I knew, my mind in a tussle, a dreg from the annals of memory-it came.

A shadow 'cross the valley, I saw, the beat of wings, and soon---A silhouette, yours, soaring 'gainst the backdrop of the moon.

Art by Nikhil Pradeep



STRAWBERRIES

Shinjini chatterjee

I didn't know what exactly had started to grow in my heart then. I expected it to be love, but love is not supposed to come with the burden of the shame that I felt. The voices in my head called me out loudly for my inane behaviour. Whatever was planted that day, I fear, has

I didn't know what exactly had started to grow in my heart then. I expected it to be love, but love is not supposed to come with the burden of the shame that I felt. The voices in my head called me out loudly for my inane behaviour. Whatever was planted that day, I fear, has proliferated to a size that I can no longer contain within the walls of my heart. The voice, when younger, used to be small, a whisper, insignificant enough for me to ignore as a random variation in the everyday graph of feelings.

I cannot yet name the feeling that blossoms in my heart for fear that giving a word to it will allow it to become real. But I can tell that it smells uncannily of her. Pink, temporary flowers that grew in spring, just like her. For the ease of telling my story, I will call her, my you, cherry.

.

Berries have never tasted sweet to me despite the widespread claim that they, in fact, do. But because she wanted to go picking them, strawberries, especially, I tagged along. Something about her presence made whatever was growing inside my heart feel extremely happy and safe. She was the only proper friend I had, too, given my social awkwardness used to be worse. And I went along but refused to taste the berries from the bowl later on. My hands were stained red with their juice—sticky—but I let it linger there before finally washing it off when we would part.

She would ask me, pointing to the heap of red fruits remaining in the bowl. "Won't you have one?"

"I don't like them; you know that."

"You should try them at least once," she would urge. A look of pleading would fill her eyes and the flowers growing inside my chest would shudder violently as if a sudden breeze had blown through.

"Someday, maybe," I would make excuses. "They are kind of sour."

"Well, you're wrong. They are not. Look at me. Do you think I would be enjoying them if they were really sour?" And she would proceed to pick a few more fruits from the bowl and pop them into her mouth.

At the end, the berries would stain her lips a pale red, and I would proceed to wash the stains away from my hands.

The branches kept growing as time passed by. Some, I could tell, were going around my lungs, wrapping around my trachea and tracheoles and eventually reaching the bronchi. When spring would come again, the now bare branches would be filled with flowers. Said flowers could proceed to kill me daresay, and hence I hoped spring never came again.

.

When we were 15, she moved away, and although I am ashamed to say it, I let out a sigh of relief. Believe me, though, I loved her, I still do. She's the closest I have ever been to a person, till today. But I feared, a little bit, that said love might mean something more. Something inane and strange. And something that didn't make sense, either! The remaining petals on the branches thankfully began to wither away after that, and while my initial thought had been to sigh in relief, it would fade to regret sometimes. Now that spring has gone away, the flowers too, would go away. My chest would no longer hurt. The blossoms would no longer suffocate me.

.
I didn't expect to meet her years later, I didn't expect the now withered tree in my chest to begin living yet again.

The flowers will grow, I thought, and I will die.

.
But it was alive again! There was life and song and wind. The shivers that would move through my heart would just be like childhood. The tree was alive yet again.

But I feared it, I feared that sense of strangeness that the happiness brought me and clouded my sense of what was to be done and what not. I love her, I love her not. Obviously, I did. But to love her or love her not.

For the longest time, the idea did not occur to me that I could indeed be in love. However, with the wrong person. Or with the right person. I had given it no thought, till well, my lungs were clogged with flowers. It was painful, even more so because things with him became painful. And at night, before I went to sleep, I would cough up blood. Blood and bloody petals, but the flowers were unending. Wrapping around my respiratory tract, growing into my flesh.

Then ashamed and guilty, I would go look for her. I would find her and let her hold me after she took note of the blood. The pain in my chest was soothed, and for a while, I could breathe in air. The flowers in my lungs smelled eerily similar to what she is named after. Cherries and cherry blossoms. "Can I stay over?" I ask, defeated. While the look of sadness in her eyes doesn't escape me, I say nothing about it. Cherry opens the door wider and tells me.

"Yes, of course"

I feel guilty, incredibly so. I think about whether I had been a bad friend, whether I was simply being an emotional vampire, taking advantage of her kindness, whether I-
As if to silence my thoughts, she tells me to stop thinking and go to sleep.

"I'm your friend."

I hate it, really.

.

But I am supposed to love this way, I pacify my heart.

"Why don't you leave?"

The same person you do not want to leave, the same person where the best option would be to leave. But I couldn't. I was addicted to attention, to feeling validated. But a relation founded on addiction was never supposed to grow to be healthy.

Something painful has always sat heavily on my heart. While I now know what did,

at the time, I tried my best not to dwell on it. Because if I did and reached a conclusion, I would have to leave, leave all my sense of normalcy behind, and make sense of whatever I have taken part in before.

"*Was it not real then*"

I again knock on her door hopelessly, because well, that seems to be my only refuge left. The metallic taste of blood from the flowers lingers on my mouth, dry, rusty. And tonight, she doesn't choose to hide her expression. Disappointment sits on her face heavily.

.

Why have I been hesitating?

.

There's a constant, almost never going away layer of blood that coats my tongue these days. And I swallow it back with my tears. I need to give in to the truth at some point, and I am scared we will drift apart. Me and her. After that night, I turned away, apologising for disturbing her every night. I planned to stay away, I wanted to stay away, like a hopelessly angsty teenager. But the bloodstains on my mattress kept multiplying every night. I am scared to wrong him, so I should end it before I jump into this strangeness that, unfortunately, soothes my heart.
Between me and death, there stand these flowers, these flowers that have been in bloom ever since spring came back, and I have been trying to kill the tree by leaving it parched, starved. The spring should go away, pass, but this was a forever spring.

.

I am a coward, so I write a letter first. Then I throw the letter away and pick up my phone to call. My fingers cut the call before a voice would appear on the other side. And he calls back rather late, the flowers in my lungs have overtaken me and my speech. I cry because it hurts, physically, mentally, everywhere.
I wonder if he had been able to tell that my lips are coated with blood these days.

I wonder if he had been able to tell that my lips are coated with blood these days. I wonder if I kiss her, would she be able to tell. Would she not push me away.

"I can't lie anymore. This is not working."

And despite all the people I have loved before, I will never forget the crashing sense of relief that I would feel each time, and my love disappearing overnight. You question my feelings? You question if it has been love to begin with. I did love them, I loved them all very much. But I wasn't in love with any. For the spring tree would suffocate every time they visited, and otherwise thrive.

.

I am longing for you, I don't want to ask this of you because I am a coward. But will you let me love you? Will you let me kiss your lips and taste the cherry off?

The juice from the berries was now replaced with my blood instead of hers. Metallic and not sweet. But then again, I have never tasted a cherry.

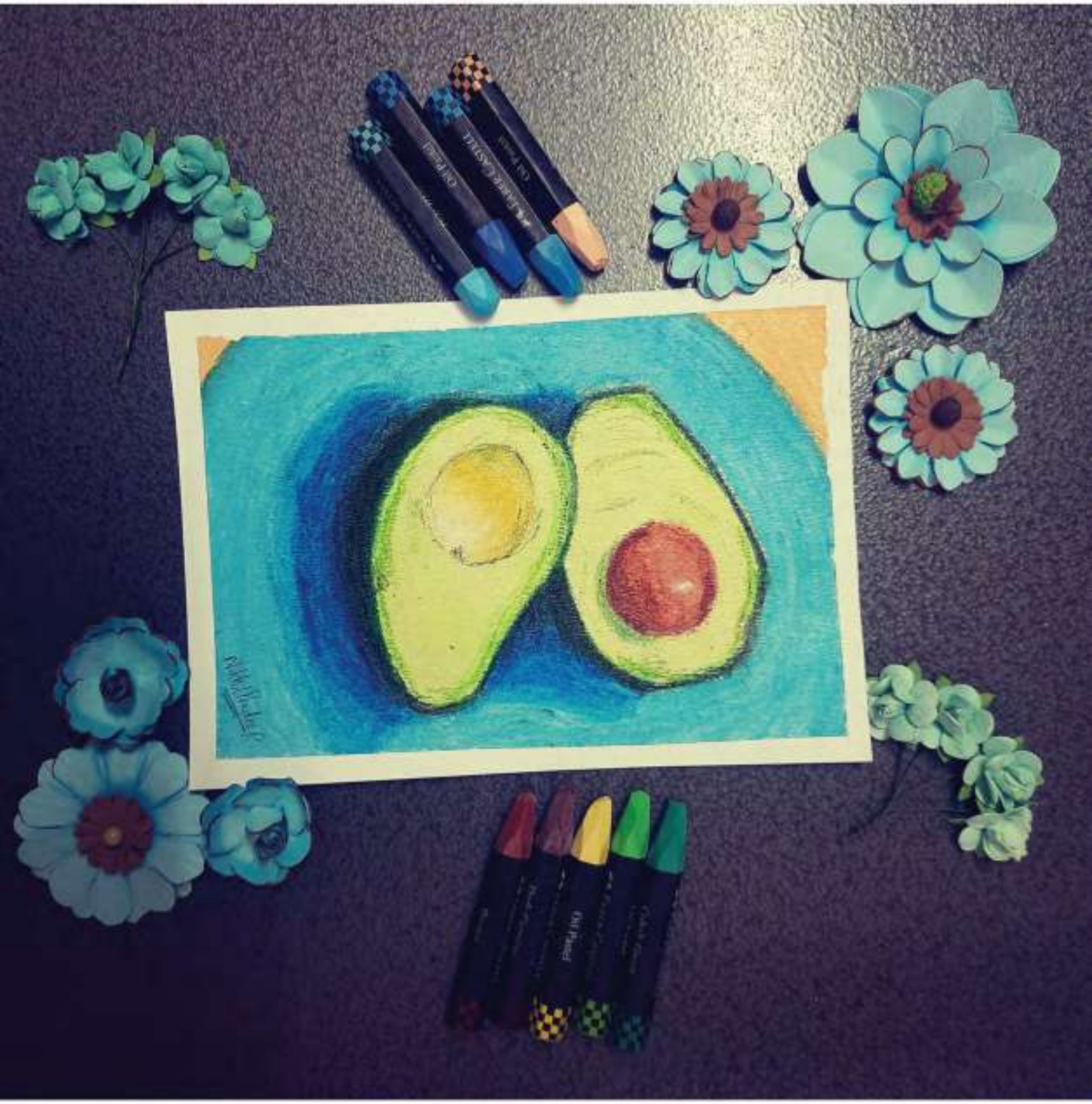
I was ashamed to knock on her door, ashamed that it took me so long to tell and while the flowers grew violently in my heart stubborn to my constant pruning. I made myself bleed. I plucked the flowers that were a sign of spring. And when spring came, I denied the tree air and light.

.

She didn't ask me why should I, she didn't ask me anything remotely close to that topic. To the topic of why should she. I had to ask her, though, unlike ever. If I could lie down beside her.

And she nodded.

My lips were red with blood when I let myself taste a cherry for the first time. Cherry blossom was the taste of her lips, and while they were stained a different kind of red, we were stained red still.



Art by Nikhil Pradeep

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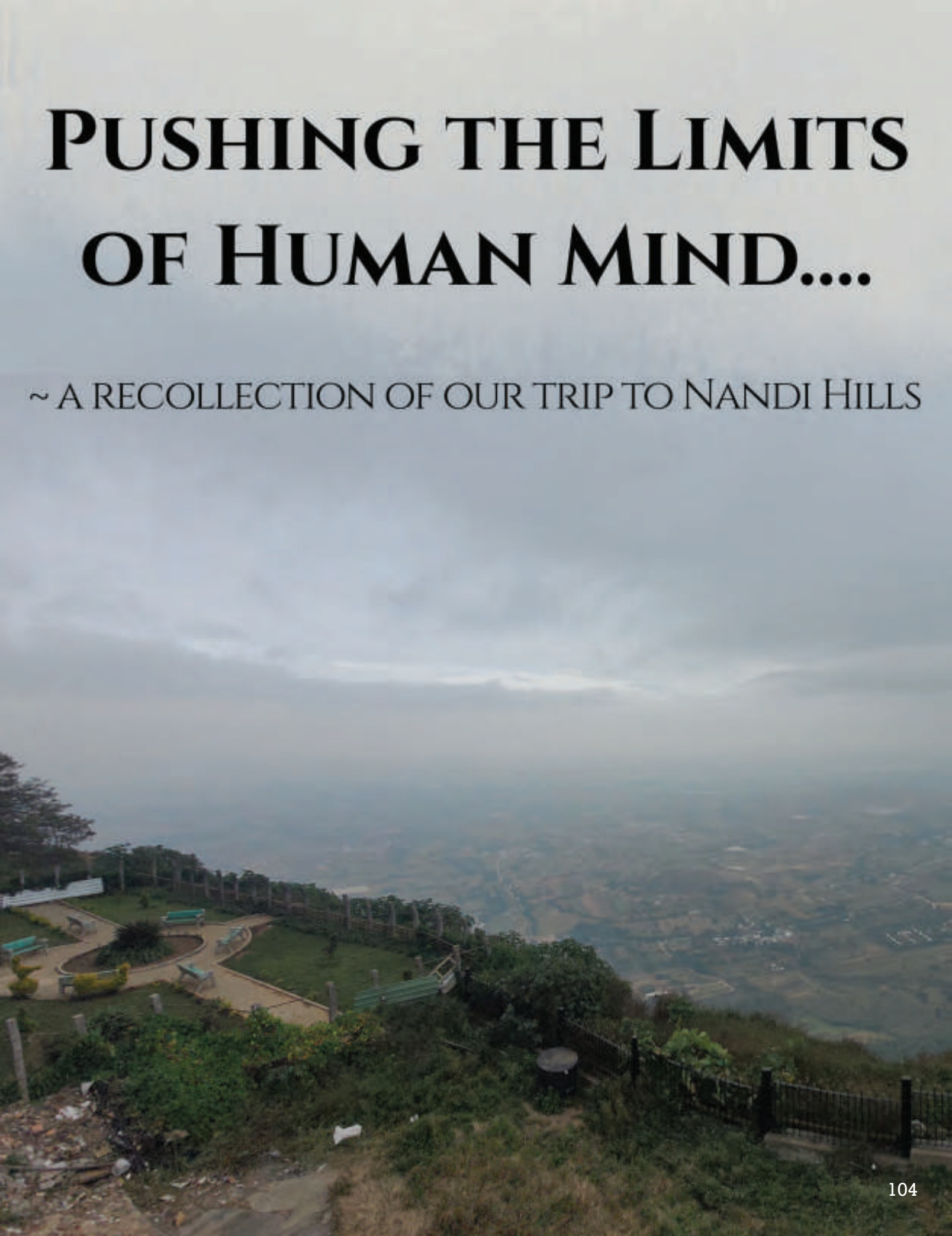
Pushing the Limits of Human Mind....

~ A recollection of our trip to Nandi Hills

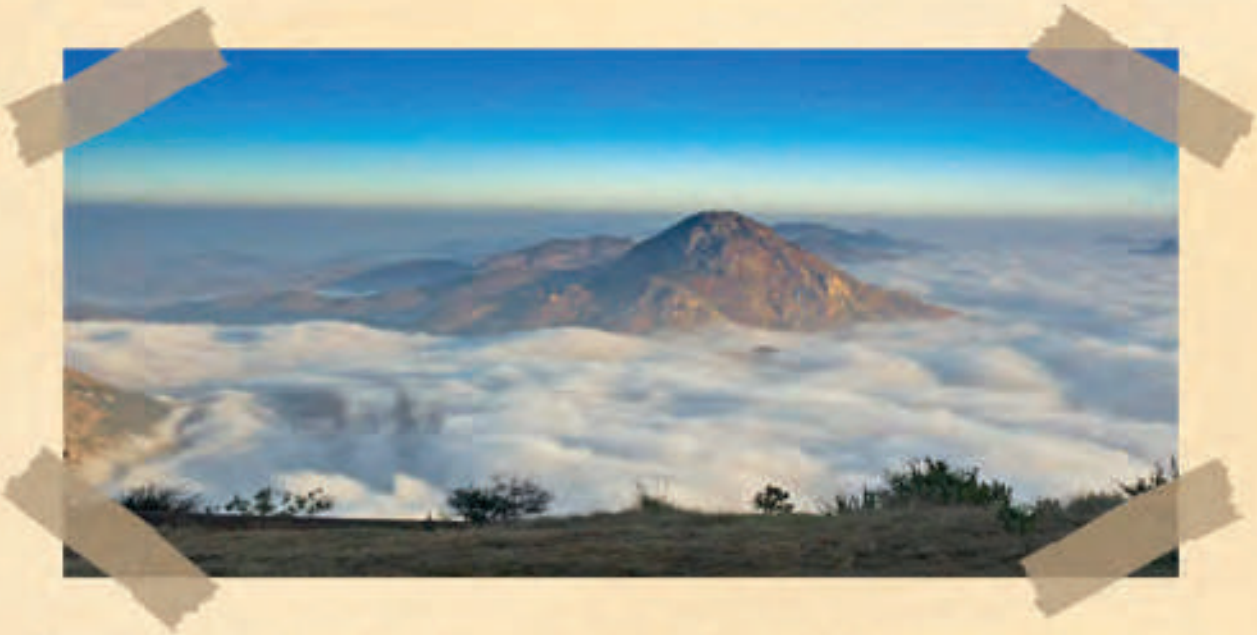



Haroon, Ashwin, Devak, Anith, Kalidas

The first semester at IISc will be one of the most unforgettable experiences in your life You meet new people, experience new surroundings, try different cuisines, learn to converse in a second language and of course, keep your head level under all the stress combined. This account delves into the madness that academic pressure had left within four students after completing their first mid-semester exams.

Once the exams were over, we were eager to leave the campus. Homesickness and adventure were settling as the studies were over, and we were all for it. Every person who visits Bangalore has heard of the esteemed Nandi Hills, a trip everyone should make. So, the target was locked in but then the next problem presented itself: how do we get there?

All of us had adventure screaming in us and so we started brainstorming. Most of us did not have a driving license, so we looked at the next possible alternative: cycling. Cycling was not particularly new to us and we had heard of cyclists travelling long distances and climbing up Nandi hills. It was just a 120 km (about 74.56 mi) round trip; what could possibly go wrong?



Nandi Hills is situated north of Bengaluru, in the district of Chikkaballapur, Karnataka. It has an elevation of around 1500m and is said to be the summer retreat of 18th-century ruler Tipu Sultan. The hills resemble a sleeping bull prompting its name and they were traditionally held impassable. Tourists flock to the summit to view the sunrise, ideally amidst a sea of clouds. All this information had us excited, and we were yearning to depart. We had one day's leave followed by a weekend. As the hills are crowded on weekends due to tourists, we were fixated on leaving the very next day.

Our initial plan was to just go, the four of us. Upon consulting with our seniors, who were part of the cycling club Scuderia Pauperazzi and frequently went on long cycling trips,

we were informed of the reality of the situation. Finally, one of them agreed to join us as we were not accepting no as an option. The motivation was strong but the preparation? Not really. He quickly briefed us on the protocol of distance cycling, and we borrowed helmets, geared cycles, first aid kits and a whole lot of electrolytes. We packed our bags and lay down in full anticipation for the next day.

On 9th December 2022, we assembled in front of N-block at 4 am and rechecked all our gear and bags. It takes around 3 hours for one way, as per our seniors and considering our inexperience, we would be there by 8 am, perfect for sunrise viewing. We started our journey, and needless to say, it was far from a smooth ride, as far as it could be possibly completed in real time. Insufficient sleep, careless injury, stomachache, lack of a geared cycle, gear malfunctions, tight jeans, wrong turns, and headaches were a few problems we faced. Around the halfway mark, a few of us were exhausted and lost the willpower to go on, but the rest of us chimed in and pulled them up to a refreshing tea, and onwards we went.

Finally, after a lot of whining and sheer exhaustion, we reached the base of the hill. It was then we were told that the climb was the hardest part of the trip. We had come all this way of almost 50 kms. Nothing could deter us from making the climb. After having an omelet and taking some snaps, we were ready to start the climb. It was a total of 40 hairpin turns constituting an elevation of 1365m.

We could see the hill and it was majestic indeed. Light had come a long way back, and morning had set in. The climb was steep for a cycle, but the view made up for it. It was all fun and laughter from nearing the end in sight until we reached the 13th turn. By the 20th turn, all of us started walking and resting in between. We took roughly the same amount of time climbing the last 6.8km as we took cycling the first 52km. That's how tough the climb was! But nevertheless, we made it to the top.

We reached the hilltop at 12pm. No words could describe the feeling standing atop the hill, the whole city of Bengaluru below us. We felt unstoppable as if we had achieved something impossible. It was just pure joy. We high-fived each other and set off exploring the hill. After spending some quality time atop the hill and a million selfies, it was time to return. Everyone was satisfied with whatever they set out for and with whatever they didn't, they simply did not care. The view was spectacular and the whole hill was picturesque. It was a real treat for the eyes, if our minds weren't filled already. Since it was winter, the sun did not affect us, and it was still cold.

We left at 3 pm but after a few kilometers in, it started raining. After waiting for a while under a shed, we were done with the trip and just wanted to get back home, to IISc. So, after having lunch we pedaled back pretty quickly, and in spite of Bengaluru traffic, we made it back by 8:30pm.

This journey shows the resilience and determination that a collective group of friends can uphold. Despite facing challenges and setbacks during our cycling journey, we remained steadfast in our pursuit of adventure. Overcoming exhaustion, physical obstacles, and even unfavorable weather, we conquered the steep climb to the hilltop, where we reveled in the breathtaking views and sense of achievement. This journey symbolizes our unwavering spirit, the exploration of our own capabilities, and the joy that comes from pushing beyond perceived limits. It serves as a reminder that embracing challenges and pushing ourselves can truly expand the horizons of human mind.

The End

Art by Nikhil Pradeep

Art by Nikhil Pradeep

Anjaney Pandey [UG, Sem-4]

झाँसी की रानी

झाँसी की कहानी, आज सब को है सुनानी।

देश ने है पहचानी, वीरता की यह निशानी ॥ १ ॥

रानी थी बड़ी महान, करके प्राण बलिदान;

कहीं भी न हार मान, पार करके इम्तहान ।

थीं वो दुर्गा मूर्तिमान, नाम करके कीर्तिमान[1];

देह तो है नाशवान, पर कर्म है महान ॥ २ ॥

जन्मस्थान उनका काशी, महादेव की उपासी[2] ;

मोरोपंत थे पिताजी, भागीरथी बाई मां थी ।

प्यार से बुला 'छबीली', गाने में थी वो सुरीली।

आँखे भी थी चमकीली, और बातें थी नुकीली ॥ ३ ॥

गंगाधर थे पति, हाय! हो गई क्षति[3];

लक्ष्मी की थी दुर्गति, क्या किया हे नियति? ।

झाँसी की थी अवनति, सेना सब बिखरती;

सुनके सब की विनती, बनी लक्ष्मी अधिपति ॥ ४ ॥

था लिया दामोदर गोद, अंग्रेजों ने किया विरोध;

रानी का बढ़ा था क्रोध, दूँगी जवाब मुँह तोड़ ।

उनका तोड़ मिथ्याबोध[4], करना देश में प्रमोद;

कर रहे हैं तोड़फोड़, लेना उनसे प्रतिशोध ॥ ५ ॥

युद्ध हुआ विकराल, सब तरफ मचा बवाल;

रानी ने किया कमाल, बनी देश की मशाल ।

सबके मन में था सवाल, कब हटेंगे ये दलाल;

रानी भी थी बेमिसाल, ज्यों काली काटती कपाल ॥ ६ ॥

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[1] कीर्तिमान का अर्थ: सफल, यशस्वी

[2] उपासी का अर्थ: भक्त

[3] क्षति: नुकसान

[4] मिथ्याबोध: झूठा घमंड, झूठा ज्ञान।

करके फिरंगी आघात, पहुँचा सेना लेके साथ;

घेरा झाँसी रातों-रात, हो गया था वज्रपात[5] ।

पर झलकारी का था साथ, समझा उसने हालात;

दे के अंग्रेजों को मात, बता दी उनकी औकात ॥ ७ ॥

'कालपी' पहुंची रानी, काल पी गई भवानी;

ग्वालियर की कहानी, राजा सिंधिया अभिमानी ।

देश की ना उसने जानी, बिन मोल ही बिकानी;

रानी थी बड़ी सयानी, ले ली उसकी राजधानी ॥ ८ ॥

जनरल ह्यूरोज आया, उसका क्रोध तिलमिलाया;

कोई वार ना हो ज़ाया, ऐसा जाल था बनाया ।

पूरी सेना को जुटाया, चप्पा-चप्पा ढूँढ़वाया;

रानी को ना था ये भाया, युद्ध का बिगुल बजाया ॥ ९ ॥

विधि ने किया कुछ और, बादल काल के थे घोर;

युद्ध में मचा था शोर, रानी हो गई कमजोर ।

पीछे भागा आदमखोर, जैसे साँप पीछे मोर;

काल की गति कठोर, युद्ध में आ गया मोड़ ॥ १० ॥

रानी को लगी थी चोट, नृत्य कर रही थी मौत;

थी वों तेज की यों स्रोत, आज बुझने लगी ज्योत ॥ ११ ॥

कर ह्यूरोज को निराश, पहुँची गंगादास पास;

स्वामी ने कहा "शाबाश, तुम हो क्रांति की प्रकाश!" ।

रच दिया था इतिहास, सिर्फ उनतीस वर्ष स्वास;

अब हो गया विश्वास, यह देश क्यों है खास? ॥ १२ ॥

चले जब तक ये स्वास, करो एक ही प्रयास;

कर दो ऐसा कुछ खास, कि बने जीवन इतिहास ।

सुनो मेरी भी ये बानी, ना भूलना कभी कहानी;

रानी थी बड़ी बलिदानी, वीरता की अमर निशानी ॥ १३ ॥

जय हिंद !!!

[5] वज्रपात: भीषण संकट

Art by Nikhil Pradeep

Art by Nikhil Pradeep

AROUND ACADEMIA IN AN AFTERNOON

Nirmal Raj is a particle theorist and recently joined as an Assistant Professor at Centre for High Energy Physics, IISc. What began as a formal interview with him soon meandered into a winding conversation about science, literature, cinema and much more. His perspectives on life in academia and beyond offered more than just hope and made for a very heartening discussion. So, read on to meet in these pages the physicist who was almost a writer, and now channels Jane Austen in his physics papers!

Can you tell us about your work?

I work on Astro-particle Physics. This basically involves applying particle physics to astrophysics. I work particularly on the question of dark matter, its interaction with stars that shows up as interference in experiments on earth. As a result, I am involved with neutrino and collider physics. Mostly, however, I call myself a particle theorist. I do get to work a lot with experimentalists.

How did you come to decide your field of work? Could you tell us about your experiences, or any anecdotes you recall?

I'll tell you about my trajectory. So, for my bachelor's degree in technology, I was pursuing engineering physics. At that time, I had no idea what particle physics was like. I did my bachelor's thesis in condensed matter physics. I didn't really know what condensed matter was either, but I knew I liked statistical physics. And condensed matter felt more of an advanced version of statistical physics. But secretly, I had always wanted to do optics. So, I took an optics elective and was trying to test the waters.

The photonic kind of optics?

Actually, I was not very sure whether I wanted to research in classical optics, or quantum optics. I got a PhD offer from University of Oregon. And when I went there, I discovered they have a huge optics group. I went to optics conferences with them. I took an optics course, and I realized I didn't want to do it. Because optics seemed more centred on applications of quantum mechanics. And somehow that wasn't satisfying to me. I was also not sure if I wanted to pursue condensed matter. I liked phase transitions and stuff like that. It was at that time that I took a collection of courses with someone happens to be my favourite professor. His name is John Toner. He's one of the pioneers of liquid crystals, the theory of flocking of animals and birds.

We have Prof Sriram Ramaswamy in IISc who works on the same field!

Oh Yes! They worked at IBM together for many years. And then Sriram came to IISc and John Toner went to Oregon. He talks very fondly of Ramaswamy! It's one of the reasons I wanted to come to IISc, to meet Sriram. So, back then I wanted to be John's student and I nearly begged him to take me up. But he was not taking students. I had long meetings with him where he very apologetically told me that he is not taking students. He said he was very old, and it may not work out for me well in the end. And then as an afterthought he suggested, "If you really like Field Theory, why don't you try particle physics?" So, I reluctantly went into it.

Tangential question: does studying Active Matter and the mechanics of murmuration involve field theoretic concepts?

The way John, as well as Sriram, approach it is by involving field theoretic ideas. They write something like a Navier stokes equation. This equation does not describe individual particles. Instead, it captures the bulk properties and some bulk symmetries of the problem, and one can then try to solve it. The pioneering work that Toner and Ramaswamy did was to identify the correct equations for flocking. And it's a little harder in this case, I would say, because this is non equilibrium physics. So, it could go any which way. They had to identify the right symmetries, the right properties, the right boundary conditions, the right numbers. After that I don't think there's real field theory involved. But John and Sriram do a lot of hardcore field theory as well. So, like I mentioned, I reluctantly went to particle physics, I found a mentor, who was retired. He mentored me for almost a year, I learned quantum field theory from him. Slowly I came to realize, this is probably what I've been looking for. Because as I read further, it struck me how much more fundamental it was than other kinds of physics. It's not some application, this is the spirit of knowledge, from where it all emerges, and provides understanding to all other things. Once I understood that, there was no going back.

So how was your trajectory after you finalised that quantum field theory and particle physics were your calling?

The first task that stood before me was to complete my PhD. My PhD was in collider physics for most parts, but it involved some of hardcore field theory and theories involving supersymmetry. After my PhD, I got a postdoc in University of Notre Dame. However, by that time, I was a little sick of colliders already. Mainly because it was, I felt, a little restrictive and had become a bit tedious as well. I am not at all putting down colliders here. There are lots of interesting avenues in the field. At that point, personally, I felt strongly about branching out because I wanted to understand more physics, a lot of subfields of particle physics itself, and try to put them together and understand the bigger picture. I was particularly envious of people who were working in what was then called Space physics, or particle physics in space. Thankfully, when I went to Notre Dame, there was another postdoc who was working on exactly this field of work and brought me on to one astro-particle project. Ever since I have been doing exclusively that. I occasionally go back to some collider physics projects. Sometimes we will do pure astrophysics, astro-particle physics, etc. It was here that I finally felt like I found my ground because the playground is much faster. There are so many interesting problems to work on and so many connections to make. I finally felt settled down. y don't you try particle physics?" So, I reluctantly went into it.

You have one beautiful list of interests listed on your pastime pages. We would love

to hear about your interests besides physics!

Ah, my interests. I have always wanted to be a writer. I never really knew what it entails to be a writer. The nitty gritty of it, the practical aspects. But I have always loved writing. In my school, I think I had written some 60 or more short stories. Whenever I found time, or even during class, when I would not, I would just hide them and keep writing stories. Sometimes, I would wake up at four o'clock in the morning, just to write.

Were these original stories, or were you writing inspired by a piece of fiction that struck a chord with you?

No, no, I almost never did that. I only ever wrote my own stories and a few poems. I never wrote commentaries. I always wanted to be the writer, not particularly a physicist or scientist. From the ninth grade, I started writing my own stories. I did not get any of them published. I did not try very hard though. But then, you know, they were circulated among my friends and family. And I still have them with me. Not here, but I still have them.

They must be prized possession for you, those stories.

Oh yes! Just in case they get lost in a flood or fire, I scanned all of them. I have them all.

So how did you develop your interest in science?

So around the 8th grade, I began to get interested in science. I had a very good friend who would give me puzzles and ask me questions about them. She picked me as her protege for some reason. That was when I realised science is actually more interesting than I thought it was. It is not just some boring people doing some crap. It's interesting. Still, I never lost sight of wanting to be a writer. In 11th and 12th grade, I went to JEE coaching mostly because parents forced me to. I ended up enjoying it because I had really good friends and the coaches were great people. This was in Chennai. There was no pressure like in Kota or other such places. In Chennai we would go to school, and in the evenings, we would go to the classes, which would take up most of our time. And in the weekends, we would solve problem sheets. We were taught good values. Particularly, the chemistry teacher, Professor Govindrajan. He told us time and again, “Help your friends. If you don't get into IIT after you solved 1000 problems, but your friend gets into IIT after solving 100 problems, and if you have helped your friend, you should be proud of it. You should be prouder of this than getting into IIT.” In this way, he completely lowered the bar, there was no real expectation. It became all about the fun of learning.

And the friends that I made at the time are still very great friends. It was surprisingly healthy. Of course, there were always unhealthy elements. But the teachers tried to mitigate

that. Anyway, I wanted to be a chemist then, mostly because of this Chemistry professor. I'm very influenced by people like them. Then, when I got in 12th grade, I got three supremely excellent physics teachers: my school teacher, and two of my JEE teachers. That is when physics clicked for me. I thought to myself, if I was going to go to IIT, I might as well do physics. I found from the brochure that there was this engineering physics stream. I got Civil Engineering first and changed my branch after the first semester. Nevertheless, I still wanted to be a writer. That is why, you know, some of my friends told me to start writing a blog. And through the blog I found many friends in IIT Madras. And when I was completing my BTech, again, I had to decide. Should I continue with physics? Or should I be a writer? I had no idea how to be a writer and how to earn money. And if I was really cut out for that. To be honest, my interest in physics had degraded during BTech, it was not what I thought it was. And I am saying this on record, but many of my teachers were not good. They ultimately demotivated me from doing physics, there were one or two that actually kept me afloat. So, at that time, my plan was to do a master's wherever I could get and learn more physics, become more employable. And in that process, I vowed to myself that I would find out how to be a writer.

So, what were the biggest things that demotivated you? Was it just teachers who were not inciting enough passion? Or was it also other people around you?

It was both. Absolutely, teachers who are not so enthusiastic, and frankly, not so competent. They couldn't really teach physics or clear misconceptions, or things like that. And the sense that they didn't really care much, that is also demotivating. You know, even as a student, I'm very sure you know this, you want some basic level of respect. The thing is, you don't, you just don't know enough about the world. That's not your fault. That is what you're in universities for. And the fact that it was not really recognized, was demotivating. In engineering physics, we were just 10 people. And we were very tight knit. But we were part of this bigger student community where there was a lot of competition. I'm not sure about IISc, but in IIT Madras there was a lot of unhealthy competition. We used to call it RG, relative grading.

“I would write some little poem of limerick, or some joke or anagram or something. And, and he would write a counter-comment for all those sections. At one point, he really stabbed through my heart. I wrote a little poem, and he wrote back, “I'm sure you had a hard time choosing between physics and writing as a career”.

But you were in different fields.

Correct. But we would take a lot of courses together. In engineering physics, we had to mandatorily take six courses in electrical engineering. And they were a much bigger group of 110 students. And since we were the minority, we were treated very well. Anyway, I decided I'm gonna do a master's and really figure out how to be a breadwinning writer. But you know, that never happened. Because once I got there, things got crazy busy. The work ethic here is nothing like Oregon's, at least going into masters. And this happens to all the Indian students. You think you work hard here. Wait until every week, you have a heavy turnout of three assignments and they're not so trivial. You must collaborate with your peers to get your assignments done. And that's all - you have time to eat, sleep and study. Right?

Anyway, so that happened. During those courses, in John Toner's course, especially, I was able to be myself. I felt the least pressure in the schools. And he would give these take home exams. Two weeks to go write the exam, you still won't be able to complete it, they're very tough. And in the exams, I would write, you know, pertinent to the problem, I would write some little poem of limerick, or some joke or anagram or something. And, and he would write a counter-comment for all those sections. And at one point, he really stabbed through my heart. I wrote a little poem, and he wrote back, "I'm sure you had a hard time choosing between physics and writing as a career". But I stuck with physics because slowly and systematically there was a philosophical change in my outlook. Fine, I would love still love to be a writer. But seeing physics as a study of nature, at some very deep level was enthralling. Also, the fact that I was good at mathematics - not super great - but good enough to do physics, and to have original ideas made me think that if I have the means, I shouldn't waste it away to go do something that I really like, but I'm not going to learn much from. It can actually satisfy my vanity but couldn't contain the philosophical curiosity of what is really making the universe tick. And it's not easy, just reading in popular books is not enough, you have to sit down for long blocks of time and calculate and understand and talk to people and get confused and get eager to get confused. Again, it's a pretty laborious process, which I at some level really did enjoy. Not only enjoy, but also it was I felt a satisfaction coming from that endeavour than writing. Writing gave me a lot of joy, it still gives me joy, but it was a choice between these two feelings. And so slowly, I got more and more into physics research, finding peace with my decision. Now I think that I am 90% at peace with that decision.

If it gives you time to pursue it on the side, then-

Of course, and that's what I always told myself, at some point.

And who knows, the writers' business might be nasty?

Yeah, exactly. The scientists, especially in particle physics and in some other fields of research, are very accommodating and kind. And, you know, there's a lot of understanding and depth in people. So, I'm not very sure if the world of writers is like that.

On the outside, it does seem glamorous.

Exactly. That's another thing, I didn't particularly want glamour, I wanted to just write like crazy. And, you know, in essence, I was able to channel those desires into particle physics. So for all our papers, I tell the collaborators I'm going to write it; I'm always the designated writer. Writing clearly and concisely is a challenge that I enjoy. And who knows now that I'm a faculty, there might be some time for me to do a little bit of writing.

Building on these last answers - you said that you felt peaceful as you kept finding 'communities' to connect with on a deeper level. Probably we are all longing for a community when we start out, it gets us very excited to find people with similar interests. There's a general fear though about getting into academia and dedicating your life to it. What are your opinions on it? How has it treated you and what fears do you think are valid?

I have also seen the seedy side of academia. Some of my peers and I have been insulated from the really dark sides, mainly because we're in physics. You don't have that many of the negative effects like imposter syndrome, unhealthy competition and people with a backbiting nature. Of course, there are always exceptions. But statistically speaking, you tend to get insulated in fields of physics. I visited several groups in the US and Canada and in India, most physics groups are very collegial. But there's always politics, every department has some politics, but you know, the kind of politics physics has is almost laughable. Nobody actually fights face to face and all. Now, about academia as a whole structure in itself, that could get hard actually. Because in order to for you to actually get settled, and all that, you know, when you get old, it's not just the exams and your dreams that matter. You might find a life partner, you might have kids and so many other things happen and everything has to be managed, and the desire for permanence actually becomes very acute. When that happens, and you are still in some postdoctoral jobs, and it takes some time, it really tests your patience. Right now, there's really nothing that can be done about that. So that is where you know, people say, unless you're really, really passionate, it's hard to sustain this. I would add that, it's not just passionate, it's also being lucky. Some people are passionate, but then they will not be so lucky, they may not have enough money, or they may have other personal situations that don't let them settle. And they have to leave academia. For a long time, I felt I had to leave it. Because for quite some time, I was not getting government jobs. And I really had to contemplate what else to do with life. It doesn't happen to everybody, but it could happen, it is always a likely possibility. So that is something to keep in mind.

The thing that we keep discussing seems to be a saturation, which is scary.

Saturation as in saturation in the job?

Something in that sense. A lot of things in physics also seem to have been done to death.

Oh, I wouldn't say that at all. This is actually a very important difference in perspective.

This is more coupled with the impulses to grow and get better, that keep lapping up back. You ask yourself, "Am I good enough? And will there be things for me to do that I am capable of doing?" So, all these questions - they just cobble together, right? It's probably some sort of irrational fear.

Right. That is completely understood. So, one thing to remember is - life is not so sure. There are so many turns and bends that you will take, right? So now, you cannot help assessing yourself based on what you know today and what you're seeing today. But you will come across many bends in the road, and you cannot see what's on the other side of the bend. Only when you take the bend you will get to see what mountains and lakes and other things lie over there, and that's some high-level philosophical bullshit. But in physics at least, when you have come to a certain level of expertise, you will see that there are always so many problems to work on, we pick a problem that catches your fancy or pick a problem that has a bite-sized problem that you can do. And probably your advisor picks that for you, and you go attack that. And you become a master of that, then you attack the next problem and so on. And before you know it you've become expert enough that you are going to see problems in the field that others don't see. That's how it works. You do progress increment by increment. I do not at all agree with your assessment. I'm not blaming you here, but your assessment that things have been done to death, absolutely not!

This is some advice that Steven Weinberg gives students and I like to go back to it, it applies to everybody – you don't have to learn everything in order to do research. You only have to learn your part of the ocean first and jump into the ocean and start swimming. And you will find that even the things that you see in textbooks are not really set in stone. That there's always more things. People just want to condense things and write it in textbooks but then there's more work to do in all of those cases. So, when you get into research, that is when you get into this mentality, you don't really have to learn everything, it's not that everything has been done and you have to learn it. No, you can always go beyond, and you will have to get there incrementally.

I think my opinion would differ on long-term projects. The idea of working freely on a topic is much nicer than having to have a deadline of a few months.

Absolutely yes. Ultimately, that is the freedom that academics want, you don't have a deadline, and you pick your problem, and you work for it for as long as you want. Because the only goal is to get there. And at the end of the day, get to the end of what you think is the end and find out that is not really the end and go further. That is ultimately what research is. And since you're not so used to it, it might seem a little intimidating. But once you start doing it, there is absolutely no problem.

We sometimes are also intimidated by the increasing mathematical techniques that are needed, apart from building physical intuition.

No, I mean, see if you have come this far don't you worry. I can assure you that your problems with mathematics will be solved with time. In the sense that when you do more research, you will take your time to work on it. It is very unlike what you've been doing. You will have no other choice, but to actually take your own time to get into your own zone and do your calculations. And when you do this, you need to undergo the cycle again, and again, before you know you're going to be very good. So, math won't be a problem. After then math will become the language that you speak for your research. This might take a few years, but it will happen. And then you won't worry about this aspect, you don't need to think of the problems as the problems on their own. I too have gone through this; my peers have gone through this. They were all of the opinion that theory is horrendous to look at and they couldn't put intuition to it at all. The more you stick with it, the more intuition you can apply. Problems will shift to something else later. Follow your passion.

I was not such a good coder in my B.Tech. But now I don't have that problem. The tools should not deter you from pursuing the ultimate emotional connection with your subject. It's a matter of time and patience. You may even hate your field for a while. But once you're past that you can actually do what you want.

If you're not good at something, that's ok. You will get better at it. There are certain things that you are aiming for. Aim for those things, along the way just be ready for lots of frustration. I know it's much easier said than done. But if you can develop that stomach, not just for research- for anything in life, it goes a long way. It's an essential thing that you need for other things too. Think of everything that comes your way as opportunities. Only way to learn something is to jump into the pool, start flapping around but don't lose sight of what is it that you want to do, that will make your heart happy.

The ultimate thing should make you happy.

Also, about the community you said you found in IIT Madras from your blog, how was that? Like, did they inspire you more? Or was it just having friends?

Oh, I don't know if my friends really inspire me. There are one or two friends who really inspire me, sorry. They're not friends I found from the blog. But otherwise, I did have this - I was sitting around having tea at the canteen, and there was a guy who sat in front of me introduced himself and he said “I’ve read all your blog posts”. And then he's still my friend now. There’re so many people like that. It’s just nice to know more people and connect with them.

Since you mentioned you wanted to be a writer, we’d love to know what kind of books and stories you like. Any preferred genres?

Ah, I used to say that I don't read so widely but now I think with age you tend to go wider. What do you guys like to read?

I like literary fiction; some Magical realism as well. We had a Salman Rushdie phase a while ago. I am also very fond of just collecting more books than I can possibly read; you can just go to bookstore, buy a lot of second-hand books and keep them!

Same! I ended up buying 200 books during my PhD. And I actually carried them with me to my first postdoc in the University of Oregon, and then I carried them with me all the way to South Bend [Notre Dame University]. Then from my second postdoc I went to Vancouver and carried them with me there. But when I moved to India finally, I donated half my books and the other half: the other 100, are in my friend's houses and inside the various basements in Vancouver.

I had 200 of them, I think I read only 20 or something. Some books are meant to have, not to read. There's a word for it: Tsundoku. This is the Japanese concept of you having books you don't even want to read because those books remind you that there's so much more knowledge out there in the world.

It makes you feel so guilty, all those unread books staring at you from off the shelf.

Yeah, but you know you can just tell yourself Tsundoku and erase your guilt! What else do you read?

“You don't have to learn everything in order to do research. You only have to learn your part of the ocean first and jump into the ocean and start swimming.

I guess humour, like Hitchhiker's Guide. That was the first series of novels that I really liked.

I also read that in my undergrad! You've already gone a little wide. That's good. You get a broader perspective, which I didn't really have at that time. So, in that sense, my reading is a little weird. Now I'm reading a little more broadly. Just to talk about Salman Rushdie. I really should have read satanic verses when I was younger. Because I did enjoy. I opened Satanic Verses. I read the first paragraph, the plague breaking upon the people, it was lovely. I should have just continued then. You know why? Because when I try to read Salman Rushdie now, I'm not able to focus. At this point. I like writers who are a little quieter. When I read Salman Rushdie, he's screaming in my ears. And there's a nice phrase in by Oscar Wilde. "He's so loud. I can't hear what he said." I can see that he is very clever in his sentences, and he has his very colourful way of putting things. I can see all that, but I don't want to. For example, I read the God of small things when I was in 12th standard. I don't think I can read it now. Back then, that kind of incredible linguistic massaging. It was so amazing.

It is very ... curatively written.

Yes, very curatively. It's pure music the language, and the story is also incredible. It's such a nonlinear timeline. And the story, I still don't know if it's very deep or very superficial. It's crazy, but all I know is that it moved my emotions like anything.

These days, I prefer somewhat quieter writers. And to be even more clear, I prefer female writers more than men. I'm sort of stereotyping, but the stereotype has a grain of truth. By and large, I find that when women write, they want to highlight the point that they are making, the issue that they are bringing forth and the humanity behind the story. Or the concept behind the story. But, when men write, by and large, what they're saying is, look, I exist, I'm here. Look how clever I am. The showmanship is always present. But women tend to put the showmanship aside and tend to draw attention to the thing, trying to keep themselves out of it as much as possible. So, these days I naturally gravitate towards female writers. Having said that, I think, back in my school days, I voraciously read Agatha Christie. And then I stopped in college, because I started reading other books, there was Arthur Clarke. Even now science fiction is my favourite, like Asimov. He mostly wrote short stories, and four or five novels. So, these I read voraciously. Then in college, I read PG Wodehouse, like crazy. And PG Wodehouse more than anyone else made me want to write. So, I got my first inspiration from Agatha Christie. I wanted to write these great stories, then PG Wodehouse made me want to write great sentences and play with words. And I was doing a lot of things with words, I was the crossword coordinator in college and started my blog and so on. So, all this really impelled me to be a writer. These four used to be my go-to writers.

I went a little broader during my PhD. But somewhere in the middle of my PhD, I actually hit upon my favourite writer thus far, which hasn't changed. Somehow, Jane Austen really spoke to me. I still can't completely fathom why. In the way that I'm wired, Jane Austen is, to me, a complete writer. And I realised that I should take this (drug) really slowly. So, that's what I did. She has written six published novels. I read them over six years. I read only one Jane Austen novel each year. It was great. First, I first read Pride and Prejudice and was totally blown away. I also made my wife, my girlfriend then, read it. That was the only book we read apart. And after that, the other five books we read together. We'd discuss, analyse, and watch all Jane Austen based movies. We even have our own rankings! But what is the big appeal? It's not just the romance. The romance is almost incidental in her books. It's her insight and understanding of the human nature. I don't know if you have read Jane Austen.

I've seen Pride and Prejudice. The one with Kiera Knightly.

To me that one is the best. Yeah. I did not like it as soon as I started watching that movie, and then immediately stopped it because the dialogue felt so clunky. I didn't realise that they were the most faithful adaptation. After I watched the other adaptations, I realised this is actually the most superior one, it was very true to the sensibilities of the book.

I am guilty of having read it and having skipped over some parts.

Okay. Do you know what I'm guilty of? In college when I was in IIT Madras, I opened Pride and Prejudice on a whim. "A single man in possession of a good fortune, must be in want of a wife" I was like what crap. I stopped reading it, I was terribly bored. Because I was not yet ready to read it.

So, what people call Jane Austen's writing is regency era fiction, because it was the regency era. I don't know what to call it. Sometimes, people also call it a 'novel of manners.' I don't know what they mean. The reason I like Jane Austen is not because the romance is incredible. It is because you get a very clear map of human nature. I would suggest that if you want to read Jane Austen, wait till you graduate from bachelor's and then take a little more time. You don't really get to appreciate all the nuances at this age, that's what happened to me. You get older, live some more life.

Her insight into human nature, to me, is unparalleled. William Shakespeare comes closest, but not even Shakespeare surpasses. Pride and Prejudice is her most well-known work. But the other ones are where you really get into the weeds of human nature. Pride and Prejudice is like a shiny example of how Jane Austen could write. There are some fairytale elements going on as well. Jane Austen books always have some fairy tale elements. But life also has some fairy tale elements. The plots are so well tuned. And the characters are so genuine and realistic. I cannot think of Jane Austen characters are fictional at all. And the

language, I also love the way Jane Austen writes. In fact, whenever I write papers, I try to channel Jane Austen more than anybody else. Because of the way the sentences go and the way the story arc goes. Ultimately, papers are narratives.

Which of her books is your favourite?

My favourite is Mansfield Park. Don't read it now. I would say you're not even ready for Pride and Prejudice. Mansfield Park is the deepest, the darkest, and probably the saddest of them all. And it is Austin's own favourite of her books. Emma is another incredible book. I would highly recommend it. It is related to detective fiction, as complex as an Agatha Christie book.

These days, I read a little more widely. I just finished reading the Mahabharata. And now I will read the Ramayana, both Devdutt Pattanaik's version. Greek Mythology too, by Stephen Fry. He's my favourite person. I read Mythos, Heroes and Troy only because he wrote them. I actually didn't read them. I like listening to him. My audiobooks are all Stephen Fry's.

One of the biggest things we keep talking about is how we want to have free time for some artistic pursuit. I would be very unhappy if I didn't have some time for say, either reading or singing.

It is very important to make that time. Having said all this, if you only do research and course work, you will eventually get burnt out and you will lose interest in everything. It is important to compartmentalize even in very hard times, to find time for these other activities. You need to scratch all these itches. Otherwise, one of those itches is going to eat you up. If you're doing a PhD, or if you take up a job, you have to find that downtime on weekends, or any other time when you go back to whatever you like to do. Make it a priority.

Even having fun is work. In my PhD, I found it hard to find ti-me for these things. But I somehow did. Sometimes, I would just stop doing research for a while. And well, I was lucky in the sense that I had the best advisor in the world, who gave me 100% freedom to do whatever I wanted. I took advantage of that. It's okay when you feel burnt out. Burn out is a very real thing. You should stop then. And, importantly, you should not use that time on Facebook or Netflix, but on what makes your heart happy. For me it was mostly writing or hiking. It is important to switch off. That is also very much part of your identity, and you have to be in touch with your identity. Otherwise you will grow tired. So many people I see in their adult life are unhappy because they have lost touch with their identity. Even my parents, my dad for instance. He used to write poems. And now in his retirement, I keep telling him "Go write your poems!" You will see how happy you will be.

So, yes, it is important to have the research burner on; keep it high, focus and plough through things to work on it and learn things. Switching off is also not easy for many people, they choose not to. But again, that also the takes practice! How to really switch off, and really enjoy the other thing that you're doing and not worrying about “Oh, what was the deadline?”, “I need to still complete that calculation”. It's okay, deadlines will keep coming through. You still got to actually live both your lives nonetheless. I got the sense from your emails that you guys don't get the time to pursue your hobbies. You know, that's very sad. It used to be not that bad for us actually.

I mean some of the blame is on us to be honest. If I don't have any other stimulation, and I don't have any other people around me, I just go on Instagram and spend a lot of time looking at people doing various things. I feel terrible at the end.

It is such a bane of what has happened to us. Especially for people like us who want to pursue other things also. One tip is to mentally block your calendar with a precise plan of what you want to do with your hobby. If you already take some time, and tell yourself: This Saturday, I am going to spend three hours writing something. I may already have some inkling of an idea; I'm just going to sit and explore that and put away my devices. I’ll just write. Or just sing. That's what I mean by even fun is work.

Yeah, once you put away the phone for an hour, it's easy to get absorbed in the flow. But the hardest part is to get started with the one hour.

Yes exactly! What I'm saying is, the best way to get things done, not just work but also your hobbies is to already have them planned. If you plan and have it in your head, your mental channel is blocked and then when Saturday comes, automatically you will remember: “Oh, this is the day I was planning to do this, I will just do this”. If you don't have anything to do, you will automatically start to drift and then you start doing other things that turn out not to be so desirable. Because if you have it blocked up, then that will happen. When the day comes, you do it. Always have some “itch” to do something in the near future; it gets you to do those things. But you have to be very sincere, you have to be sincere to yourself. When you sit and you know, sing, or paint or write or read books, you should do nothing else. That means not even your work! You should be sincere to that-- get deep into that. That's when you really enjoy, that's when you really live.

Nevertheless, three hours at the same time is not the same as three hours separately. The third hour is when the magic happens. I will guarantee you that if you're somebody who can get things done in the first hour of day in writing and research, then the quality won't be good. You need to have that extra synthesis of all these ideas in order to do something deeper. Its a feature not a bug!

Besides books, is there any other kind of media that you have been regularly consuming?

I watch an enormous number of movies, actually. I am such a huge movie nut. Even during my BTech I was watching movies, but it was nothing compared to what I did later during my phd. I have this Excel sheet that lists every movie I watched, where i watched it, with whom I watched it and how I felt about it.

Oh that's something we wanted to for a long while! The whole idea of recording your experiences like that and preserving a space about yourself, like your website, is something really nice.

Oh yes. Especially for things that I love, I like recording them this way. It feels really nice looking back at them later. Also, it becomes like a data. I have this bar graph of how many movies I watched every year that kind of tells me Oh, during my second year of PhD, I was so free. In my second year of PHD, I actually watched more than 200 movies. Thats like a movie every 1.5 days. Then there was a very marked decrease when I started my first postdoc. That was also the time when my wife and I were living apart. I got married in the middle of my PhD. I had a very hard time in my first postdoc. I was having a hard time with physics and that resulted in my having a hard time with movies. Then we went to Canada together and watched a lot of movies together. So again, the numbers rise. We watch a lot of old movies. Starting from 1930s, all the way.

Oh! Any hidden gems to recommend?

There are so many actually. I very much like this movie called Adaptation. It has Meryl Streep and Nicolas Cage. It has one of my favorite filmmakers, Charlie Kaufaman. Here he is the writer. Nicholas Cage plays Charlie Kaufman in the movie. It is uch a crazy story, but it has an incredible live tight logic. It's one of the flawless movies I have watched and loved watching it again. In general, I love watching well-made dramas. I recently watched Brokeback Mountain and it completely broke me. I also watch a lot of science fiction. On my website I have a list of the top 10 that I really, really loved the others that I could find no fault in. They have really influenced me.

I don't watch TV shows though. Simply because, I feel that a life in research is not compatible with the addictiveness of TV shows. You don't want to give that part of your brain so much stimulation. Avoiding binge watching becomes very difficult and it just eats into time and your energies as well.

But there are so many good ones out there! How can you resist something so well written.

Yeah, thats a problem for me actually. These days TV shows are so well written. They make them so good! I really appreciate what they are doing with the medium there. That is why I am actually scared of TV shows.

It's this giant Pandora's box!

They can be disruptive. I fear if I ever start watching them, all these activities that I like doing but that take work would be affected. In that sense life is short, it is finite. And I would rather, you know do these things. Thats why I prefer movies. It's just 2 hours and its very nice way to wind down. Another reason I love watching movies is because they are a window for me to learn about the world. And to learn about so many different kind of humans and cultures that otherwise I would not have encountered in life. Somebody called movies 'Empathy Machines.'In that sense, I like movies. They are, to me, like a philosophical window in the world.

Another thing that I do extensively is hiking. Everybody needs to get some physical exercise. If I climb anything I am happy! That's why I look forward to the slope near Janata Bazar on my way from the guest house where I live. Haha. I am very lucky to have found a partner who happens to like that. Bangalore is also great for that.

It was very nice talking to you! You gave a very healthy perspective about life in physics. It was very reassuring.

I am very glad! I probably painted a very rosy picture because there will be barriers and hardships. But try to take all of this as an opportunity and don't lose sight of the thing that you ultimately want to do. You will be blindsided by many things. Sorry to say, but that is how life is. But you try to find a way. Ultimately, don't get into things that your heart is not quite in. Because that will make you unhappy for sure. That is the main thing. And the other thing is: remember what you really want. It is possible that you still haven't seen what you really want. Because at your stage I was also pinballing between condensed matter and optics and did not feel sure about them. It took me a while to realise what my field is and that this is what I have always wanted. I just didn't know it yet. You may not even know it yourself because. Your exposure is ultimately limited at this point. So, catch on to things and learn as much as you can from whatever you are doing now. Because ultimately what you are doing is learning how to learn at this point. Everything that you do, think of it as learning how to actually deep learn things. Then, once you have mastered how to do that, you can use it to deep learn anything in the field you are in.

And it does work out.

Strange-o-little Star

(Inspired by “Bhindeshi Tara” of the band Chandrabindoo)

Sarthak Talukdar

My strange-o-little star,
In the lonely sky you are!
Playing hymns of tinkling glass,
In the garden without a fuss!
Dusk drips over the hills,
Echo of your name in the valley fills.
Misty welcome of the eve,
Whisper the story of linen leave!
O the star of nightly god,
I watch you from abroad,
Scared eyes in withered sorrow,
Walking lanes- too dark and narrow.
kites rise kissing the cloud,
Fake drunk is very proud!
Roses close my eyes- so sweet,
A darling breezy night.
You are warm as a mother’s touch
Like a Sweater in the Winter rush

My kid-o-little star,
Why swim you so far!
Be quite and listen to me-
There is a lot here still to see!
You are a flower over the peaks,
Me - a river meeting the sea,
If you touch me- you will wet your palms,
I will flow you to new charms.
And my sleepy eyes with tears-
I'll wipe them away, erase my fears.
O my god of late night,
Your feet over a height,
I dream to touch you, hold you near,
But wake up lonely, with frozen tears!

A Dozen Holes On My Wall

I have a dozen holes on my wall,
Made by pins, hooks and crooked nails;
Drilled deep into those poor bricks,
I sympathize the agony it felt.

Those pins, hooks and nail stare,
Glaring somberly into my weary gaze.
O rusty dusty and weary they look;
Their burden too lethal for words to frame.

Faded amidst this marching strife,
Whims of love, hate and embrace.
Those dozen holes on my wall—
Are tunnels tangled in memory's haze.

Clocks ticked and years flew;
Many souls left their scratches and dents.
Some to cherish, others to hide;
Lost souls leave behind the moments spent.

Bygone phases of an illustrious life;
Pinned in time – to be lost in space.
My regrets buried in fine cobweb,
Yet one thing I am left to expatiate:
A dozen holes mar my wall—
Does the void they at all appreciate?

~ *Anindya Guria*

ভেজা রাস্তার গান

Sarthak Talukdar

Inspired by the song
Suzanne by Cohen

আমার শূণ্য লেখা বুক,
আমার হারানো যত সুখ,
তুমি কুড়িয়ে নিয়েছ বলে,
আমি বৃষ্টি ভেজার ছলে-
বেরোই বাড়ির দরজা ঠেলে-
ফেরার যত রাস্তা ভুলে!

পথের প্রান্ত ধরে
আমি চলেছি অবহেলে,
তোমার মুখটি মনে ধরে,
তোমার স্পর্শ দেহে ভরে,
আমি পৌঁছোবো সেই গ্রাম-
যেথায় চিঠিবিহীণ খাম।

পাহাড়ী নদীর পাশে,
বসে ডাকবাক্সের গান ধরে,
প্রিয়তমা ডাকছে মন,
ঝোড়ো বৃষ্টি আনছে কোন
দখিন প্রান্ত ধরে-
আমায় ফিরিয়ে নেবার ছলে।

দেখি ছোট্ট নদীর গাং,
এল প্রবল ভরে মান,
আমায় ভাসিয়ে নিয়ে শূণ্যে,
ঝড়ো হাওয়ার সাথে হন্যে
হয়ে, ফেলবে নিয়ে কোথায়,
আমার দাফন হবে যেথায়।

কেটে গেছে অনেক রাত,
শান্ত বনের মাঝে শুয়ে,
ফিরল আমার ঘোর,
তখন লালচে সিঁদুর ভোর,
দেখি তোমার কোলে মাথা,
ঢাকা সেই নকশী কাঁথা।

The Quarks Daily

DEPARTMENTAL HOROSCOPE

Department of Physics

*Through Heisenberg's ruling, you will either have the time or the energy to secure your physics career but **not both**.*

Centre for High Energy Physics

The universe will conspire to make a math major out of you before you begin to learn physics. Young, starry-eyed, novice - you would do well to jump ship at the first chance you get.

Your lucky Greek letter of the week: upsilon (υ).

Centre for Condensed Matter Theory

Keep praying to the men who died on the altar of Statistical Mechanics (Boltzmann, Ehrenfest, and the like). These days, the only exercise is to map all your problems to what they have already solved before.

In order to progress in life, and please your particle physics ancestors, we recommend inventing new undetectable particles. Fine-tuning these particles to match experimental data will be critical in maintaining a good reputation (unlike string theorists).

***Wisdom of the day:** Random walk on an alcohol addled brain had inspired Feynman about the notion of travelling all possible paths. What we are saying is, you never know when creativity strikes.*

Astrophysics

Those who read the stars for others shall not read their own horoscope.

Cosmology

There is a high chance of your theoretical effort not matching observations. Inspiration from discarded ideas of Einstein and mysteriously named fudge factors will be essential to ensure the continual flow of grant money.

Department of Instrumentation and Applied Physics

Trust the master equation all you want kid, but when it comes to experiments it will be Murphy's law acting out in your life.

Disclaimer: This is a work of parody. Please take this lightly as a joke and try not to get offended.

Department of Mathematics

You will spend most nights trying to decide between a life of extreme riches and one of extreme mental labour and poverty. For some reason unbeknownst to mankind, you will bend towards the latter.

For every epsilon (ε) of thinking you do, a delta (δ) or even an iota (ι) of proof wouldn't be awarded. Sacrifice a rat instead.

Chalk color to choose to resist all worldly urges: *red velvet.*

You will be awarded your cosmetology degree so that you can finally rescue your barber friend from the land of paradoxes. Good job champ!

Department of Computer Science and Automation

Because of Github copilot being in retrograde, all your algorithms' time complexities will be squared. To counter this, shift all your operations to punch card machines as soon as possible.

Molecular Biophysics Unit

You will probably survive yet another week without an autoclave giving way or the roof falling apart. The stars are not very sure of this so do not throw caution to the wind. The stars are sure about the projectors though. They will not work.

Centre for Ecological Sciences

This is a great time to go on that field trip you have always been planning, the tea leaves say that the leeches and ticks are off on a vacation this month. Before you leave, a small prayer to the Last Universal Common Ancestor can ensure the animals behave themselves for your behavioral experiments.

Lucky model of the week: *what's the point, the data won't fit anyway.*

Department of Biochemistry

You will finally have a gel that does not resemble a two-year old's artwork. To ensure your band is present, you will have to perform this simple ritual as soon as you finish running the gel – Step 1) Image the gel and load it on your PC, Step 2) Open MS Paint, Step 3) If you know you know.

Disclaimer: This is not a work of parody or fiction. Do not take this as a joke. If this offends you in some way, make sure to stay offended for as long as possible.

Department of Developmental Biology and Genetics

The change in the name of the department will not affect your fortunes in the lab - your cells will continue to misbehave. But don't worry, yet another conference in the auditorium will get you free food to cope.

Centre for Biosystems Science and Engineering

Sacrifice one more mouse, but not your data quality.

Centre for Neuroscience

Be prepared to juggle ML, psychology, and signal processing in the guise of cognitive neuroscience. If you decide to still stick to cognition, make sure to engage your subjects in raunchy inter-block conversations so that they don't fall asleep while counting the number of bars on the screen.

Unlucky programming language of the week: *Hoc*

Department of Organic Chemistry

Like Kekule's benzene, your compounds will reveal themselves in dreams. And only in dreams. At this point, who knows? Russian Roulette in the lab might just align your stars better.

Department of Materials Engineering

Your lucky colour: black

Your lucky constellation: aquarius

Both of these will conspire together to make sure all you learn is to grind and polish.

Centre for Earth Sciences

One day, Pangaea will reunite again, and the planet will prosper in unity. Till that happens, you'll continue to drift from your good fate. Good luck, primate.

IDC

Any incontinence caused is regretted.

Disclaimer: No disclaimer















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