

Photo: Makarand Sarnobatbat

A Piece of Pi Rugved Pund

“We now take this opportunity to inaugurate our very own, IISER’s Maths Club; and present to you a wonderful day, the Maths Day, ladies and gentlemen”, concluded Dr. Steven Spallone, and thus commenced the much anticipated IISER Maths Day on 8th March. And wonderful it was.

It began with the members of the Maths Club bridging the gap between mathematics and fun with a myriad of different activities and challenges. With ‘Bubbles’ to optimise surfaces and ‘Hexaflexagons’ to twist our minds around, the Maths Clubhouse soon started buzzing with mathaholics. ‘Nim’ and ‘Hackenbush’ unravelled the beauty behind game theory, while the large number of ‘15-Puzzles’ tested our spatial foresights, ‘Shakuntala Devi’ challenged the best and the brightest amongst us with her very confounding puzzles, and beat them with her innovative ways of reasoning.

The ‘Women in Mathematics’ showcase was an exhibition that strongly highlighted the inspiring works of women from across oceans and continents in mathematics. It proved to be, without doubt, humbling and encouraging at the same time.

Maths Carnival was a fun room to be in. Pictionary left some people scratching their drawings, if not their heads, as other members of their team scratched their respective heads to decipher the drawings that stood for some mathematical concepts assigned to the team. I’m sure

our dear Newton must have felt something wrong with his nose, after dozens of people successfully pinned it onto him, with the answer attached, in a game of ‘Pin the Nose’. ‘The Telephone Game’ passed on the baton of mathematical thinking, with teams running the mental relay of problems whose answer was the key to solve the next problem. Every new round of the Carnival was as much of a pleasure as torture for our minds as we stretched and pulled to wrap them around the problems.

Pockets full of chocolates and heads full of newly understood enigmas, the mathaholics marched to join the ‘Prime Number Bee’ in LHC 101 (which incidentally, was a prime place for the event). The buzz in the hall soon quietened as everybody realised how surprisingly difficult figuring out the next prime number could get. Nevertheless, the hall broke into a big round of applause as the only contestant to have correctly figured out all primes bowed before the audience.

A prime achievement, I’d say.

Our heads were reeling with numbers and divisibility tests, until *he* came. The one whose address is as famous as his name. You don’t have to be famous for him to know you with just a glance. Complete with a long overcoat, collars up, a black chequered hat and a pipe held sideways in his teeth, the high-functioning sociopath stood tall. Sherlock Holmes. A Game of Chances. With an air of char-
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Ψnce Day

Adithya Rajagopalan

On 28th February, the IISER campus was abuzz with activity. It was National Science Day. Commemorative of Sir C. V. Raman's birthday, Science Day plays an integral role in teaching the public the importance of science. This year, IISER held several talks, demonstrations and competitions as a part of the day's events.

The morning started off a little subdued thanks to the mid-semester exams that had just ended. The first program was a talk on "Raman Spectroscopy and the Raman Effect" by Dr. G.V. Pavan Kumar and Dr. Mrinalini Puranik, with the help of students working in their labs. This was followed by Prof. Sunil Mukhi's talk on "Fostering Scientific Temper".

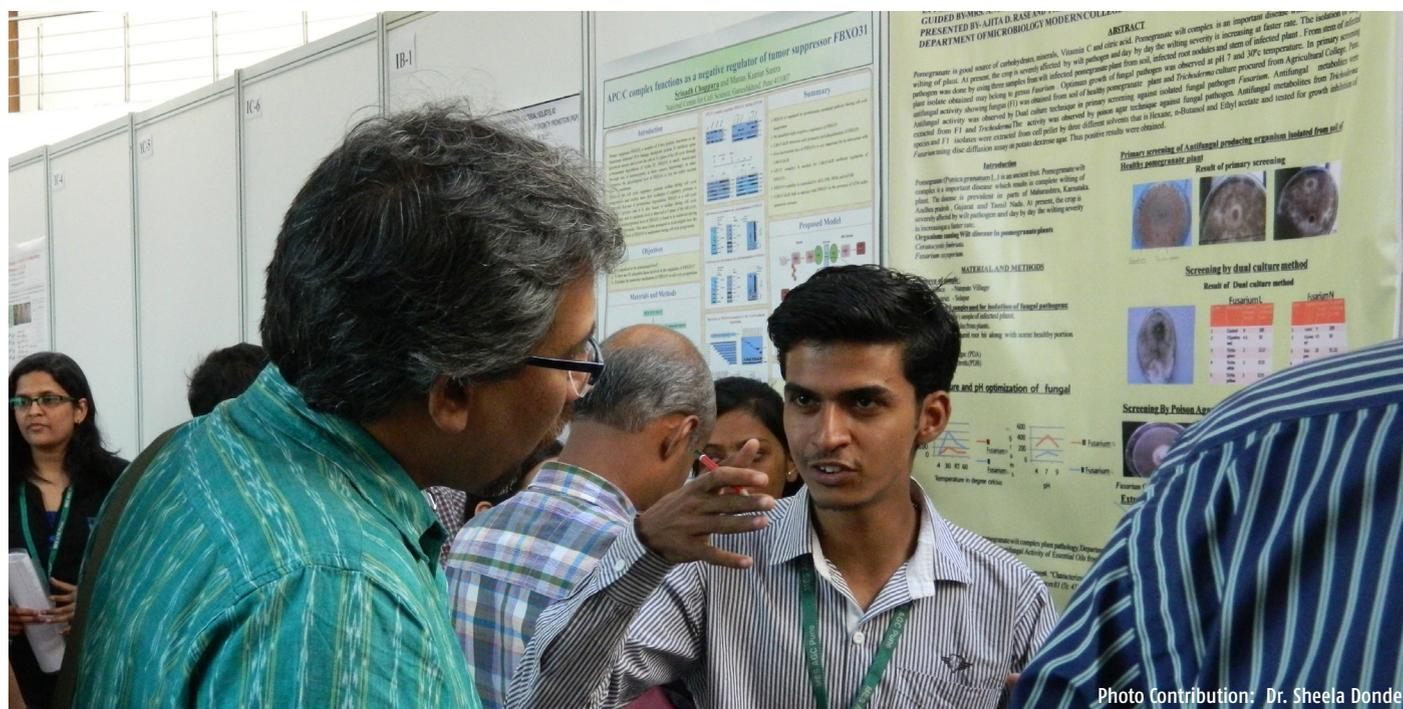
After a break for lunch, the competitions began. The atrium of the LHC was soon filled with students and their posters. More and more people streamed in to view the posters; this included many students from schools and colleges in Pune. This year, the poster competition was also open to entries from outside IISER. Apart from the poster competition, an essay-writing competition based on the theme 'Fostering Scientific Temper' was also conducted and the results were announced by Prof. Mukhi during his talk.

At the same time, HR-4 saw a large group of school students occupy C-201 to witness the experimental chemistry demonstration set up by Dr. Shabana

Khan. Along with her team of volunteers, she enthralled the students with colourful and exciting experiments. All the day's events were covered by the IISER Pune Media Centre.

In addition to this, the library had organised a wonderful book exhibition. The bookstalls were filled with amazing manuscripts, ranging from textbooks to picture books.

The grand finale to the day's events was the prize distribution ceremony where the prize-winners were handed their awards by Prof. K.N. Ganesh. With this, an exciting day filled with creativity, fun and most importantly, science, came to an end!



A Piece of Pi

...CONTINUED FROM PG. 1

acteristic arrogance and fluid logic, he gripped dear old Watson and Inspector Lestrade in the familiar condescension we all know.

Irene Adler, enigmatic as ever, left her own unique charm over the detective and the audience as well. Humour in apt places complemented the, needless to say, impeccable reasoning of Mr. Holmes, to beat the crazy crook at his own game.

"A mathematician may be a crazy person, but a crazy person can never become a mathematician!" were the words used just before the audience drowned the hall in praise and applause.

Following the mystery was a tale in history. A story of great Indian minds through the ages, since Independence. A saga told in all its grace by a mathematician none other than Prof. M.S. Narasimhan. Winners of the poster competitions received their prizes from him.

Selected teams of mathaholics assembled late at night near our fountain-without-water, to be briefed about the midnight treasure hunt, 'Cryptex'. Each team had to solve a problem whose answer served as the key to decipher the location of the next clue. Sniffing out combinations and crypts with their analytical noses, our Cryptex adventurers were seen running around the campus with the light of hope in their eyes and beads of sweat on their foreheads.

Stringy Days

Khilav Majmudar

Stringy Days was a mini-workshop on String Theory organised by Prof. Sunil Mukhi and Dr. Arjun Bagchi on 6th and 7th March.

It was inaugurated by Prof. Dabholkar, from the Laboratory of Theoretical and High Energy Physics (LPTHE), Paris followed by a colloquium titled "Quantum Black Holes: A Window into the Short-Distance Structure of Quantum Gravity". He spoke about the recent progress in String Theory towards understanding the quantum structure of black holes and also explained how to compute the complete, quantum-corrected generalisation of the Bekenstein-Hawking formula.

The next day was reserved for a series of technical talks by various specialists

working on the theory, including Dr. Arjun Bagchi himself. These talks were meant for an audience that had sufficient know-how of the frontlines of research in String Theory. The talks were given by scientists from TIFR, IISc, ICTS and LPTHE, Paris.

The concluding talk of the workshop was a colloquium by Prof. Sandip Trivedi from TIFR. He explained how String Theory and strongly coupled systems in Condensed Matter Physics are connected and reviewed these developments with some examples.

Overall, this workshop was a success, both for the technical audience and the interested scientist.

Ars Gratia Artis

Sumeet Kulkarni

Based on an idea by Prof. Milind Watve, various cultural clubs at IISER got together to kickstart the 'Art Appreciation Series'. The idea is to have a group of enthusiasts gather regularly to discuss an art form— this could be in the form of a presentation, a talk, a demonstration or anything that would change the way we look at an art form.

The art forms span everything; dance, drama, music, paintings, literature, sculpture, etc. Prof. Watve himself opened this series with a talk titled "Rhythms in World Music" on 4th March. He started

with rhythms that prevail in our everyday life— those created by people walking, working, the hammering of blacksmiths, kids playing, dancing and so on and then moved on to the various types of rhythm in international music. He demonstrated pieces in 3, 4, 7, 9, 15 beats and even different types of 3.5-beat rhythms.

Dr. Aditi Deo, a new faculty member will soon carry out two more events in this series, the first of which will be on 'Musical Interactions'. Hope everyone joins this initiative and becomes part of a unique and exciting learning experience.

Acad Buzz

Radhika Ravikumar

1. Workshop on p-adic Aspects of Modular Forms

Venue: IISER Pune

Dates: 10th – 20th June, 2014

Application deadline: 31st March, 2014

URL: <http://www.icts.res.in/program/details/341/>

2. MASTANI: Summer School on MAterials Simulation Theory And Numerics

Venue: IISER Pune

Dates: 30th June – 12th July, 2014

Application deadline: 31st March, 2014

URL: <http://www.iiserpune.ac.in/~smr2626/index.html>

3. Summer School on Computational Approaches to Memory and Plasticity (CAMP)

Venue: National Centre for

Biological Sciences, Bangalore

Dates: 28th June - 12th July, 2014

Application deadline: 30th March, 2014

URL: <http://www.ncbs.res.in/camp/>

4. Workshop on Galaxies: Structure, Dynamics and Evolution

Venue: National Centre for

Radio Astrophysics, Pune

Dates: 7th - 18th July, 2014

Application Deadline: 31st March, 2014

URL: <http://www.ncra.tifr.res.in/ncra/news-events/2014/workshop-on-galaxies-structure-dynamics-and-evolution?searchterm=workshop>

5. Young Women and Mathematics - 2014

Venue: IISER Pune

Dates: 25th - 27th July, 2014

Application deadline: 15th April, 2014

URL: <https://sites.google.com/site/ywmiisc/>

6. Himalayan biodiversity and bioresources: mapping, utilisation and conservation

Venue: University of Kashmir, Srinagar

Dates: 1st - 3rd May 2014

URL: <http://www.kashmiruniversity.net/forthcomingevents/28.pdf>

7. Refresher course on Experimental Physics

Venue: Department of Physics,

University of Mumbai

Date: 3rd - 18th June, 2014

URL: <http://web-japps.ias.ac.in:8080/Refreshcourse/EPUM.jsp>

Holy coloured



Photo : Gaurav Arya

4

Branching Out

Darshini Ravishankar

Last semester saw long-dormant clubs spring back to life, and one need not look further than the Quiz Club for an example. On similar lines, Prutha seems to be blossoming this semester, with its activities becoming more frequent.

The club has, over the past two months, organised a clean-up of the campus, taken students to Sinhgad for an awareness-cum-trash pick-up hike and is trying to set up a way to recycle cans and bottles, among other things, on campus. The trip to Sinhgad took place on Sunday,

9th March, and it made very obvious the amount of garbage humans generate and throw in the hills there. Six bags of rubbish were collected in the first half hour, and even after the subsequent focus on plastic bottles, the bags taken for trash collection were not enough. More than three dozen bottles were collected from the gaps in the rocks and the shrubbery within the next hour.

On a different note, students who participated in last year's Environment Status Report (ESR), recording traffic on Pashan Road, recently received certificates for their work. They also got the opportunity to listen to Dr. Aneeta Benninger, a renowned geographer and

development planner, speak about her experiences in her field. She stressed the importance of observation, especially for science students, and further spoke about lifestyle changes and the dangers of being an 'aspirational generation'. She was accompanied by residents from Panchavati who are active in preserving the greenery and natural ecosystem of Panchavati Hill.

Further plans for the semester include participation in the clean-up of the Mula-Mutha River that is being organised by the Art of Living foundation. If anybody has any ideas to contribute, they are urged to contact Prutha at: prutha.iiserpune@gmail.com

Art form of the Month - Pattachitra

V. R. Shree Sruti

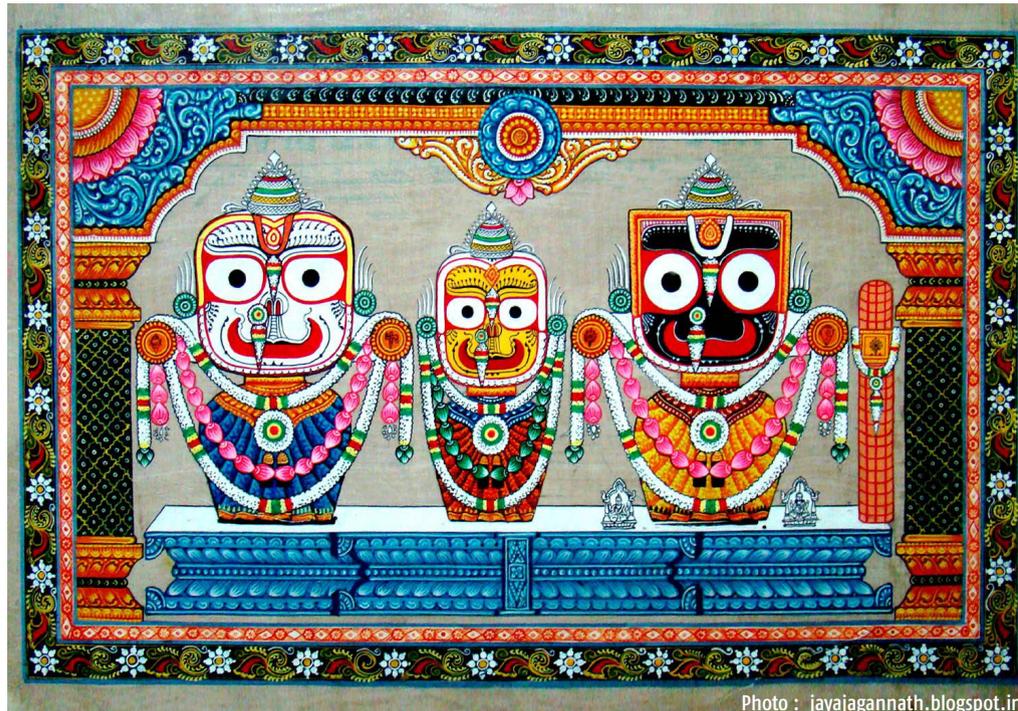


Photo : jayajagannath.blogspot.in

Pattachitra is a traditional form of painting from the heart of Odisha. Pattachitra, which literally translates to 'cloth-painting', has been in existence since the 5th century B.C. in the form of murals. These paintings are traditionally made on canvas with bright colours, depicting stories based on Hindu mythology. This form of painting, localised to around Puri, is most common in and around Raghurajpur in Odisha.

These paintings are vivid, with motifs conveying mythological stories, mainly of Krishna and Puri Jagannath. The paintings focus mainly on the characters in the story, with attention being given to the depiction of the essence of the characters rather than on the details. The background is often enhanced by

the addition of details in the form of flowers and leaves interwoven into the story depicted in the painting.

Pattachitra is made on a treated canvas with rich, bright colours. The canvas is treated with chalk powder and a glue made from tamarind seeds which confers tensile strength to the canvas. This also makes the canvas slightly absorbent towards the paint, thus giving it an appearance unique to this form of painting. The paints are made entirely from natural sources; black from lampblack, green from the *haritala* stone, red from the *hingal* stone and others from sources such as vegetables, stones and earth. Paint brushes are made from the hair of domestic animals tied to a bamboo stick. Once the paint dries,

the painting is coated with a layer of lacquer to confer water resistance and consequently increase the longevity of the painting.

A variation to this art form is the Pattachitra made on dried palm leaves, sewn together or folded up to form a compact structure. Conventionally, Pattachitra also includes the narration of the story that is depicted in the painting, the *chitrakar* moving through panels as the story proceeds.

One of the oldest surviving art forms of India, Pattachitra stands as evidence to the richness that Indian heritage has accumulated over time.

References :

1. <http://www.odisha.gov.in/portal/>
2. <http://www.rabindraart.com>

Cornering COSA

We approached the newly formed Committee On Student Activities (COSA) over a cup of tea, bringing to the fore various issues of campus life. An excerpt of this two-hour long interview follows.

ST: What is the aim of COSA? Why was it formed?

COSA: Committee On Student Activities (COSA) coordinates with the Dean Of Student Activities (DOSA) on student activities and grievances, including those regarding the hostel, mess, health services and general campus-life related issues (DOSA has a COSA.). It acts as an interface between the students and the institute. Every institute has one and their purpose is to divide work and ensure that more people are involved in decision-making, so that students know whom to approach.

ST: What is your take on student representation?

COSA: We think that it's a good idea but something that is difficult to implement, taking into consideration issues like how the student body will be formed, how to ensure uniform representation of various student communities, how to prevent the system from becoming too political, how to ensure that the students in the body do not abuse the power they are entrusted with, etc. We also need to consider the alternative to this which is to have a poll for major decision-making, though we understand that the minority view might not necessarily be represented, and then take the opinion of that poll into account when taking decisions. We are trying to figure out a system that works. Presently, we try to incorporate the views of the entire community while creating policies.

ST: How does the COSA-club interface work?

COSA: We think it's important to provide opportunities for students to have a multi-dimensional and rich experience on campus. The institute is happy to facilitate and support club activities. We are trying to formalise the clubs, their budgets, representatives, members and activities. We have encouraged clubs to submit their budgets, create a website for themselves with all the relevant information (to be hosted on our webpage), start a forum to discuss issues, etc. The response has been so far has been mixed. While a few clubs have gone ahead and organised very successful events for their peers and the IISER community, some club representatives do not follow-up after a discussion and fail to submit the necessary information, making the process inefficient. Also, on some occasions our emails enquiring about the status of a particular project do not get a response. It is difficult to successfully administer a student club given your busy schedules, but also a great learning experience. It's crucial to put in place a system of accountability, responsibility and transparency especially when institutional funding is

involved. We might have grievances too and need a COFA!

ST: Are there going to be common spaces for recreation purposes, open till later hours?

COSA: We have worked hard to facilitate you guys with a common space for studying and discussing and are working on improving the present facilities there. A common TV/recreational room and as well as rooms for clubs to conduct activities and use for storage are in the pipeline. In about 6 months, the student activity centre should be functional. This will prevent the "quiet hours" rule from restricting music and other cultural activities, which are presently affected because they are carried out close to the hostels. A word on the quiet hours: While many of you seem to think that the rule is ridiculous. This view is not unanimous amongst students. Indeed we have received complaints about noise from many students, which is one reason for having quiet hours in the first place.

ST: What is your take on (dis)allowing opposite genders into hostels?

COSA: The students here come from a variety of cultural backgrounds and age groups. The youngest of the student community are not even legally adults, which means the institute is still answerable to their parents. Many parents as well as some students are uncomfortable with allowing opposite genders into the hostels and most hostels in the country are, after all not co-ed. Also, hostel rooms are essentially the only private space that the students have. The conditions under which these rules were enforced here must be taken into consideration. Also, being a graduate student hostel, New Hostel – II is free from such restrictions since Ph.D students are older and less subject to parental restrictions. It would be nice if some of you could take the initiative to collate information regarding undergraduate hostel policies in other similar institutes so that we can review it.

ST: Will there be a night canteen?

COSA: While we understand that students get hungry in the middle of the night, we urge them to consider various things. Firstly, plan ahead so that you have food stored when you need it. Also, reconsider staying up late on a regular basis, many of you have early morning classes. We also know several faculty encourage their lab members to keep regular hours as much as possible. They believe this has serious long-term benefits and allows students to have a life outside the lab. Secondly, we urge you to think about the mess staff, they work very hard everyday. If the institute permits a night canteen and there is a profit to be made, there will canteen staff kept up at all hours to make hot sandwiches and tea for a small percentage of students who opt for this lifestyle. Some of you may argue that it's not your problem and you will give good money to get your hot

dosa (not DOSA) at 3 AM. India and several European countries have very stringent rules about closing hours etc. that ensure that workers are not exploited by their employers for profit. Once you know what the timings are, shop, eat and store accordingly.

ST: What about the rule regarding sports?

COSA: Playing is an integral part of college life and we do encourage students to use the facilities provided. However, unfortunately the sport grounds are all right beside the hostel and after a certain hour the noise created becomes a nuisance. We will take into consideration the views of the entire student community and arrive at a mutually beneficial policy regarding the sports curfew. In the meanwhile, we urge the students who play past 10 to be considerate towards the others in the hostel and control their noise levels.

ST: Why the sudden emphasis on counselling?

COSA: Many students on campus are presently unaware of the counselling facilities that are available and the purpose of the group sessions is just to introduce the counsellors and for them to gain a better perspective on how students are thinking at IISER. There is always a section of the students who require help and hopefully they will be able to benefit from this facility. We understand that there is a social stigma associated with requiring counselling and we request all of you as students to help break this barrier and make it possible for those who need it to receive the maximum benefit possible. There is also an initiative planned, requesting for volunteers from the senior batches, who can help the counsellors understand the problems that they faced and hopefully help their juniors cope with similar issues.

ST: Why is there such a large discrepancy between the prices at the other IISERs compared to ours? Also, why hasn't the mess contractor been changed despite the repeated complaints since the beginning of IISER?

COSA: COSA has not fixed mess prices, or selected the mess contractor at IISER. We have no involvement in this process, which is entirely handled by the administration. You may therefore please direct your questions and comments to the Deputy Registrar, Registrar, or Director.

ST: A few words about Sentience.

COSA: Please don't close Sentience. We think it is an excellent initiative which acts as a voice of the student community and this is required for a healthy campus life. Even if the quality or quantity cannot be maintained to its present standards, it is unwise to completely discontinue it. Also, it is important to ensure that there is a system of understudies, not just in Sentience but all other clubs as well, for their continuity. We are all mostly avid followers of Sentience who would be disappointed to see it disband.

6

Space Race: Black or White

Arushi Bodas

No, it's not a typo! I am talking about 'white' holes. You see, black holes have been heard about, talked about, written about, and joked about so much that I didn't feel like writing about them (no offence to black hole fanatics!). So I looked up some references and accidentally found out about white holes!

As you can guess by the name, white holes are the exact opposite of black holes. Black holes are famous for eating up everything that comes within or on their event horizon. On the other hand, white holes are (not very) famous for puking out everything within their event horizon (even light cannot enter white holes from outside). Unlike black holes, however, white holes are completely hypothetical and no physical evidence to suggest the existence of white holes has ever been found.

The idea of existence of white holes was first proposed by I. Novikov in 1964. They

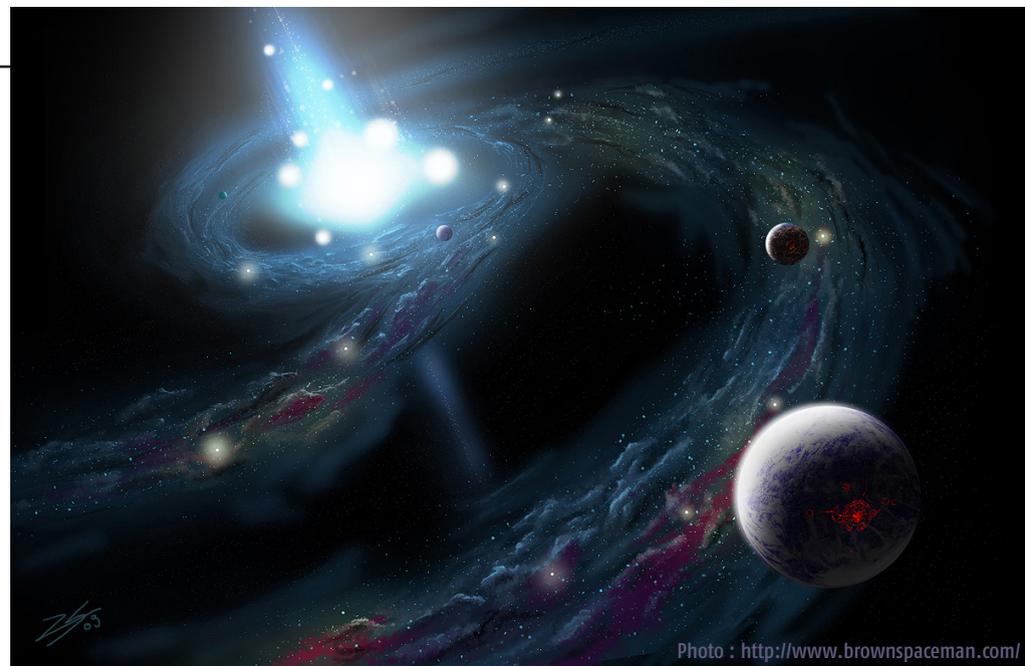


Photo : <http://www.brownspace.com/>

were predicted along with black holes as a solution to the Einstein Field Equations. For now, let's leave the complex analysis part to the super-intelligent physicists and think about the mere idea of white holes for a while.

Imagine a hypothetical world where white holes do exist. What would they look like? Just plain white or bright and colourful? Is it just a coincidence that black holes, which suck in matter, have a counterpart which throws out matter? Or is there a physical link between them, like a worm hole perhaps? And if there is a link, does that mean we will be able to revive the information lost in a black

hole? What will happen if a black hole and a white hole collide? Will the black hole successfully absorb the white hole or will the white hole succeed in kicking the black hole away? Is every black hole paired with a white hole? If yes, then are they just two outcomes of the same process?

While it is entirely possible that white holes do not exist at all and whatever we are thinking is plain nonsense, it is nevertheless quite entertaining to just think about them!

References:

1. <http://listverse.com/>
2. http://en.wikipedia.org/wiki/White_hole

Primary News Updates

Dr. Steven Spallone



Photo : <http://www.goettinger-tageblatt.de/>

At the 1912 International Congress of Mathematicians, Edmund Landau of Berlin lamented four basic problems

about prime numbers as "unattackable at the present state of science". Now 102 years later, let's check in on how mathematicians are unravelling these mysteries.

1. Legendre's conjecture: There is a prime number between N^2 and $(N+1)^2$ for nonzero integers N . This was the next step after Chebyshev's Theorem (1850) that there is a prime between N and $2N$. Progress: In 1975, Chinese mathematician Chen Jing-Rung proved that there is always a *semiprime* in each of these intervals. (A semiprime is a number which is either prime or the product of two prime numbers.)

2. Goldbach conjecture: Every even number N greater than 2 is the sum of two prime numbers. Practice for the next Prime Number Bee by verifying this up to $N = 200$ in your head! Progress: Last year, Peruvian mathematician Harald Helfgott proved that every *odd* number greater than 5 can be written as a sum of three prime numbers. Notice that the Goldbach conjecture implies this, but not the other way around.

3. Near-Square Primes conjecture: There are infinitely many prime numbers

of the form $p = x^2 + 1$, where x is an integer. Actually, you could replace $x^2 + 1$ with *any* irreducible polynomial with integer coefficients and degree greater than one, and this would again be an open problem. Progress: In 1978, Polish-American mathematician Henryk Iwaniec proved that there are infinitely many *semiprimes* N so that $N-1$ is a perfect square.

4. Twin Prime conjecture: There are infinitely many primes p so that $p+2$ is also prime. Progress: Last year, Chinese-American Yitang Zhang stunned the world by proving that for some number N , less than 70 million, there are infinitely many pairs of primes which differ by N . Teams of mathematicians led by Terence Tao have brought 70 million down to 264.

It's 2014 and Landau's four problems are all still open. Of course, Landau knew that it would be incredibly hard to identify primes that do all these things, because we don't have *any* decent formula for producing an infinite sequence of primes, or even semiprimes. So there's something really clever with all these proofs. Why don't you check them out yourself?

Of Watts, Whats and Wastage

The Lion, The Witch and The Wardrobe

It has been said, time and again, that the grass is greener on the other side, but when the said other side is the parched and burnt hillock of Panchavati, drier than a camel's epiglottis, we need to reconsider. Scores of elegantly dressed plant biologists who entered IISER's gates may have been hoodwinked by its proud proclamation of being a Green Campus (a metal sign at the gate, mind you), but young minds refuse to take this seriously without evidence. A few students decided to take this up and test the greenness of the campus.

Let us approach the problem qualitatively first. To an outsider, IISER looks green enough. Right next to HR-4 is a greenhouse, the bulwark of the greenness of IISER. Housed in it are, if nothing else, a variety of potato plants of varying heights. This epicentre spreads its influence in its vicinity in the form of a clump of Eucalyptus trees that are witness to many lovers' declarations, a patch of creepers that bear large white flowers that are as large as the fruits are bitter, and to top it all, the icing on the cake is the foul-smelling compost pit. What is more, IISER has scaled the heights of mechanistic eco-friendliness with a water recycling system that is channelled to the plants and the artificial-looking lawns! By extending the definition, the campus even seems to harbour enough wildlife in terms of established pedigrees of dogs, lineages of psychotic cats and maybe a stray catfish or two in its puddles.

Wait, are things really this rosy (forgive the pun)? Is this really an article with no whining? Fret not, for we have a bucket-load of dirty linen to fling at you. The greenness of the campus seems to be biased towards monocots with squares of close-cropped grasses and clumps of bamboo (Sai-sickness perhaps?) as against tangled messes of shady canopies. The campus is so starved of shade that it is no irony that a poor soul expressed happiness at eating under a bamboo 'tree'. Attempts by several student groups and interested faculty to plant indigenous trees in the campus to increase shaded area have gone off-the-radar like the recent Malaysian Airlines jet.

Another locus of discontent among nature lovers is the brightest star in the IISER multiverse, the seat of interdisciplinary learning, and the namesake of the womb of the God particle, the LHC. Although an engineering marvel in the face of a few other structures at IISER, it is a glutton in terms of power consumption. Foremost in this category is the army of SAMSUNG S22B370H monitors that announce a pointless welcome and a quiet zone in ironically loud colours. A similar monitor in the foyer functions as a random advice generator, probably controlled by lonely counsellors. Another debacle in planning is seen in the sensor-controlled doors which now remain constitutively open, a scar in the eternal attempt at the mall-ification of the campus. During the day, the temperature of the centrally controlled air-conditioners in classrooms is

set to near-freezing temperatures, forcing students to exhibit a novel behaviour of running to patches of sunlight to thaw themselves in between classes, much to the alarm of basking lizards.

Shockingly, this complex is blindingly well-lit even in the night time. The motive behind this is unknown as it is hard to conceive that students, who hardly visit the place during lecture hours, would frequent it at night.

You may ask, is this really significant? Let's look at the data. This data has been collected over the course of one night and has not been repeated quantitatively. However, it could serve as a decent estimate. This data is an estimate of the expenditure of energy in the night time, a significant fraction of which is wasteful. We counted the number and the different types of lighting switched on in the LHC at night and approximated an average use of 12 hours per day. A bit of background research on the General Electric website and matching the products gave us the power consumption per model. A simple multiplication and totalling returned the energy consumption for that night at LHC. This figure came up to 87.88 kWh. (The authors can be contacted for actual data.) An additional wastage of 30W per TV, for 19 TVs, for 12 hours each day would add another 47.88 kWh to the energy consumption. To put this number in perspective, the per capita energy consumption for Maharashtra in the year 2011-12 was 3.3 kWh per day as per Wikipedia.

Now, all we need for this unreplicated, highly dubious data to be published is a climate change perspective. A minimal reading of the Wikipedia page on Carbon footprints reveals that it is what we suspected it to be, a measure of the total carbon emissions by a population, system or activity. Further, it can be calculated easily in terms of carbon emissions per kWh of electrical energy with the knowledge of the source of fuel used. The official website of the Maharashtra State Electricity Board, in its Company Profile, lists thermal power as its major power source. Coal, as a fuel source, produces 955g of carbon dioxide equivalent per kWh of energy generated. Therefore, discounting transmission losses, the LHC at night leaves a footprint of 8.39×10^4 g of CO₂ equivalent each night, which is a whopping 3×10^7 g per year. The global carbon footprint average is around 9×10^6 g of CO₂ equivalent per household per year.

In an institute of this scale, it may not be possible to cut these excesses down drastically. In the proposed silk-stocking district of science, one needs to keep up appearances after all. However, every light switched off goes a long way in making lives a little less difficult the generations to come. If you had any doubts about the claim of the greenness of the campus, the authors hope to have confused you further through poor science and inconclusive results.

Women in Science

“In the future, there will be no female scientists. There will just be scientists.”

- inspired by Sheryl Sandberg

The Sentience Team decided to get a sneak peek into the lives of women scientists here at IISER. Here is what they had to say.

Despite similar publishing accomplishments, do you think gender makes a difference in terms of acceptance in academia, procuring grants, etc.?

Yes, it does. I have sometimes noticed the following during conversation with some colleagues: 1) If a woman scientist talks about collaborative research work during conferences or seminars, it is assumed by many that she is not a primary contributor to that work. The contribution of her male collaborators is more willingly acknowledged. 2) In departments familiar to me, people have doubted the credentials of the woman spouse when a couple was hired. Now, a careful look at the record of the women concerned would show that they were active scientists with a good publication record and completely deserved the position. In fact, their records were comparable to those who had been hired in sim-

ilar positions before at that department. But, some of my (male) colleagues referred to them as “baggage”. I must admit, though, that the above comments were made by colleagues who had no role in the decision making process and were not in a position to harm the women scientists concerned because of these perceptions. Nonetheless, I am sure that perceptions of this kind make women feel less accepted at their workplace. - Anonymous

No, I do not think that it makes a difference. The selection criteria for academic positions and grants for both male and female applicants is the same. - Dr. Richa Rikhy

Nancy Hopkins, a senior Professor of Biology at MIT, discovered that although women bagged academic positions, gender biases could heavily influence the relative resources allocated to them as faculty. MIT president Charles Vest publicly admitted that the data was so convincing that discrimination was indeed possible. For talented women, academia is all too often not a meritocracy. Despite several such studies, very few women or men are willing to admit that discrimination is a serious problem in science. Do you think that the science community is in denial regarding such issues?

I strongly believe that the science community is in denial regarding issues of gender bias. Very few women are able to rise to higher powers. It is still very much male-dominated.

- Anonymous

I find it difficult to believe that there could be such discrimination in science. I never witnessed any such case myself.

- Anonymous

I know that some of my past and present colleagues are uncomfortable acknowledging it. For one, the immediate implication is that, whether you are a male or a female scientist, you might be in your position unjustly/undeservedly. But the data stares you in your face, just because you have not experienced it yourself does not mean it does not exist, just like racism or any form of discrimination. Its stupid to claim that it does not exist.

- Dr. Suhita Nadkarni

Has the fact that academia is traditionally a male-dominated field ever deterred you, and/or how have you overcome that?

It is never easy being a female student in a male-dominated research institution. There are several negative side-effects (in comparison to the male students), of which the most common were (i) being patronised (ii) being ignored in social/academic discussions in academic gatherings (iii) being ticked off for ‘being rude’ when logically countering someone in a physics discussion. However, one soon develops strategies to deal with this. I developed an (almost defiant) independence as a student which made it hard for people to patronise me. This issue has not bothered me since.

- Dr. Suneeta Vardarajan

Yes, there are some men who do not like that women are trying or doing well but there are also some men, particularly quite seniors to you, who do not differentiate between men and women as far as work is concerned.

- Anonymous

No, it never has. Even though I observed it later, because my parents or teachers never talked about science as a male-dominated field, it did not bother me as much.

- Anonymous

As a woman in the science field, what are some of the greater challenges you have faced?

Most of the challenges relate to the fact that academia is male-dominated. It is very challenging for a woman to break into old-boys clubs. Also, I and several women I know have been asked personal questions (either on marital status, spouse or where the spouse lived and worked) either informally or formally before or during a job interview. I am not aware if my male colleagues were asked such questions. However, what I have found disturbing is the tendency to extrapolate from the answer and form conclusions - in one instance, one comment made was that the female applicant’s spouse would be unlikely to relocate for her because, as the person put it, ‘the wife would go where her husband is’! Needless to say, it affects hiring decisions. I have been informed that the UGC has come up with some guidelines for job interviews, one of which is avoiding such questions. It is a welcome step.

- Dr. Suneeta Vardarajan

After my son was born, I had to get back to work in 4 weeks. Given the logistics of feeding an infant, no clearly defined maternity leave, no child care at work, limited financial power of a postdoc and fatigue from lack of sleep, to resume work on demanding scientific projects in the lab was hugely challenging.

- Dr. Suhita Nadkarni

The biggest challenge is managing one’s own laboratory and the family. Striking the correct balance was critical. The other challenge was convincing one’s department not to hold meetings after work hours and over weekends. That may be the time when the male colleagues have time on their hands but as a woman, that is the time one needs to spend with one’s family.

- Anonymous

The names of certain authors have been withheld, as the authors were given a choice of maintaining anonymity. For any further queries, write to us on sentience.iiserpune@gmail.com

- The Sentience Team

Soapbox Science is a blog about women in science. The blogger recently posted the following, "Often, women are uncomfortable with speaking out about the challenges and problems they face in their careers. Speaking out or asking questions about balancing work and family life may signify lack of commitment to the job." In relevance to the above statement you may choose to answer one or both of the questions below: (a) What are your opinions on women honestly unwilling to address questions on balancing work and family life? (b) Do you have a child? How did that affect your career?

I think that the playing field has to be equal for women and men, for women to talk about family and work and not feel vulnerable about it. The fear that they will be targeted for it and the information might be used against them in their next promotion might be a driving reason for not being open and vocal about it. It's a vicious cycle. I have a child. Given that there more things on the plate, I have noticed that I tend to prioritize more in the hope of being efficient and not affecting my work a great deal and honestly, I sleep a little bit less.
- Dr. Suhita Nadkarni

From my experience I have observed that women make such a statement only among friends and not to colleagues/press. If they are facing difficulties and if they crib about it, the message conveyed is the following: She is not efficient hence the problem. Perhaps women avoid answering such question for the reasons I mentioned above.
- Anonymous

Have you ever felt the need to work harder to prove yourself or to be taken more seriously as a researcher in comparison with your male colleagues?

No I have not. - Anonymous

No. Never. - Anonymous

Yes, always. - Anonymous

Women should not need to address questions on balancing work and family. We and the world should recognise these and make provisions for women for balancing family and work in an effective manner. This is increasingly being addressed in many countries and hopefully, even though slow, a change will come about.
- Dr. Richa Rikhy

The first 2 years were very difficult but as my child grew older, managing family and my job became much easier. The institute also helped by giving child-care facility etc.
- Anonymous

I think that by posing this question you are being harsh to women unwilling to talk about balancing work and family. In most workplaces, there are very few forums to really express such issues. In any case, blogs aren't official.
- Dr. Suneeta Vardarajan

I feel the need to work hard anyways, it is not because of male colleagues, it is because I believe that there is no substitute for hard work in any field!
- Dr. Richa Rikhy

Some fields have a smaller fraction of women researchers than others. In such a case, women might get picked over their male counterparts with the same/better qualifications for a position, scholarship etc. What is your take on this?

This argument has been abused to hire men over women. Statistically, for every inappropriately hired woman there are several inappropriately hired men. Gender apart, hiring personnel, especially in science, is a hugely complex task. Work environment, value to the institute, collaborations, compatibility with other colleagues, teaching etc. are just some of the parameters. To pick on the CV alone is a bit foolish and short-sighted argument.
- Dr. Suhita Nadkarni

They may be doing so to keep a healthy male-female ratio in a workplace. Attracting more women to science is good for science because they say if you educate a woman, you educate a family. But one should draw a line between encouragement and favour.
- Anonymous

"Men are rational, women are emotional", is a perception commonly held by many. It has been the subject of several debates in the scientific community, as some believe this to be the reason for the slower progress/lesser involvement of women in science. Please comment.

Why would you and I as scientists even discuss a statement like this in the absence of any conclusive scientific evidence linking gender and scientific ability?
- Dr. Suneeta Vardarajan

It is true women are more emotional than men, but I strongly disagree that this has hindered women's progress in science.
- Anonymous

I do not think being rational and emotional are contradictory. One may take the decision rationally but if one is without emotions and behaves as if there are no emotions, I think that is a false impression one is trying to make.
- Anonymous

On a lighter note, how do you think tea-time gossip sessions among women in science differ from those in other fields or perhaps even men from the academic field?

Have not had the opportunity to do this. Coffee-time sessions are with both male and woman colleagues. - Anonymous

There are all sort of people everywhere and hence all sorts of teatime gossip everywhere. I think the only striking difference between gossip sessions among women in science is that we don't talk much about cosmetics/beauty parlour etc. - Anonymous

Talking about people you know is universal entertainment for all humans and as far as I can tell has no gender, cultural or professional boundaries. - Dr. Suhita Nadkarni

Sorry, I do not enjoy gossip. - Dr. Suneeta Vardarajan

Gossip is a gossip. Who like to gossip can be men/women, scientists/administrators. It's a part of life! However, too much gossiping is futile, and instead can be used for communicating with others and improving the atmosphere around. - Anonymous

Were there any role models/mentors/ key figures that inspired you, particularly any women?

Swami Vivekanand. - Anonymous

My mother. - Anonymous

My mother, who has a Ph.D in mathematics, and who is one of the most rational, independent thinkers I have known.
- Dr. Suneeta Vardarajan

I have always found inspirational women in my close vicinity all thoroughly the years, whom I admired among things for their honesty, warmth, strength, perseverance, sense of adventure, resilience.
- Dr. Suhita Nadkarni

What do you have to say about the "nerdy girl" stereotype?

Who cares? - Dr. Suneeta Vardarajan

I think over the period of time either one changes her "nerdy girl" image or the not-so nerdy people around you start accepting you the way you are.
- Anonymous

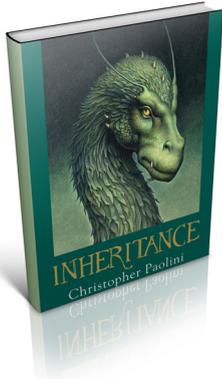
The nerd is such a one dimensional description for anyone that's interesting.
- Dr. Suhita Nadkarni

Have not come across any! - Anonymous

Fun Trivia

Inheritance Cycle

Bharath Krishnan



Eragon was the humble attempt of fifteen-year old Christopher Paolini to express himself in the world of fiction at a time when J.K. Rowling was hailed as its queen. The innovative plot, catchy back-story and beautifully detailed characters very soon won the hearts of many fiction enthusiasts who eagerly welcomed this change. Eragon was followed by three other books, namely *Eldest*, *Brisinger*, and *Inheritance*, which constitute the Inheritance Cycle.

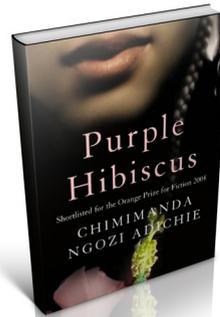
Paolini's story unravels in the magical land of Alagaësia inhabited by four prominent races viz. humans, elves, urgals and dwarves. The plot revolves around a group of individuals known as the Dragon riders. The Dragon riders share a very special bond with their exquisite beasts, the dragons. Eragon begins with a gripping prologue that introduces the reader to the tyrant Galbatorix who overthrew the council of Dragon riders and proclaimed himself to be the Emperor of Alagaësia. The protagonist of this series is a young boy named Eragon, who finds a mysterious blue stone which changes the course of his life. This stone turns out to be a dragon egg which hatches into a blue dragon called Saphira, who chooses Eragon to be her rider. The chronicle articulates the cascade of tribulations and challenges that Eragon must face to overthrow Galbatorix and return peace to the land of Alagaësia. Paolini adds a great deal of precision and flavour to each book by carefully describing minute details and the attributes of every character and scene.

I personally believe that the Inheritance Cycle is an exclusive blend of magic and supernatural phenomena. Such an extraordinary combination is not witnessed very often and it is the craving of all authors to be able to construct such a magical world with nothing but words.

Photo: luxuryreading.com

Purple Hibiscus

Parijat Bannerjee



The Purple Hibiscus is an outcry against blind faith and fanaticism in the name of religion. Fifteen-year old Kambili lives in fear of her father, Eugene Achike, a charismatic Catholic patriarch, who appears generous in the eyes of his people but has a different image at home. Kambili and her brother Jaja are not allowed near anything 'ungodly'. Failure to abide by rules results in severe punishments. The neighbours know that Kambili's mother has not been blessed with a third child. Poor Eugene, a person of his standards will have to make do with two children because of the shortcomings of his wife, they would say. She and her brother often witnessed their Mama silently bear physical abuse from their father, the souls of their unborn siblings being washed away with the blood that trails across the floor of their parents' bedroom.

Aunt Ifeoma, Papa's sister, is open-minded with liberated views on life and God. Kambili's visit to her aunt's opens the window that has been closed all these years, letting fresh air fill her life. She learns that it isn't wrong to let others, even elders, know that you do not agree with what they say, that it isn't a sin to laugh, to take care of your dying grandfather even if he isn't a Christian.

The story vividly paints the unfurling of a girl into womanhood. There is love and hatred, oppression and liberation, silence and laughter, making the novel complete in every way. With clever subtlety, Adichie rips off the curtain that screens the hypocrisy involved in religion and exposes the futility of blind faith and religious intolerance.

Photo: <http://i.bp.blogspot.com>

Eluveitie

Naven Narayanan

For many music lovers, the perfect balance of melody and rhythm in a song or an album has proved to be a nasty conundrum. As a 'veteran' metalhead who cringes whenever he hears the comparison of metal to noise, I began to search for something with a bit more melody. This forced me to explore less brutal forms of this genre, more generously laced with melody and highly catchy riffs. Luckily, I happened to stumble upon the album 'Slania' by the Swiss folk metal band Eluveitie. What sets this band apart is the addition of instruments like the hurdy-gurdy, bagpipe, and violin to the usual screaming vocals, the insane guitar riffs and of course the mesmeric drum solos. Further research has led me to believe that this in fact is one of the few genre-defining albums of folk metal. The lyrics of this band are often in the now extinct language of Gaulish. The album begins with the brilliant 'Primordial Breath' which leaves you at a loss for words. This is followed by my personal favorite, the catchy metal

anthem 'Inis Mona' where the usual guitar solo has been replaced by a flute solo and as a result, is just magnificent. Songs like 'Grey Sublime Archon' and 'Tarvos' may sound mysterious as the electric and the folk instruments are given the same weight. 'Slania's song' is also an amazing mixture of folk and metal elements with male growls and hypnotising female chants. The album concludes with the haunting 'Elembivos'.

For the avid metal listeners out there, don't expect any mind-blowing technical work on the instruments. The seamless blending of the folk instruments and the guitars is phenomenally captivating and more than makes up for whatever technical deficiencies they may have. For those who just like music without an inclination towards any one genre, their music is profound and haunting, simple and efficient. It will surely leave you spellbound.

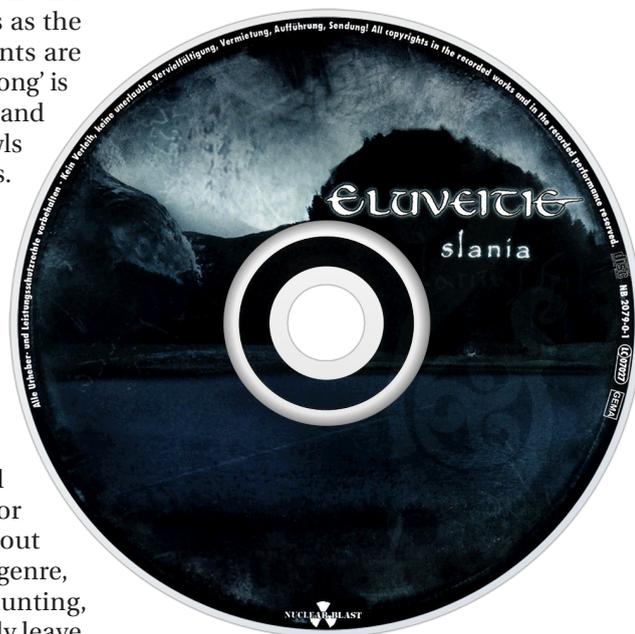


Photo: www.fansshare.com

Fandry

Mihir Kulkarni & Prasenjeet Kawale



Photo: <http://www.gomolo.com/>

Fandry is set in Akolner village near Ahmednagar, Maharashtra in current times. Jabya (Somnath Awaghade) a teenage boy from an 'untouchable' (Kaikadi) family has a crush on his 'upper-caste' classmate Shalu (Rajeshwari Kharat). Jabya doesn't accept the job forced onto his family by the caste system, but somehow it seems like he doesn't have much of a choice. Without making a direct comment on the caste system, the film shows these facts silently.

For an audience that is used to watching cinema solely for entertainment, the plot of this film, initially, isn't appealing. But as the story progresses, it creates a sort of chaos in our minds and we get stuck to our chairs. The word 'Fandry' means pig in the local dialect but the film portrays a broader meaning of the word, encompassed by the existence of the people who use it, their feelings and their sorrow. In the last fifteen minutes

of the movie, the pig-catching sequence and the paintings of social reformers bring us to a standstill and force us to think about today's structure of society, as well as one's own hybridised modern-orthodox mindset.

In his directorial debut, Nagaraj Manjule shows his skills of extracting the same quality of performance from debutants as well as veterans. The acting is not at all dramatic. The dialogues are natural and so is the screenplay. This makes Fandry seem like a classic Iranian movie. Further, the usage of symbolism in the movie, its background score and cinematography, make Fandry an interesting and thought-provoking watch.

In the era of Bollywood masala movies that portray fantasy on the screen and get a large response, Fandry shows reality. Such movies are a rarity as they lie beyond conventional rating schemes. Do make time for this milestone Marathi movie.

An Award to(o) Many

Dr. M. S. Santhanam

“This may have happened or may not have happened, but it could have happened”

- Mark Twain

It all started with an innocuous remark by the Prime Minister at a non-descript function in Guwahati. The only local English daily that reported this event reached Delhi a week later with a headline, “PM decries lack of humanism” tucked away in a corner of page 7. The PM reportedly said that the innate potential in every individual is enormous and should not be judged through the narrow prisms of nationality, caste, creed, language or even awards and accolades won or lost. In the stratified power corridors of Delhi, this speech would have gone unnoticed if not for the brewing rivalry between two cabinet colleagues. It did not help that one of them was up for an award for his ‘services to the nation’. The other had to retaliate, and the answer was the ‘Awards Regulatory Authority’ (ARA), to regulate the mushrooming ‘Awards Syndrome’. Earlier, the Supreme Court too had questioned the selection procedure for the Padma awards, further justifying the need for this sort of authority.

The draft preamble of the bill for the ARA, as it came to be called, cited the PM’s Guwahati speech, talked of the lack of humanism in governing human affairs, about how awards are colonial hangovers, how the Mahatma did not win the Nobel, how most awards are fixed by coterie, the need to reward true excellence in every field of human endeavour; hence the imperative to regulate indiscriminately mushrooming awards. As a legal document, it was nearly unreadable but it still kicked off a national debate.

The news channels had ‘breaking news’ about the ARA ticking. Soon, letters started pouring into newspaper offices; ‘opinion makers’ dominated the prime-time TV debates, celebrities not known for anything in particular gave their opinions on Twitter, students and workers held protest marches. One leading English newspaper even asked popular Bollywood stars on what they thought of the ARA bill. The proxy reply

received from their PR agents was duly published in page 3. Among MP’s, the battle line, cutting across party colours, divided them into those expecting an award and those who were not.

Similar divisions existed in every field ranging from arts to even spirituality. The minister’s announcement had launched a full-blown war between the award-haves and have-nots.

The ruling party was unprepared for such sentimental reactions but did not mind the clamour. After all, the ARA announcement helped shift the focus away from the embarrassing revelations of the previous week. Finally, the government’s chief trouble shooter, long used to handling such burning issues, quickly brought some sanity. He announced that a committee comprising of experts from several fields and chaired by a retired Supreme Court judge would study the ARA draft and suggest changes within a month.

The first sitting of this omnibus committee saw no convergence of views. Businesses wanted awards to be free of government control, preferably in corporate control if possible. Some scientists scoffed at this idea. They were rebuffed saying scientists feared losing control over the awards that they bestowed on themselves. Artists felt that the standards for awards in other fields were pretty low. Leftists believed that all this to be a ruse to allow imperialists to dictate who gets which award. Trade unions wanted more awards to satisfy everyone. Sport bodies declared that they would not tolerate government interference in awards through ARA legislation. Opinions depended on whether the member was expecting an award or not. In three weeks, the committee had clocked 304 hours of deliberations and meetings with stake holders, costing nearly ₹8 crores.

Under pressure to submit a report quickly, the committee assembled all the disparate opinions. It ranged from

‘banish all the awards’ to ‘give awards to everyone’. Then came the spark that seemed to unite almost everyone. The idea was to formally approve a hierarchy for the existing awards in all fields, calling them bronze, silver, gold and platinum classes. Every existing as well as new award instituted by the government or a private body should mandatorily get a no-objection-certificate from the ARA. The ARA will in turn decide where in the hierarchy the new award will fit in and issue a notification. Then, every organisation can decide what class of awardees they would like to deal with. Individuals can declare their ARA class wherever it mattered. “This helps to identify bogus awards from the real ones”, said a bureaucrat. As a sop, more awards were to be approved for various sundry purposes. The minor section of dissenters who wanted all the awards abolished were easily brushed aside. Finally, this argumentative committee submitted a report running into 2647 pages with 37 annexures.

The minister was not amused at all. He was not going to tolerate his rival getting an award that might belong to a higher class. He trashed the report as ‘creating more divisions among the people’. By then, the media had moved beyond the ARA and was occupied with a riveting divorce story of two film-stars. A face-saving formula was needed to give the entire episode a decent burial and that was never in short supply. It was agreed that the ARA would become a low-key ombudsman for government instituted awards. “It will function until the craze for awards exists”, said a spokesperson. Soon all this was forgotten in the crowded contemporary history of India. One more institution was thus born.

As Mark Twain said, “This may have happened or may not have happened, but it could have happened”.

Editorial

It has been three years since Sentience was born, and we've had a plethora of experiences thanks to the newsletter since then. Most of them were enjoyable and exciting, some were not so savoury, but all of them were instructive in their own way.

It's with some sadness and reluctance that we announce that Sentience is going on hiatus, but it is, as these things are wont to be, for the best.

Sentience has evolved and improved throughout its life, and all its members have tried to maintain and raise its standards in whatever way they could. We reached an important milestone when we procured our own funding and became independent of the administration, enabling us to be open about things we thought needed coverage without having to worry about a conflict of interest. We

While it is certainly our responsibility to check the material we print, we had never before deemed it necessary, being a small-scale newsletter that did not go into the depth of that particular aspect of publishing. We trust our contributors to provide us with their own original work, and we still do, though we will now be more vigilant about the same.

Another hardship we have faced is reacting to the apparent lack of readership we have. We have no way of knowing who reads Sentience unless they tell us or send us feedback, or whether we are making any difference to anyone at all. Much of the time we assume that only the odd person at the canteen picks up a copy while waiting for their friends to show up- this is, of course, all turned on its head when we print something controversial or unpalatable to a certain group,

even. While we took polls, we did not take enough, and we surveyed only one part of the section of people that we wrote about. As a result, the content of the article offended with the unintentional generalisations it made, and the broad strokes with which we painted a group of people that we, without doubt, have respect for. Interpretative journalism is fine, but as we've come to see, needs to be backed up with some solid facts.

Wading through the mess, we came to observe something about the batch dynamics here at IISER. Many of the impressions about a batch of students is passed on through word-of-mouth, and any impression, true, false, bad, or good, tends to stick around in the minds of those who hear of it, defining that group's image in their heads for all of eternity (or some similar length of time). After

“

Interpretative journalism is fine, but as we've come to see, needs to be backed up with some solid facts.

”

found regular contributors and managed to get a steady stream of articles for each issue. We played with formats and tried to improve our content and editing styles. We felt happy when people gave us their two cents about what went into an issue, when they told us that they read one. When it was begun a few years ago, it was the second newsletter of its kind started by IISER students, the first having been discontinued owing, among other reasons, to the lack of manpower. It is a similar issue that we face now.

At this time, we feel that a little introspection is due. We have struggled in a number of respects, and we'd like to share those issues with our readers. Oftentimes there are technical errors and oversights in terms of editing, and those are simple errors on our part. We have, in the past, edited articles rashly in an effort to fit them into the space we had available. We had also omitted to get our edits approved by the authors, in the process, losing contributors. More seriously, there has, in the recent past, been an oversight with respect to plagiarised content published in Sentience's pages.

in which situation it feels like the whole of IISER Pune has read the offending article. While it is nice to know in these cases that someone is reading and thinking about Sentience, it also teaches us to be more cautious about writing. We are not at all about unnecessary appeasement or pandering to people who don't like what we say, but we do realise (and sometimes this realisation has been hit home the hard way) that there is a difference between writing carelessly or irresponsibly and stating unfortunate truths that we have discovered through proper research.

Coming to the issue of proper research, we want to clear the air on the last editorial we printed- we are aware that it has hurt sections of people. The intent behind the text was not to offend or to chastise. It was meant merely to appreciate the growth of IISER, the atmosphere here, and look forward to further growth and improvement of the student culture and mindset. The article clearly did not come off that way, and we recognise our failings in that respect. We acknowledge that the background work that went into the article was insufficient, half-baked

all, when you don't meet someone, what you hear is often all you have to picture or imagine them with. We fell into this trap quite easily, but have learned from it. We want Sentience to be a tangible link between batches, one that creates no false impressions, and one that can be trusted.

When Sentience comes back (and it will, we promise!), it will be better than ever. Lessons have been learned, and with the experience we've gained and the fresh faces that will come in next semester, we're optimistic and expect the revival to come soon. It's sad to say goodbye to something we've worked hard for, and especially now that we've been battle-scarred (to use some fanciful terms). We want to thank everybody who made Sentience possible- those who supported us with funds, with words of encouragement, advice, and admonishment, those who told us what they liked and what they didn't, and those who contributed and gave us their input. We thank you, and we bid you adieu.

The Final Countdown

Avani Gowardhan

The 5th year is an extremely intense one, punctuated by bouts of melancholia and moments of great highs (some even non-pharmaceutically-induced). Uncertainty haunts the steps and fear looms large, but at the same time there is an exhilarating anticipation about what the future holds. Graduate studies? A job? A glamorous globe-trotting best selling-author lifestyle?

By now, you, the current 4th years, have a vague picture of the 5th year. You are all set to work with Prof. Smith or Dr. Wesson, on the revolutionary topic of discovering zero. The future may be uncertain, but it's also very far away.

One of the most common questions that you face at IISER, especially in the 5th year, is whether you want to continue in research. Deciding based on the summer projects that most of you have done sometime during your four years is a bad idea. Typically in those, the guide tells you what to do, and you do that. Very few of us actually think up questions, design experiments, and think of ways to attack the research problem. This is where the 5th year project comes in. It is a precursor to life as a graduate student, and a good clue of what the future will be like. It is by turns hectic, exciting and frustrating; but never boring. You are supposed to solve problems yourself and think up new things to do. The project evolves throughout the year in a way you never see in a short gig as a summer student.

Apart from exceptional circumstances, such as not getting along with your research group, enjoying (or not) your 5th year project is an excellent indication of whether you are cut out for life as a graduate student (or not). For those who prefer clarity to nebulous emotions, there are wonderful books like Peter Medawar's 'Advice to a Young Scientist'. There are dozens of articles¹ that deal with the misconceptions prevalent in the Indian education system, such as the popular belief that getting good grades is correlated to being a good researcher. It's not. There are also lengthy discussions on the pros and cons, on the future prospects, on the difficulty and risk, and on the inevitable comparisons to what 'friends in industry' are earning, but far fewer of these are actually valid concerns.

If you do decide to do Ph.D, there are a plethora of websites that tell you how to go about it. How to pick universities, how to apply, how to write statements, which exams to give, how to prepare for the aforementioned exams, how to give the exams, and so on. They go all the way to 'What to do if you submitted Statement for University A in application to University B'. I sincerely hope nobody needs to look up that one.

However, in the context of the 5th year, the chief difficulty comes in handling the project work along with the whole process. There is a lot of work to do – which field? Which topic? Which group? Which University? Even which country? The absolute best way to decide on the general field is to read articles. Discussions with Prof. Smith are also a great way to get an idea of the latest work. Though difficult in the beginning, it is great fun once you get the hang of it. Unfortunately, fun is relatively in short supply on the whole, since the nitty-gritty of the applications tends to get on the last nerve. There will be exams, statements, resumes, recommendation letters, transcripts, deadlines - with all these balls to juggle, it is vitally important to plan well and plan early.

One of the most obvious concerns are the exams such as the GRE, the TOEFL, the NET, the GATE ... the list goes on and on. Since we are used to look upon tests as gauges of intelligence since high school, we tend to take them far too seriously. As far as I know, none of these seem to be designed to test intelligence; rather, all are aimed to test our training. Though generally not very important, they are slightly more so for us, since IISER is a relatively new institute. However, the interest and motivation that you demonstrate are still much more important than exam scores.

On the other hand, the importance of picking a good mentor for your graduate thesis is often overlooked. There is an excellent review on this subject written by Ben Barres, a Professor at Stanford University.²

You should also reflect carefully before jumping onto the 'going abroad' bandwagon. Institutes such as TIFR or IISc are excellent places for graduate study; far better than most of the nondescript universities scattered around the globe, whose only redeeming feature is that they are 'abroad'. A Ph.D is a long-term commitment, so you should apply only to places you are really interested in.

To put things in a nutshell, there is a lot of work, a lot to learn and some pretty difficult decisions to make. At the end of it all, it feels like a battle has ended and that you have barely made it through alive. Like the ancient mariner, only devoid of dead fowl, we all want to tell our stories and give our juniors deep insightful advice.

Links :

1. <http://www.insightiitb.org>
2. <http://www.cell.com>
3. "To PhD or not to PhD.." by Jorge Cham www.phdcomics.com.



Rooted in Hymns

Anonymous

The author Dan Brown said, “History is always written by the winners. When two cultures clash, the loser is obliterated, and the winner writes the history books” - books which glorify their own cause and disparage the conquered foe. As Napoleon once said, “What is history, but a fable agreed upon?”

Have we lost touch with our own history? Do we really know the magnitude of contributions made by our ancestors? Here are two instances brought to my attention by an influential friend.

Encryption is a fundamental tool for transferring information securely in modern computing systems. From day to day applications like internet banking to more exotic ones like spying, the ability to encrypt information is critical for its security and to be able to “store” it easily. Authors in ancient India used a system of encryption which mapped each Sanskrit alphabet to a number – the technique was known as the *katapayadi* system. The encryption rule mapped each number from 0 to 9 to a set of Sanskrit alphabets as shown in the table below.

Those who’ve studied encryption and cryptology will realise this encryption is a “one to many” function and therefore it is not bijective. As a result it cannot be used in the same way RSA cryptography works today – where one needs a public key and a private key – and which requires the inverse function to be unique. However, the objective of this encryption technique was not to “hide” information, but rather to “store” complex mathematical data in an easily accessible format. Here is an example:

“Gopi bhagya madhuvrata
Srngiso dadhi sandhiga
Khala jivita khatava
Gala hala rasandara”

This text to the left is a seemingly innocuous *shloka* which seems at first glance to have purely mythological significance. However, if one replaces each Sanskrit alphabet in this *shloka* with its corresponding numerical equivalent as defined in the table below, i.e. –

कटपयादि संख्या - kaTapayAdi for Melakarta Ragam Names & Numbers									
1	2	3	4	5	6	7	8	9	0
क	ख	ग	घ	ङ	च	छ	ज	झ	ञ
ट	ठ	ड	ढ	ण	त	थ	द	ध	न
प	फ	ब	भ	म					
य	र	ल	व	श	ष	स	ह		
ka	kha	ga	gha	nga	cha	Cha	ja	Jha	nya
Ta	Tha	Da	Dha	Na	ta	tha	da	dha	na
pa	pha	ba	bha	ma					
ya	ra	la	va	sha	Sha	sa	ha		

pa = 1, kha = 2, ga = 3, bha = 4, ma = 5 and so on. The string of alphabets gets replaced by the string of numbers- 31415926535897932384626433832792

Adding a decimal place next to the first number, i.e. 3, this string of numbers is the earliest documented value of pi accurate to an astounding 30 decimal places!

A massive driver of the industrial revolution was the invention of batteries which helped generate electrical energy from chemical reactions. The simplest single cell battery, the voltaic cell, was invented in Europe by Alessandro Volta in the 1880s. The following is an extract from the ancient Indian text *Agastyasamhita* written over 2000 years ago:

“Sansthapya Mrinmaya Patre
Tamrapatram Susanskritam
Chhadyechhikhigriven Chardrarbhih
Kashthpamsubhih.
Dastaloshto Nidhatavyah
Pardachhaditastah
Sanyogajjayte Tejo
Mitavarunsangyitam”

This translates as, “Place a copper plate in an earthen vessel. Cover it with copper sulfate and moist sawdust. Put a mercury-zinc sheet on top of the sawdust to avoid polarization. The contact will produce an energy known by the twin name of *mitra-varuna*.”

If you remember high school physics, you will realise this is essentially a description of a voltaic cell. Instead of calling the output electricity, it refers to it as *mitra-varuna* energy.

As German philosopher Friedrich Nietzsche said, “There are no facts, only interpretations”.

Erwin Schrodinger, today known as the father of Quantum Physics, noted, “There is no kind of framework within which we can find consciousness in the plural; this is simply something we construct because of the spatiotemporal plurality of individuals, but it is a false construction... The only solution to this conflict, in so far as any is available to us at all, lies in the ancient wisdom of the *Upanishads*.”

References:

1. Mein Leben, Meine Weltansicht [My Life, My World View] (1961) Chapter 4
2. <http://mysterieexplored.wordpress.com/>

Until we meet again!

Dear Readers,
We would like to inform you that Sentience is being discontinued for the foreseeable future. The Sentience team has built a great rapport with its readers and within itself. We are thankful to those who provided funds, to those who gave us words of encouragement and criticism alike, to those who contributed articles, and of course, to you, the Reader. We have strived to maintain and improve our standards. We are not dying, but are hibernating, and will be back with the “next” issue, as early as possible.

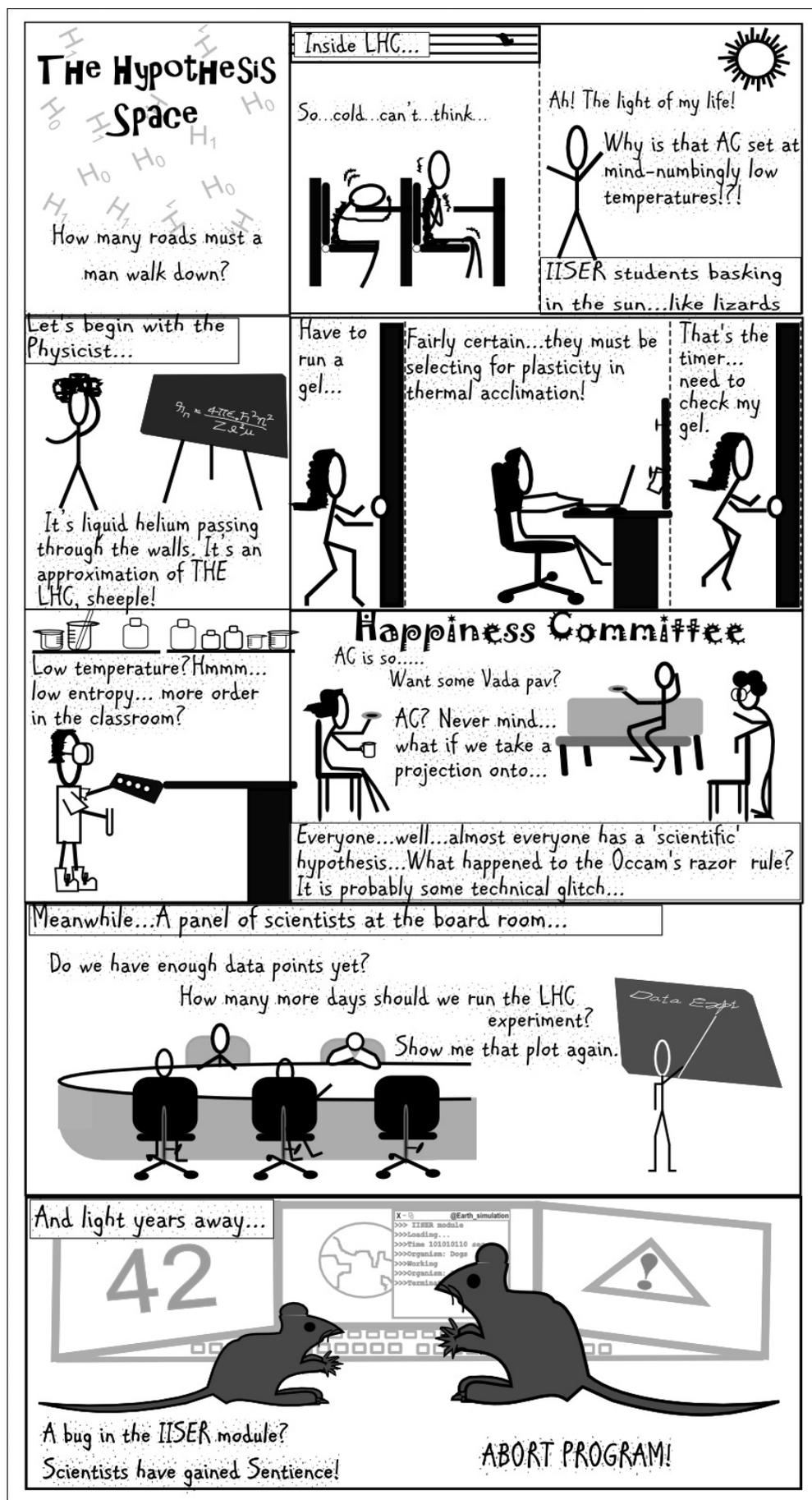
Quillingly yours,
The Sentience Team

The Hypothesis Space

The Lion, The Witch and The Wardrobe

Foodie Corner

Pavan Iyengar



I recently went to Tien with my friends for a snack bite. In contrast to several other foodie joints, Tien is known more for its health food, both vegetarian and non-vegetarian. Since I like to compare tastes and styles, I decided to order a Caesar salad to critique it with the one I had at Greens and Olives. I felt the salad at Greens & Olives to be much better inspite of being really expensive. The tastes were more varied and the ingredients were more exciting.

My friends had grape juice and sandwiches, which were nice too. In the beginning one might find the aroma a little weird but the ambience is okay. A visit to Tien can be pretty informative as they have snippets of information and news about healthy habits and choices of food. But let me warn you, these healthy choices can be a tad expensive on this side of town! While the juices and smoothies range from ₹80 to ₹200 and the Caesar salad burnt a hole of ₹160 in my pocket. I would have liked it better if they had mentioned the health benefits of Caesar salads, for this would have enhanced the experience. Well, my rating for Tien is 3 out of 5 for this visit!

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