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SENTIENCE

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□e K-Fever!

Photo : Manish Kumar Tekam

Sahana Srivathsa

Months of midnight meetings and everlasting discussions, week a□er week of dedicated, tiring practice, hours of incessant phone calls, a myriad of minutes spent in achieving perfection, innumerable seconds of anxiety, anticipation and amazement, added to bagfuls of creativity and style, all culminated in the three most awaited and celebrated days of IISER Pune; Karavaan, the central focus of all our lives for the duration of the past month. In a earnest attempt to make Karavaan bigger and better, each and every aspect of these three days was meticulously planned and debated over weeks in advance by the un□agging K-Team and the Club heads.

Psychedelia was the theme, and expression of the unique was the game. Adding to the □avour were the wildly popular and innovative events like Band Wars and Nerdy Night, and using a □ash mob for publicity; to the funky decorations that sprouted up overnight, courtesy the elves of the Art Club. Joining in the fun and frolic, we had with us a brigade of students from our sister institutes, IISER Trivandrum and IISER Bhopal, apart from a multitude of students from colleges all around Pune and Mumbai, who were fairly impressed with the □nesse with which most events were conducted. The Friday night fervour was inaugurated with spectacular and diverse showcase performances, which included classical Bharatanatyam, of both the original and fusion variety, melodious singing which struck a chord deep within the audience's hearts, dance numbers by undergrads and Ph.Ds that had everyone's feet tapping, the extremely skilled and novice mime act which had everyone laughing their heads o□ and a blazing dance performance by the IISER Dance Club. IISER's very □rst rampwalk, of the nerdy variety of course, followed this with each pair exuding the aura of studiousness, vying for the coveted title of Mr. & Ms. Nerd.

Saturday and Sunday saw a □urry of activity at both HR-4 and the LHC where events by all the Clubs were held throughout the day. Junk Art and Paintopia were the Art Club's most popular events, with the Disha kids stealing the prize and impressing the judges with their creativity. Be it solo, a duet or a group, the ever accomodating Dance Club let you have it your way, witnessing □erce competition from colleges all around India to see who's got the grooviest moves. Building up to the ultimate □nale with weekly themes, the Karavaan Quiz saw a great response from outside IISER, with only one home team qualifying for the □nals. □e assiduous Drama Club, with their excellent preparation and regular meetings, apart from putting up an extremely well received street play, also organised the hugely popular

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Photo courtesy: Photography Club

A Nobel Venture

Nilima Walunjkar

IISER, in association with NCL, hosted the public talks on the 2013 Nobel Prizes on the 8th of November. The ese annual talks expound the discoveries and extraordinary ideas that were awarded the Nobel.

The talk series commenced with an introduction to the Nobel Prizes by Prof. Raghuram, which consisted of trivia about the Prizes. He lamented the absence of a Nobel for Mathematics, which was due to the fact that Alfred Nobel thought that Mathematics was of little consequence.

The first talk was by Dr. Richa Rikhy, who elucidated in simple words the complex machinery of vesicle regulation, and talked of the different model systems used by the Prize winners. Next up was Prof. Pradeep Apte from Fergusson College, who had kindly consented to lecture on the Nobel awarded in Economics. He talked of how bizarre it was that three experts with opposing views had jointly won the Nobel, aptly christening them Amar, Akbar, and Anthony. He provided an insight into Economics to the IISER audience who, while familiar with its byzantine equations, are not well versed with the jargon.

After a short break, and a refreshing cup of tea, Prof. Sunil Mukhi began his presentation of the Physics Nobel. He spoke, not of equations (they were printed on his shirt) but of the story of the Standard Model and the Higgs Mechanism. With amusement, he noted the length of Peter Higgs' papers (one to two pages long) and ruminated on why the ATLAS and the CMS groups, the discoverers of the Higgs particle, had not received the Nobel.

Last up was Dr. Suman Chakraborty from NCL whose post-doctoral adviser was none other than one of this year's chemistry Nobel laureates, Prof. Arieh Warshel. He showed the audience an academic tree and observed how most Nobel laureates had doctoral or postdoctoral advisers who were laureates themselves. He then commended the Nobel Prize committee for awarding the prize to computational chemistry; a field, which in his opinion, hadn't been given due credit.

The series ended with comments by Prof. K.N. Ganesh, who spoke about how these talks captured the spirit and the enthusiasm that surrounds the announcement of a Nobel Prize and hoped that this tradition would continue in IISER for years to come.

The K-Fever!

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event Dumb Charades as well as a few unique events like Use Me Well. An integral part of everyone's life is music, but only a few have the talent it requires to produce wonders through it and move the audience. Drawing out this innate skill of an elite few, the Music Club challenged classical musicians to their limit in Meet the Beat and tested the participants' knowledge of Bollywood music in a fight-till-the-end in *Antakshari*. Clicking away and capturing every delightful moment, and otherwise, of those three days was the Photography Club, who displayed their best snapshots in a special gallery on the top floor of the LHC, along with the work of IISER's budding artists, apart from organising three highly creative events. Wracking their brains for multiple sleepless nights, the Literary Club conducted a stew of events, including a novice event JAM, which had everyone stuttering and stumbling over their words, as well as a Potpourri for all the self-proclaimed literary enthusiasts. The highlight however, was the Midnight Treasure Hunt which lasted till 3 AM on Sunday morning, with more than one participant calling the hardworking organisers sadists.

Saturday night was dominated by a succession of musical performances, interspersed with a hilarious Mad Ads display, which for the first time included both genders, promoting C&T Deodorant with a performance that had the audience in splits. The mood for the evening was set with a rendition of Carnival of Rust followed by a heart-wrenching duet of "Skyfall" and "Set Fire to the Rain". Two other IISER bands delighted the audience by paying tribute to Aerosmith and

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Academic Buzz

1. The Metre Wavelength Sky: Celebrating 50 years of Radio Astronomy at TIFR
Dates: 9th Dec 2013 to 13th Dec 2013
Location: Pune, India
Topics: Radio Astronomy Low Frequency
URL: http://www.ncra.tifr.res.in:8081/mwsky/

2. Jawaharlal Nehru Centre for Advanced Scientific Research Summer Fellowships- 2014
Location: Bengaluru, India
Deadline for applications: 20th Dec 2013
URL: http://www.jncasr.ac.in/eobu-main.php/Summer-Research-Fellowships-Programme/15/1/12/

3. Annual meeting of the Astronomical Society of India
Dates: 20th Mar 2014 to 22nd Mar 2014
Venue: IISER Mohali, India
Topics: Astronomy, Astrophysics
URL: http://www.asi2014.in

4. GWPAW – Gravitational Wave Physics and Astronomy Workshop
Dates: 17th Dec 2013 to 20th Dec 2013
Venue: Inter University Centre for Astronomy and Astrophysics (IUCAA), Pune, India
Abstract: It is a general meeting on the Physics and Astronomy of gravitational waves, techniques for their detection, and interpretation of data and results.
URL: http://www.iucaa.ernet.in/~gwpaw/

5. 27th International Carbohydrate Symposium
Dates: 12th Jan 2014 to 17th Jan 2014
Venue: Indian Institute of Science, Bangalore
URL: http://www.ics2014bangalore.in

6. TechSym – 2014 IEEE Students' Technology Symposium
Dates: 28th Feb 2014 to 2nd Mar 2014
Venue: IIT Kharagpur, West Bengal
URL: http://ewh.ieee.org/sb/kharagpur/iit/TechSym2014/

Science is in the Air

Sourajit Basu

Science Radio, a student initiative, is a community radio show by the Media Centre of IISER Pune, with the purpose of popularising science via mass communication. Presently in collaboration with Pune University's community radio, Vidyavaani (107.4 MHz), the show has a variety of segments on topics ranging from the latest in science news to interviews with eminent scientists, visits to research laboratories in and around Pune, to reviews of popular science books!

The target audience is, as the name suggests, the community around us. With this as a cornerstone, the content delivery, though scienti□c in nature, must appeal to the community at some level.

We plan to air two □□een-minute episodes every week. The complete packaging of the show, right from interviewing, to anchoring and editing, is done by the students working at the media centre. It is is no easy task and more helping hands or voices are always welcome. The media centre is located in the central wing, on the 2nd □oor of HR-4. If you are interested or willing to learn, feel free to drop by the media centre and interact with us.

When is it going to air? Well, you don't have to wait very long! We went on air for the □rst time on the of 20th November, 2013 and the segment will be broadcasted twice, every □ursday at 9:15 AM and 3:15 PM on Vidyavani-107.4 FM for 15 minutes. The range is within a 10 kilometre radius of Pune University's broadcasting station, so IISER Pune falls well within its coverage. You can even catch us on your mobiles!

This project is still in its infancy and we are looking to grow. With your help and inputs, we can certainly make it a top-notch show. You can write to us at radioiiserpune@gmail.com for comments, feedback or input. We look forward to hearing from you!

Art Form of the Month - Yakshagana

V R Shree Sruti

Yakshagana, which translates to 'song of the yaksha', is a unique folk theatre-form from the coastal lands of Karnataka that traces its origins back to the 16th-17th century. It is unique in its way of amalgamating the di□erent elements of music, dance, make-up, costume, and stage presence. The important features of Yakshagana are the music, the literature, the costumes and the ornaments used.

The music has two components, the raga and the tala. The Yakshagana raga is based on □ve or more basic notes and is o□en considered to be a precursor to the classical ragas. The Yakshagana tala is structurally di□erent from the tala of classical music, with a single composition being set to on or more talas. Yakshagana has its own literature in a collection of poetry referred to as Prasanga or Padya.

Costumes and ornaments carry chief importance in any Yakshagana performance. Costumes, ornaments, and make-up are o□en very intricate, the levels of which depend upon the character being portrayed.

Traditionally, ornaments are made from light wood, covered in gold foil and coloured stones, with additional mirrorwork to increase re□ectivity. The costume for male characters includes a *kirita* (the headgear), a *kavacha* (vest), *buja keerthi* (armlets) and a *daabu* (belt). A unique *kachche* (*dhoti*) in red, orange and white checks, padded with cloth to make it bulky, completes the male costume. The female costume includes the saree and decorative ornaments. Originally, the female roles were also played by males, though female artists are prevalent in the arena these days.

There are two main styles in Yakshagana, the *Badagutittu* and the *Tenkutittu*. The *Badagutittu* style hails from the northern districts of Uttara Kannada, and emphasises on the facial expressions and dialogues. The *Tenkutittu* style, which is prevalent in the southern districts, of Kasaragod, Coorg and certain districts of Udupi, involves more jumps and spins (called *dhingina*). The in□uence of Carnatic music on the *Tenkutittu* music is also very apparent.

A typical Yakshagana performance starts at dusk and lasts the entire night, ending at dawn. Di□erent *ragas* are played to characterise di□erent times of the night. A performance involves a dance, a dialogue group and a background music group. The Bhagavathar (the narrator) is the lead singer and is accompanied by musicians on the maddala (drums), *pungi* (pipe), harmonium, and *chande* (loud drums). Dancers enact the story as it is narrated, with on-the-spot innovations, bringing in a distinct □avour to each performance.

O□en referred to as Indian opera, Yakshagana is an inimitable art form that forms a signi□cant part of India's rich heritage.

Notes from a Neurobiologist

The Sentience Team went digging to find out what makes Dr. Raghav Rajan, the ever-smiling neurobiologist's, grey cells tick. Here are a few snippets from our conversation with the newest addition to the Biology department.

ST: What made you decide to base your research upon songbirds?
RR: There is lot of work done in the field of Neuroscience with songbirds. But my interest in songbirds comes from a combination of an interest in animal behaviour and partly from my Ph.D topic. I basically joined NCBS for a Ph.D and I liked what Upi (Dr. Upinder Bhalla) was doing. During my Ph.D, I had trained rats to do certain tasks and I knew their


Photo : www.iiserpune.ac.in

behaviour under some experimental conditions. But one thing that I was always interested in was how animals behave naturally, and songbirds were the right choice as I wouldn't have to train them to sing, they naturally learn it. Historically, there has been a lot of work done in the field of songbird (research), as there are very few animals that learn their vocalisation and hence how we do for our speech. It is always interesting to understand how they learn their vocalisation, (and hence) how we learn our vocalisation. And songbirds are the most experimentally attractive system to work with.
ST: You did your undergraduate degree in Mechanical Engineering, and now you are in Neuroscience. Why did you make this transition?
RR: I had always been interested in Biology. I think when I did Engineering, I kind of followed the crowd after school and had to choose between Medicine and Engineering. But one summer I joined NCBS to do a project which made me feel that Biology was what I wanted to do. I think I chose Neurobiology because I joined NCBS and I liked what Upi (Upinder Bhalla) was doing and I decided to join him for my Ph.D. So, from then on, Neurobiology was the most interesting field for me.
ST: Why did you take the decision to get into research when society has a very narrow-minded view about it?
RR: I get this question a lot from the people I know. In my circle of friends, everybody has moved on. My friends from Engineering have all moved on and taken up software jobs, and they feel that I am still studying all the time. They think of research as studying, but I think it's like any other job that gives you a chance to look at something you are interested in and (are) curious about. I never intended to get into research in my childhood. I used to play a lot of cricket in my childhood and I wanted to continue playing cricket back then.
ST: How would you describe your experience of teaching a course here?
RR: I find it great to teach here. It's my first experience in teaching and I am learning a lot. I hope the people who have taken the course are also learning and enjoying it as much as I am! I am taking the Animal Behaviour course next semester which I am looking forward to. It is something that is related to what I am working with. I work with songbirds but this will give me an opportunity to learn about many other interesting animals out there. I think it will be fun to teach the course.
ST: Apart from working in the lab, what do you do in your spare time? How was your Kreeda Jung experience?
RR: I play a lot of things. I played basketball in Kreeda Jung which was a nice experience. I used to play basketball during my Ph.D. Apart from that, I play badminton and cricket, both to a small degree. I also enjoy reading.
ST: What do you expect from students who want to join your lab?
RR: I think just interest is good enough. Even when I joined NCBS for my Ph.D, I didn't have any experience and that's what usually happens. You mostly join a lab because you are interested in that field or you want to find out what that work is. And you learn as you go. I think it is very difficult to have an understanding (of a topic) before you get into it.
ST: What is your opinion on the IISER system of education?
RR: I feel the system is good. Right after school you may not know what you want to do (like me!). And the broad range of courses that IISER offers will not only provide you a good base, but also help you to explore and find what is interesting for you! You have no exposure to any of these courses and this gives you a chance to explore and take the right decision.
ST: What kind of questions do you think researchers should address?
RR: What research you do here is mostly basic science research. It's not necessarily, immediately, translational. For instance, the work that I do, looking at the initiation of movements, may have implications in the future to treat diseases that have problems with movement initiation. But I don't think it has an immediate implication. The drive is to understand movement initiation from the basic science point of view. On the basis of curiosity- how is it that the brain initiates movement? Personally, I think you should choose a question that interests you and if you think it's really important and interesting, and then you eventually show others why and how it is important and interesting. At some level you are limited by what you can ask and how much you find out, and the techniques that are available. It all depends on what you feel. Most importantly, you need to enjoy doing research and this comes from choosing a question that really interests you. I feel it's time to move on to new questions, I would.

Chasing Cocaine through Chance

Abhishek Shukla

An interesting application of simple probability theory came about when the Florida police department had to prosecute a defendant for buying an illegal drug, cocaine. In the USA, both buying and selling cocaine are criminal o□ences.

One night, the Florida police raided a suspicious facility, and upon □nding nobody there, seized the bags lying around. Out of the 496 bags con□scated, they randomly chose four, found them to be cocaine, and immediately destroyed them (not the whole batch, just the four tested that were tested).

A few months later, they randomly chose 2 packets from the lot and sold it to someone while posing as drug dealers. □ e same night, they arrested that person for buying cocaine.

□ ey could not □nd the sold packets in the person's house nor in his body; he tested negative for drug intake. In court, the doubt arose, □What if the other packets were not cocaine?□How could the person be prosecuted without any evidence? □ e Florida Police consulted a local statistician and asked him to calculate the probability of the person being innocent. It turned out that the answer could be computed without much di□culty.

Out of the 496 packets, let us say N are packets of cocaine and (496-N) are something else, say a substance X (which is not illegal). □ e probability of the person (henceforth referred to as the defendant) being innocent is the probability of the event that the defendant bought X, which would correspond to the situation in which the Florida police chose 2 packets of X from 496 - 4 = 492 bags and sold it to the defendant.

Since N could be any number from 1 to 496 we can try to estimate N. □ e court, being an authority of fairness, could not convict the defendant without strong reason. Shuster, the statistician, computed the maximum likelihood estimate of the given event i.e., what the number

$$P[\text{innocence}] = ({}^{N}C_4)\,({}^{496-N}C_2)\,/\,({}^{496}C_4)\,({}^{492}C_2)$$

N must be, such that it maximises the probability of innocence, which is fairly easy to compute. Maximising P is the same as maximising log (P) , since log is a one-to-one function (refer equation). □ is function can be numerically optimised with respect to N, and since computers were pretty well-developed in those days (which was in 1991), the result could be easily calculated and it came out to be N = 331. □ e probability of such an event occurring (by plugging the values back in) is 0.022 which is a moderately less than the probability of the event in which there are 100 men, (including one criminal) and you point to a random guy and proclaim him to be the culprit. Hence, the defendant was prosecuted by this modest application of probability theory.

$$\log(P[\text{innocence}]) = \log(N) + \log(N-1) + \log(N-2) + \log(N-3) + \log(496-N) + \log(495-N) \,/\, ({}^{496}C_4)({}^{492}C_2)(48)$$

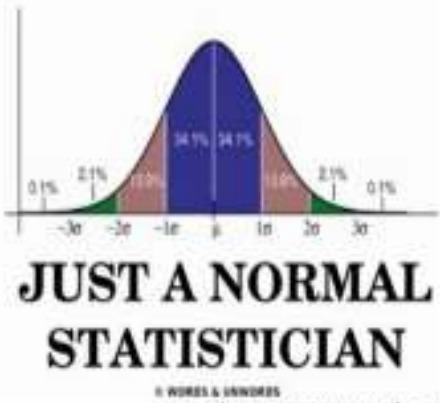

Photo : www.zazzle.com

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□ e K-Fever!

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Porcupine Tree, paving way for Amygdala, the battle of the bands. A medley of □ve rock and metal bands had the crowd head-banging away to glory, as they fought it out in a brutal battle, with Studmu□n just barely snatching the □rst place away from Trinergic. □ e □nal night of Karavaan started o□ with an intricate and innovative performance by the newly formed Juggling Club, led by Dr. Steven Spallone, who dazzled the audience with both his de□ness and accuracy, as well as his pro□ciency in Hindi. Oyster Stadium's tribute to Nirvana followed the juggling act. □ e contemporary Bollywood piece brightened the stage (quite literally) with a fusion of novel steps, stunts and fancy costumes. All the metal-heads at IISER rejoiced amidst the chaos that was Chaoskampf, head-banging with such vigour that cricked necks were almost a fad the following morning, though a fair few immediately vanished from the scene as soon as the starting notes were played; but with metal, you either love it or you hate it. Bringing about an end to the festivities were two DJs who had everyone on their feet; jiving and writhing to a wacky fusion of beats as well as popular Bollywood tracks. All in all, everyone departed thoroughly satis□ed and satiated, with a smile on their face and the name Karavaan on their lips.

Deriving: A Familial Trait?

Khilav Majmudar

The name Bernoulli strikes a chord with many a mathematician, and the occasional physicist. They talk about Bernoulli numbers, Bernoulli distributions, the Bernoulli equation, Bernoulli polynomials and Bernoulli trials. The non-mathematician listens in awe, and is about to relegate Newton and Euler from their top posts of 'Math Behemoths' when a scholar taps him on the back and informs him of the truth; the fact being, that all these Bernoullis were different! This is what I want to talk about in this article.

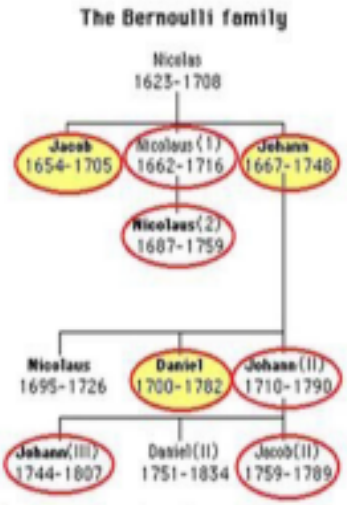

Fig 1. The Bernoulli Family Tree (the ones circled in red are mathematician

History: The Bernoulli family was of Dutch origin, with strong Calvinistic influences. They were driven from Holland by Catholic persecution, and settled in Basel, which was a big commercial hub of Europe in those days. The Bernoullis were initially traders and merchants, specialising in the spice business. However, the brothers Jacob, Johann and Nicolaus I, turned a blind eye towards this profession, and instead took up Mathematics at the University of Basel. There were five more prominent mathematicians who followed them, namely Nicolaus II, Daniel, Johann II, Johann III and Jacob II.

Contributions: Together with Newton, Leibniz, Euler and Lagrange, the Bernoulli family dominated Mathematics and Physics in the 17th and 18th centuries. They made important contributions to Differential Calculus, Geometry, Mechanics, Thermodynamics, Hydrodynamics, Optics, Astronomy and probability theory. This article will focus on the contributions of the brothers, Jacob I and Johann I.

Jacob I: His first few important contributions were on the parallels of logic and Algebra (1685), Probability (1685), and on the Geometry of certain divisions of triangles (1687). In 1690, in an article published in *Acta Eruditorum*, he showed that the problem of determining isochrones is equivalent to solving a first-order nonlinear differential equation. An isochrone is a curve for which the time taken by a particle sliding without friction, under uniform gravity, to reach its lowest point, is independent of its starting point. It is in this paper that the term 'integral' appears for the first time in its present day sense.

The famous lemniscates of Bernoulli are named after him. Jacob Bernoulli's most important work was *Ars Conjectandi*, published posthumously. It is of great significance in the theory of probability.

Johann I: He is well-known as one of Leonhard Euler's early tutors. In 1713, he became involved in the Newton-Leibniz controversy. He strongly supported Leibniz. He argued for Leibniz's calculus by solving certain problems that Newton had failed to solve. Johann also made important contributions to Mechanics with his work on kinetic theory. He discovered additional theorems for trigonometric and hyperbolic functions using the differential equations they satisfy. By solving the brachistochrone problem, he invented the calculus of variations.

Johann I and Jacob had quite a fierce rivalry. In 1696, while Johann I held the Mathematics chair at the University of Groningen, he proposed the problem of the brachistochrone in *Acta Eruditorum* and challenged its readers to solve it. Five solutions were obtained, with Jacob Bernoulli, L'Hopital, Leibniz and an anonymous mathematician having solved it, in addition to Johann himself. Not to be outdone by his brother, Jacob then proposed the isoperimetric problem, which minimised the area enclosed by a curve. It turned out that Johann's solution to this problem was less satisfactory than that of Jacob.

Johann's work, *Hydraulica*, is one among the many signs of his jealous nature. The work was dated 1732, but this was incorrect and was an attempt by Johann to obtain priority over his own son Daniel. Daniel Bernoulli's most important work, *Hydrodynamica*, was completed in 1734 and published in 1738.

On a positive note, one of the biggest contributions to calculus, the L'Hopital's rule, was Bernoulli's doing. This is how it happened: L'Hopital, in his early days, was tutored by Johann Bernoulli. While tutoring L'Hopital, Johann signed an agreement saying that he would send all of his discoveries to L'Hopital, in return for a regular salary. Hence, although Johann 'discovered' the rule, it was L'Hopital who got the credit for it.

A digression on the Brachistochrone problem: The problem was to find the curve of the fastest descent for a particle sliding from one point to another under the influence of gravity. Five correct solutions were obtained, of which four have been mentioned, the 5th being an anonymous mathematician. However, seeing the method of solving the problem, experts could easily recognise that it was none other than Newton. The answer to this problem is an inverted cycloid. A cycloid is a curve traced by a fixed point on a perimeter of a wheel rolling along a straight line.

As for the other Bernoulli mathematicians, they did not go unnoticed. Daniel Bernoulli gave the famous Bernoulli principle, which is an example of conservation of energy. Nicolaus Bernoulli I invented the famous St. Petersburg paradox. Johann Bernoulli II gave important results on the propagation of light and magnetism.

All in all, it can be safely said that Bernoulli family is the family with the best mathematicians, in terms of the number of geniuses produced and the significant contributions they have made.

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Of Driving, Discipline and Despair

Adithya Rajagopalan

It's a bird! It's a plane! No, it's just some idiot motorcyclist, without a helmet, □ying through the air and crashing into a truck. Motorcyclists zipping around like □ies without giving two cents for the law, and car and bus drivers bullying everyone else on the road, have become so commonplace that such incidents are even considered a part of the quintessential Indian driving experience. Many of us blame this on the police and the poor enforcement of tra□c laws. True as this may be, I truly believe that there is another cause for this horrendous state of a□airs- driving tests!

Just as the development of a country requires the masses to be educated and literacy levels to increase, so does road safety. Look at countries like Japan and New Zealand, where road rules are treated with such respect that one can hardly hear a horn being blown. □ is is a direct consequence of the importance that is given to educating motorists.

Let's compare this to the scene in India; driver education here is a farce. When one goes to take the test, (in most parts of the country) all one has to do is drive forward 20 metres and make a U-turn. □ e regional transport o□cer is so lazy that for a majority of the time, he doesn't even get into the car with the person taking the test. In fact, one doesn't even need to know how to turn the car to get a license; giving the RTO a little bribe will do the trick. In some places even that isn't necessary! Why is the testing system in such a dismal condition?

Here's what I think. First, as always, is corruption and laziness. Many (there maybe a few honest individuals but they form an extreme minority) at the RT of□ce are corrupt. Be it the errand boys, who'll take ₹10 and put your form on the top of the stack, or the RTO, who takes a few hundred to give you the license. □ e stench of corruption □lls these centres and there is no escape from it.

□ e second reason is the manner in which driving is taught. How can a person who does not own a vehicle of his own take the test? To learn how to drive, these people end up going to driving schools. □ ese schools add yet another layer of sleaze to this already over□owing waste-disposal lorry of corruption. □ ey don't teach students how to drive. □ ey teach students what to do on the day of the test, and promise to get them the license without any hassle. How can an education system where the teachers don't teach the students anything possibly be of any use?

□ e use of the driving license as an identi□cation card is another reason for the ease of the Indian driving test. Many people see it as nothing more than an ID card and hence don't even bother learning to drive. □ is causes them to bribe the o□cials involved to get a license. □ ese o□cials realise that if their superiors come to know that people are getting licenses even a□er failing their tests, their jobs will be at stake. So, they reduce the di□culty level of the test. But since no one bothers to learn how to drive and end up going through driving schools anyway, the o□cials still collect enough money through bribes to be happy.

□ e driving test basically entered a vicious cycle that caused its standards to drop more and more until it reached a bare minimum. □ is, supplemented by the fact that it drastically reduces the amount of work that the learner needs to put in to get a license, deters most people from trying to improve the system; they'll be at the receiving end of it at some point, right?

So, how do we □x something that is so broken we can hardly even recognise it as the original object? □ e □rst thing we need to do is stop the corruption. Yes, I can imagine every single reader putting this article down right now and saying, □What naivety! If this is his plan then the system is never going to get □xed□ Well, if you want to □x it completely, this is the only way. I'm sorry, but it's true. However, major improvements can be made without having to □ght the corruption. □ e 'ID card' line of thought is the □rst issue that needs to be dealt with. A drastic step would be to disallow the use of the driving license as an ID. A more pragmatic step would be to increase awareness about how important learning to drive is. By educating people on the importance of obeying road rules we can □x this line of thought.

Photo : www.bringingboryahome.blogspot.com

Another possible step would be the introduction of private driving schools where people who actually want to improve the system can volunteer to teach. Most of these driving classes happen early in the morning and if a good samaritan is willing to wake up just that little bit earlier and teach new drivers about road rules, we could really improve the levels of road safety.

Wouldn't you want the roads to be safer? I sure would. But then again, maybe this is just the hypocritical raving of a mad eighteen-year old, who himself got an easy license from the system.

This semester has been packed with far more activity than usual, most of it related to Karavaan or IISM. People's schedules have been crammed- flash mob rehearsals, band practices and athletics training sessions began very early on, and students have been attending these in earnest. Preparations for Karavaan saw students in a sleepless state for almost a week before it started; setting up decorations, finalising acts and dance pieces, hashing out organisational and hospitality details, and making sure that the stage and stalls were set up on time. Those getting ready for IISM were similarly embroiled in frenetic activity, trying to get everything ready for December.

When we say 'students', we usually mean the BS-MS bunch- the Int Ph.D and Ph.D set are typically far too busy with their theses and laboratory tinkering to participate in extra-curricular activities with much gusto, and until now have been fairly isolated from the rest. At least, that's what our impression has been. This semester has seen this notion being turned on its head by a large faction of very exuberant and interactive Ph.Ds and Int Ph.Ds (here on referred to as simply the Ph.Ds for convenience), who have joined in on everything that is going on and have given campus participation at IISER a whole new flavour and strength.

When people want to send an email notifying and inviting participation for some event or the other to fellow students, they use the three 'student' email groups, one for the BS-MS stream, one each for the Int Ph.Ds and Ph.Ds. The emails sent to the latter groups for non-science events were usually formalities, just a bulletin, and the past years have seen only the odd Ph.D turn up. The expectation that there would be many Ph.Ds responding to, or even reading, the mail was low. As said before, this is not so any more.

When the coordinators of the pre-Karavaan flash mob sent out their email, they were pleasantly surprised that over ten Ph.Ds came to shake a leg, and even more so when they emerged to be the people who attended the practices most regularly (four times in a week, and on time!). Who said scientists had no other interests?

It's been the same case with Kreeda Jung events- Ph.D teams were a force to reckon with. The best example of Ph.D participation in non-academics is perhaps the way that nearly the entire math department has been converted into a juggling club of sorts, with the Ph.D and non-Ph.D members of the club practising frequently and even performing. The Drama Club also has a high percentage of committed core members, and their involvement was made plain during Karavaan, especially in their mime act, which the audience loved. The Photography Club hasn't been left behind- it is now co-handled by an Int Ph.D student.

Prutha (IISER's green club for those who don't know of it yet) has also had Ph.D volunteers on its campus clean-up drive. Disha's coordinators tell us that there are many who are working with them regularly on their weekend programme. Some even work at their Someshwarwadi centre, while many sit in at Talk for Twenty, every alternate Sunday. Speaking of all these clubs, we need to mention that Sentience too, has a Ph.D member now, which is a first for us.

> There's been a welcome shift in perception- they're now seen more as fellow students rather than intimidating, alien, semi-teachers, and both sides are speaking with each other about non-academic matters

We think that these are wonderful signs that IISER's nascent student community culture is starting to take root, and that this is doing away with any of the barriers or obstacles that existed earlier between the different streams of IISER students. There's also been a sharp boost in the level of institute spirit this semester, and we hypothesise (like the campus behavioural ecologists that we claim to be) that the Ph.Ds' participation has strongly affected this, and has even been a big part of the cause. Indeed, where last semester most BS-MS students knew Ph.Ds because they were their teaching assistants or lab guides, many this time are recognising them based on the Karavaan events they participated in, who acted in which play, or danced in which position during Karavaan's Showcase.

There's been a welcome shift in perception- they're now seen more as fellow students rather than intimidating, alien, semi-teachers, and both sides are speaking with each other about non-academic matters, joking, gossiping even, and generally interacting more freely. An instance of this was seen during Karavaan- BS-MS students (from the very first year) and Ph.Ds got together, choreographed, and performed a dance piece for Showcase. What's remarkable is that some of those Ph.D students had packed laboratory schedules, working until or past midnight. They still found time to practise their piece, prepare costumes, dance, attend and celebrate Karavaan after that. Participation in the Diwali and Dahi Handi celebrations was similarly high, even though the workload faced by Ph.D students didn't let up during those times. We say that that's some serious university spirit, and it is heartening to see it develop.

While this semester has been exciting in terms of participation from every quarter (even faculty!), we need it to continue, and improve, so that we can soon have a tangible form of student culture that permeates the campus, that we call our own. We need it to kick-start further club development, enhance the way our fests are organised and conducted, and augment the effort people put into every event that IISER holds. We can't have the involvement people have shown this semester just be an exception, an anomaly or a blip. This is not an organisational issue, but again, an issue of enthusiasm which is high right now. In a way, we hope that this forms a nice and subtle virtuous cycle- all we need to do is sustain the involvement we've seen this time. Our student community is burgeoning. With all the new ideas coming up and events being organised, the outlook is very positive.

I.E.M.

Anurag Mishra

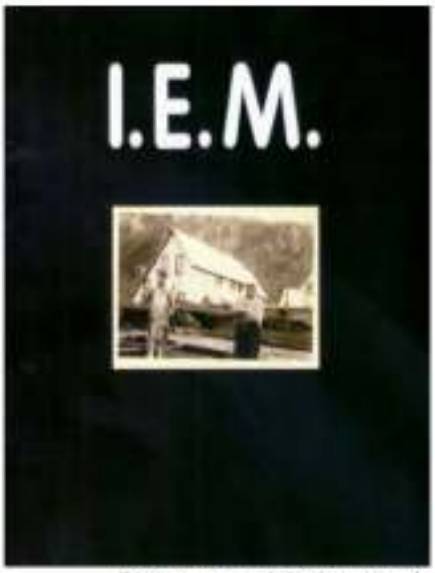

Photo : www.delerium.co.uk

I.E.M. is one of the lesser known projects from one of the biggest names in the progressive music scene□ Steven Wilson. I.E.M., an abbreviation for Incredible Expanding Mindfuck, is a continuation of the experimental psychedelic music that Wilson started with Porcupine Tree, before they turned into a more mainstream rock group,with the album Stupid Dream. Every instrument on the I.E.M. albums is played by Wilson himself, barring a few tracks, making I.E.M. more or less his solo venture.

In□uenced by numerous genres, from the 1960-70's psychedelia to cosmic jazz, it is probably the most experimental of all Steven Wilson's projects. □ e sounds used range from instruments like the mellotron, organ, electric and acoustic guitar, drum, bass guitar, piano, tanpura to random objects like tape recorders, sewing machines, horns and even birds chirping.

□ e self titled debut album is regarded the best in their discography. Although heavily in□uenced by the Krautrock scene-of-the-70's, the in□uence of psychedelia is also pretty prominent. □ e second album, Arcadia Son, is an eccentric mix of speech, Krautrock, jazz and psychedelia discography, uninhibited by any sort of song writing theme, structure, or time limit. Cicadian Haze is arguably the standout track on this album, with □ eo Travis' □ute being the big star. □ e latest album in their discography, I.E.M. Have Come for Your Children, has no song titles, just six untitled tracks and is probably the most dark and bizarre of the lot.

Porcupine Tree fans may not enjoy I.E.M. as much as other Steven Wilson projects, such as No-Man and Black□eld. □ ough I.E.M. can't ever be expected to be the commercial success that some of his other projects were, it surely does no harm to Wilson's reputation as a creative genius.

Fermat's Enigma

Ajith Nair

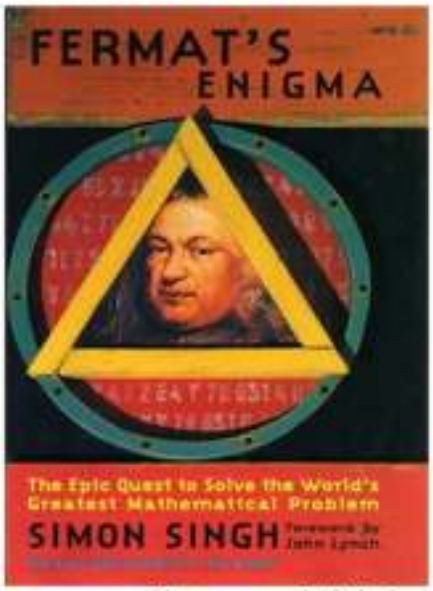

Photo : www.gk12glacier/

Ever read a book on Mathematics without getting scared by the dreary looking equations staring back at you? It's no wonder people convince themselves that such books should be a matter of interest only to the mathematically-oriented. □ is book de□nitely sets the record straight.

'Fermat's Enigma' is the mind-boggling tale of the quest to solve the world's greatest mathematical problem, popularly known as 'Fermat's Last □ eorem'. □ e problem, in simple words, can be stated as□ `□ e equation $x^n + y^n = z^n$ has no non-trivial integer solutions for $n > 2$'. □ is proposition, which appeared as a marginal note in Fermat's book, with a comment as to his reason for omitting the proof (due to lack of space), went on to torment mathematicians for more than three centuries. □ e problem was ultimately solved by an English mathematician, Andrew Wiles, in 1993-94 a□er toiling hard in complete secrecy for seven years.

□ e book brings together the lives of numerous mathematicians whose works have laid the foundation of number theory and thereby contributed to the ideas of the proof of this theorem. A few of the more note-worthy ones are Pythagoras, Diophantus, Fermat, Euler, Sophie Germain, Gauss, Dirichlet, Kummer, Hilbert, Godel, Galois, Taniyama, Shimura, and □nally Andrew Wiles himself.

It beautifully narrates the heart-warming stories of how Mathematics has saved, and sometimes even taken the lives of, those eternally devoted to it. □ e book nicely assimilates the ideas involved in a rigorous mathematical proof and the logic embedded in it, with quite a few illustrations of such proofs.

All in all, 'Fermat's Enigma' is undoubtedly a feast for all mathematics-lovers, and in my opinion, it would serve as a lovely read for others as well. In conclusion, I would like to remark that this column is simply too short to contain all that I would like to say about this book.

Rule it out!

Lokahith Agasthya

Picture me, walking around a compound to reach the other side of a building, with the a□ernoon Bangalore sun beating on my back like a thousand hot iron knives, rendering even my faithful cap hopeless under the □erce onslaught of the heat.

It wasn't quite the distance that infuriated me, a mere half kilometre of excess walking made no di□erence to my youthful 16 (almost 17)-year old body.

□ e building in question was my school. To give you a clear picture, the campus had a gate to the east, a well-trodden path, the side from which we students entered every day in hordes. And on the other side (the west, obviously), there lay two grand gates, formidable, reminding late-comers (who were expected to enter from that side) what they were up against. On working days, entering through the West Gate, or the front gate, was illegal, unless of course, you happened to be late, with a good reason too. It helped distinguish between the punctual and the not-so-punctual lot, and made it easier to pull them up to face the consequences.

In the summer however, the school ceased to function, with higher authorities dropping by only occasionally. Only coaching classes conducted by another institution continued to operate within the campus. It was a rather informal a□air, with a handful of students, a couple of teachers, and a soldier or two from the squadron of gardeners, watchmen and other miscellaneous workers.

□ e heavy tra□c, which I mentioned above, had forced me to come up to the school from the western side. □ e heat had been blistering, and exhaustion had begun to creep in. Assuming that the rules would be relaxed, since the coaching classes didn't matter much to the school, I thought that I could walk in through the □wrong□ gate.

□ e watchman was precisely the chap you would imagine if the word □watchman□ □ashed in your mind. Sun-burnt skin, pot-belly, gru□ voice, proud demeanour and all in all pretty much a bloke who looked dominating but in reality, was a stark contrast to his appearance. What he possessed though, was a real loyalty to his job, always on the watch.

Upon seeing me enter the front gate, despite knowing full well, by recognition of my features as well as uniform, that I belonged to the school, he directed me to the eastern side, which le□ me seething.

And that is the basis of this article. Rules!

□ e whole idea behind rules is to make things easier without unduly in□icting harm on anyone in the process. Rules, on paper, always must have a sound logical backing; a time for usage based on the situation, rather than universal application.

For a moment, if we assumed that the stodgy watchman had let me pass, what would the consequence have been? □ e □late-comer□ rule applied for school hours. □ is was a completely di□erent situation. □ ere would have been no consequences, by virtue of the more □exible rules of the coaching class.

Hence, the logical backing behind the rule broke down. And if viewed in a wider perspective, we must ask ourselves, must we always follow rules? Must we always follow the guidelines, idealistic ones at that which do not necessarily conform to all situations?

Undue, arduous processes o□en are undertaken simply for them to be in keeping with laws. □ e logic behind the rule, breaking down, is apparently not reason enough to by-pass rules.

Let us look at it this way. Rules are just guidelines; a path, a route, and by no means a destination. □ e objective is not, or rather, should never be, merely to follow rules. □ e task on hand, as I already stated, must be done as quickly, as e□ectively as possible, meting out the results and as far as possible without o□ending, injuring or endangering anyone.

With this basis, I could quite grudgingly, even admit that walking in lines on school corridors is indeed justi□able. But what about other rules, often unwritten but overstated; societal norms, quite obviously and glaringly illogical, and unnecessary bureaucratic procedures. Can they be avoided?

Jugaad is an over-used, sometimes abused, Hindi word. Jugaad is the art of being clever on the job, twisting boundaries, making improvisations; which usually does not end up causing harm to anything or anyone, merely helps in the quicker completion of work, but o□en leads to an insigni□cant amount of norm-□outing.

Wikipedia says, □Jugaad colloquially means a creative idea, or a quick workaround to get through commercial, logistic or law issues. As such, the Jugaad movement has gathered a community of enthusiasts, believing it to be the proof of Indian bubbling creativity, or a cost-e□ective way to solve the issues of everyday life.□

In a recent survey, 81% of Indian businessmen surveyed, claimed that Jugaad is the key to their success.

□ en, the undue importance placed on rules and regulations is not really justi□ed. It might be an emotional issue, or sometimes we may not really know the reason behind the rule, and blindly conform to it.

But logic should, in my opinion, always reign supreme, with all due respect to all the conformists to society out there. If the least harmful and the most e□ective way is the illegal one, by slight twisting of regulations, by Jugaad; then justi□ed it should be.

All I could do was to accept fate and walk an extra 500 yards; until Jugaad is legalised and well-catalogued; when sanity will rule over all situations, rather than universal guidelines. If rules were a path in the woods of human morality, then, Jugaad would be walking on the edge to minimise the distance through a curve. I would do it every time, if allowed.

Xpression

A Walk in □ under

Lokahith Agasthya

To walk in the rain, let go of all inhibition,
Walk in the downpour of ambition

Walk in the rain, alone
Walk in the rain, even if there's nothing to moan
With every drop that lashes your face,
A tear drop too,
Silently, only for you.

Walk in the lightning,
□ e □ash of earth's brilliance,
Transformation in resilience.
Walk in the lightning,
To see the sky lightening
If only for a second.

Walk in the rain,
Forget your sorrow.
In the pleasant pitter-patter
Of the rain drops
Trust me
Your troubles do seem hollow.
Every wish unful□lled,
Every goal unconquered
Every path, traversed and failed
Seems golden
In the merry light of the rain.

□ e rain never ceases,
Nor the tears that pollute it
Every drop
Like the cradle of your mother's arm
Hear the noise, the yell of nature
A billion drops, for every creature.

And then suddenly
Hear the thunder
All serenity and tranquillity
In the noise
□ e distant rumble of satisfaction
To express your hearts elation
For walking in the rain
Forget all sorrow

Walk in the rain, even if there's
Nothing to moan
With every drop that lashes your face,
A tear drop too,
Silently, only for you.

Photo : www.depositphotos/

A Walk in the Night

Siddhartha Sohoni

Everyone, everywhere was fast asleep.
It was just me,
And the night.
Talking to each other,
On this eerie night.

For once, even the crickets did not sing,
□ e geese didn't cackle.
□ e trees looked lifeless,
Devoid of leaves.
Never before had the night been so alive.

Absolute silence is quite rarely heard.
If ever, it's with tears and grief,
Never before had I felt so happy.
□ e happiness in silence was whispering
Something to me.

□ e chilling winter breeze,
□ e moon- full and staunchly bright,
Orion there above the horizon,
□ e smell of the moist dew laden soil.
All of them were saying something.
It was the message of the night.

□ e walk and the talk I had with the night
On that strange silent night,
I'll never forget it.
And as I reached home,
□ e cricket started singing.
□ e geese cackled
And the leaves rustled.
□ e night had given me her message
Her message of silence, in silence.

□ at day I met the soul of the night
And with her my own soul,
□ e soul of my inside.

Foodie Corner

Sahana Srivathsa

A mildly quaint bistro, with a fairly geographically diverse menu, ranging from Mediterranean and Italian to Chinese and classic North Indian, Polka Dots is the perfect dinner destination when you're in the mood for excellent food with a bit of variety, without having to travel too far. Located just about 200 metres from Parihar Chowk, scarcely a half-hour's walk from the back gate, it has a breezy, casual, outdoor ambience which lets you enjoy the evening weather without the usual noise and □urry. Catering to both vegetarian and non-vegetarian taste buds, each item is uniquely different and □lled with bags of □avour. Both the Ravioli di Casa and the Primavera delight your senses, while it's advisable to satiate your oriental appetites elsewhere. □ e absolute highlight of the meal had to be the delectable and mouth-watering desserts which caught our eye even as we were entering. □ e rich, layered Death by Chocolate pastry with ample chocolate sauce drizzled over it, the creamy tiramisu in its perfect balance of □avour or the Cr□me Br□□e, which had a unique blend of spices. It was impossible for us to choose a favourite amongst them. A meal at Polka Dots is slightly heavy on the wallet (`300-350 per person) but the satisfaction at the end of the meal makes it worth the strain.

Contact:

Address: Polka Dots
157, D P Road, Aundh

Phone no.: 020-25580339