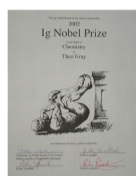


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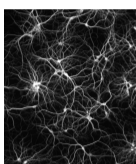
Ig Nobel
Scientists

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I Think,
Therefore I
am

4



HOLI SPECIAL:
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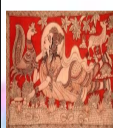
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Look Be-
fore You
Taste



Opposites
Do Not At-
tract!

Hide And
Seek



ScienArt-
The Science
Behind
Kalamkari

featured

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Science Fest Organized At IISER Pune



'SCIFEST 2011' - a unique event was organized at IISER Pune on the occasion of National Science Day. It was a mega event stretching over three days from 26th-28th February 2011. It featured games, competitions, seminars, workshops, talks, a book fair, experiment demonstrations and much more. It was a novel concept, conceived and entirely organized by the students of IISER Pune. More than 120 volunteers worked hard for about 2 months to make the event happen. The fest was sponsored by Ariel Outdoors, Red FM, Next Generation News, Invitrogen, Eppendorf apart from IISER Pune and NCL.

The idea was to start a Science fest on the lines of Techfests organized by various engineering institutes in India. The target audience and participants of the fest were undergraduate and graduate students from colleges and universities around the country. The fest saw around 600 visitors over three days. Most of them were undergraduate and school students from Pune. There was also a participation of the general public in the event, which added variety to the crowd.

There were more than 30 talks and 20 different events and competitions in the fest. The fest venue was divided into different clusters viz., Chemie cluster, for chemistry related events, a Physics cluster, Computer Science Cluster and a BioTech cluster. Nash'DAQ was an event which caught a lot of attention. It was a virtual stock market which had the participants glued, looking at every small change in the prices of the stocks, making theories to predict the future sway of the market. In the SCIFEST, was a hidden treasure and people looking for clues to find it, and if they found one, thinking hard to decipher it. There was also a digital treasure with digital leads and clues in the Digi Treasure Hunt, which tested the Microsoft XP skills of the participants. Then, for the fans of Sherlock Holmes, there was a murder mystery to crack.

At the centre of it all was a cricket match with the rules tweaked by the players themselves. The tweaking was based on the famous Cake Cutting Algorithm which ensures that nobody can make an unfair rule all by themselves.

Eco-friendly painting saw huge crowds with many paintings adorning the beauty of the Earth; the use of eco-friendly materials telling the need to conserve it. Godel Combat was an innovative idea in which the participants had to check the logical consistency of their answers. Some other events like Maapana-Instrument Design, Neumannics, Space City, Cricket Auction and many others also saw good participation. There were also paper and poster presentation competitions.

SCIFEST 2011 also celebrated 'CHEMFEST' as UNESCO and IUPAC have declared 2011 as the international year of Chemistry. CHEMFEST had a lot of events based on Chemistry. Moreover, each and everything used in the CHEMFEST was natural and eco-friendly as the motto of the fest was 'Green Chemistry, Clean Chemistry'. The 'smoke bomb' - made using sugar and Potassium Nitrate became an instant hit and was used to inaugurate the event. There was *Home Science*, which had manufacture of soap, perfume and mosquito repellent from natural oil. There was a fascinating display of fluorescence. This is used in photodynamic therapy used to cure cancers and tumors. Then there was *Kitchen Science*, which demonstrated various experiments involving items found in the kitchen, like preparation of toothpaste from baking soda and salt or turning an egg into a rubber ball and so on. Then there was Insta Quiz, in which you answer simple chemistry questions and get instant cash prizes.

A book fair was also organized, which brought out the bibliophile
(contd. on page 2)

Osmania Medical College Wins MIMAMSA 2011

Sixteen undergraduates from Hyderabad and Pune racked their brains in the finals of MIMAMSA 2011 and the group from Osmania Medical College, Hyderabad beat others in the race to win the competition. Fergusson College (Pune), BITS Pilani (Hyderabad campus) and University of Hyderabad finished at second, third and fourth place respectively.

with a gruelling trial of the intellectual stamina of the participants.

The different rounds of MIMAMSA were rather fascinating for the teams, as this unique quiz has just as many unique rounds. 'Deep Thought', 'Analyzer', 'Talk Round' stretched the participants' intellectual prowess to the limits. The arguments put forth by the participants were



The Osmania Medical College Team, pondering over a question in the MIMAMSA Finals.

MIMAMSA 2011 saw participation from all over Maharashtra and Hyderabad. The preliminary round was held at Pune, Mumbai, Nagpur and Hyderabad. One hundred and eight teams registered for a grand preliminary round, totalling the participation to 432 participants - over four times the crowd from MIMAMSA 2010.

The top 4 teams from the preliminary round were then selected for the final round which was held over two days on 5th and 6th February 2011 at IISER Pune. It was divided into four subject sessions, namely, physics, biology, mathematics and chemistry. Each session stretched for three to five hours,

judged by 18 eminent scientists of Pune, who not only critiqued every answer but also provided correct solutions at the end.

A tough battle fought very bravely by the four teams over a 14-hour period left everyone thoroughly exhausted but high on adrenaline. Finally, it was the team from Osmania Medical College that made the final mark by collecting the MIMAMSA rolling trophy.

The entire event was video-documented. It was also blogged live on Facebook, a first for an Indian quiz, with active participation from the online community.

IISER Pune hosts QFT Conference

IISER Pune in collaboration with the Max Planck Group, Germany organized the Quantum Field Theory Conference from 23rd-27th February in Raman Hall.

22 speakers from 7 different countries attended the conference and gave talks on their research in the area. Moreover, there were about 20 Undergraduate and PhD students who attended the conference.

The conference mostly had technical talks. But there was one colloquium by Prof. Spenta Wadia of TIFR, Mumbai at IISER Pune and a public lecture by Prof. Herman Nicolli at IUCAA on "N=8 Supergravity and beyond".

The conference was a good platform to discuss various aspects of quantum field theory in the context of gravity and high energy physics.

Academic Buzz

UPCOMING SEMINARS AT IISER

1. Mass Spectrometry for analysing chiral compounds, International Year of Chemistry (IYC) 2011 Lecture Series by Dr. M. Vairamani, National Centre for Mass Spectrometry Indian Institute of Chemical Technology [IICT] -March 14, 10:30 am at Raman Hall.

2. Approximability of subspace approximation by Amit Deshpande, Microsoft Research, Bangalore – March 15, 04:00 pm at W303.

3. The critical Casimir force in the superfluid phase: effect of fluctuations by Dr. Shyamal Biswas, Calcutta University-March 17, 04:00 pm at Board room.

4. Nonperturbative Predictions for Cold Atom Bose Gases with Tunable Interactions by Dr. Frederick Cooper, Los Alamos National Laboratory, US– March 18, 04:00 pm at Ramanujan Hall.

5. International Symposium on Materials Education (ISME – 2011)-March 26 – 28. Website: <http://www.iiserpune.ac.in/isme/>

6. Exploring New Chemical Space to Undertake "Undruggable" Targets: Small Molecule Modulators of Protein-Protein Interactions, International Year of Chemistry (IYC) 2011 Lecture Series by Professor Prabhat Arya, Institute of Life Sciences, Hyderabad –March 29, 04:00 pm at Ramanujan Hall.

The Rascals Triumph In IPL 2011



IPL 2011 Winners - The Rascals

Clockwise (from upper left): Zoheb Sheikh, Abhishek Meena, Vasu Singh, Ankur Paliwal, Nikhil Y L K, Jeeten Patel, Mohit Dixit, Amit Kumar, Pravu Dhal, Abhishek Kumar, Upendra Singh, Gaurav Arya, Nishant Singh, Dinesh Kumar

Like every year, this year's IPL also brought along a lot of excitement and enthusiasm. It saw the participation of 10 teams, 2 more than last year. The spirits were quite high this time as the tournament not only saw immense participation from the undergraduate and PhD. students but even the faculty and administration could not restrict themselves to just being spectators.

The tournament saw a number of exciting matches. One of them was the match between Faculty and Physics PhD. Dr. G V Pavan Kumar and Dr. S G Srivatsan set a tremendous opening partnership contributing 29(27) and 44 (27) runs respectively. The team finally presented a target of 95 runs for the

loss of 7 wickets in 15 overs. Physics PhD. in answer played a very challenging game but lost the match by 2 runs in the very last over.

The most exciting one was undoubtedly the finals between Slayers '07 and The Rascals. Both the teams lived up to the expectation of spectators and played amazing cricket. The game had many twists and turns and ultimately had a nail-biting finish and the Rascals emerged victorious.

Slayers '07 who are well known for their extraordinary bowling lineup and outstanding fielding for the first time were facing The Rascals who had already gained an emphatic victory in the semi-finals over the last year's champions, The Alchemists. Ankur Paliwal, captain of The Rascals, won the toss (unexpected, as it was for the first time in the tournament) and elected to bowl. With a major contribution by Sandeep Gupta- 31(35), Slayers '07 set a target of 87 runs.

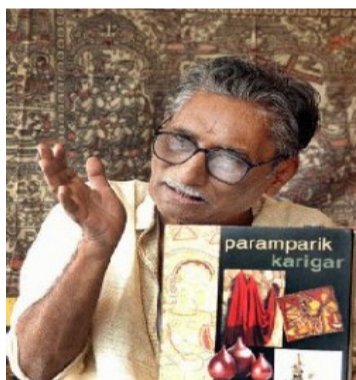
In spite of a good start by the openers, The Rascals' middle order suddenly collapsed owing to the extraordinary bowling performance by the Slayers

'07. Over to the final over, it was a fuddled packet of thrill and excitement as 11 runs were needed off the last over with only one wicket in hand. Karan Kapoor bowled the deciding over and Mohit Dixit and Ankur Paliwal were at the crease. No doubt it had to get a bit filmy-single on the first ball, a wide, a double along with an injury to Ankur (due to his extra efforts to finish off the 2nd run) and then ... a dot ball. 3 balls remaining and 7 runs to score. Slayers '07 were quite sure about the victory, spectators along with The Rascals standing restless with fingers crossed, praying for some superhuman performance by the batsmen on the field. Then came the unexpected - a wide, followed by a blistering four by Mohit and all equations were revised. Next, a fierce bowl by Karan and Mohit was no way even near to touch the ball. 2 runs more were needed off the last ball. The crowd was unable to hold their excitement...

Then, wham! Mohit smashed the ball straight through long-off for four. The bowler was left shocked, the fielders shattered, and stumps in the hands of Mohit claiming sweet victory for The Rascals with pride.

A Chat With Padmashri Gurappa Chetty

J SREEVANI



Shri. Jonnalagadda Gurappa Chetty

Padmashri Jonnalagadda Gurappa Chetty, one of the leading Kalamkari artists in the country, was invited by SPIC MACAY to conduct a workshop at IISER Pune. The workshop was held from 13th February to 17th February during which we got an opportunity to talk to him. Here's what he shared with us, while showing us some of his world-renowned works of art.

About him

Though he lives in Srikalahasti, Andhra Pradesh, he is originally from the small town of Jonnalagadda, Guntur District, Andhra Pradesh. The ancient art of Kalamkari was passed on to him by his father. He started practicing Kalamkari at the early age of 11 and shows no sign of stopping. At the age of 63, when most of his contemporaries have retired, he actively continues to this day.

About colours

In his unique philosophy, where colours play a pivotal role in life, he says, "Life is full of colours. For example, when you are angry, your face turns red. When you are happy, your face glows, this is white.

The colours we use in Kalamkari are all the colours found in the rainbow."

His views on art

"Art is enlightenment. There are many things, many different viewpoints you can learn from an old art like Kalamkari. For example, in one of the paintings it is depicted as Sita scolding Ram for not taking her along with him to the forests because she wanted to remind him of his duty to protect his wife under all circumstances."

About his Kalamkari works

A lifelong proponent of kalamkari art, he has depicted epics like Ramayan and Mahabharat on cloth. He also depicts traditional Indian practices like Ayurveda etc. Currently, he is working on a tapestry showcasing the games played in ancient India.

About his books

He has published three books. All his books are taken from parts of epics like 'Bharata Ratnamala' from Mahabharata, 'Bhagavata Manimala' from Bhagavata. 'Kalamkari' which was written in English is yet to be published in Telugu.

His words for youngsters

"I give this message wherever I go. Do not sacrifice your life under any circumstances. Think about your parents before doing anything stupid."

Scifest(contd.)



The Home Science stall organized as part of CHEMFEST

(contd. from page 1)

in everybody as they were seen browsing through the book stalls.

The highlight of the SCIFEST was the various seminars, workshops and talks given by eminent people from all over India on various different topics. There were technical talks on 'Analytical Reasoning' by Prof. Jayant Narlikar, 'Industrial Mathematics' by Prof. K Balaji, 'Careers in industry' by Dr. C V Natraj, 'Rational Inquiry' by Prof. K.P. Mohanan, 'Quantum Computing' by Prof. Prasantha Panigrahi, 'Game the-

ory' by Prof. Ramanujam and many others. These talks enthralled the audience and hugely benefited the students.

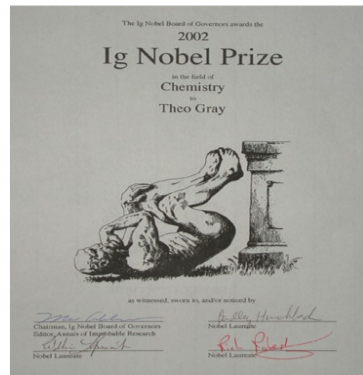
There were also public lectures by Prof. Jayant Narlikar on 'Why study Astrophysics' and Dr. Vijay Bhatkar on 'Socio-Scientific issues and Supercomputing'. Interacting with such great minds was a great experience for all the students.

Overall the SCIFEST was a unique event and a novel attempt to spread and popularize science.

Ig Nobel Scientists

The Ig Nobel Prizes were first awarded in 1991 as a spoof of the Nobel Prizes. They are given each year in October for achievements that “first make people laugh, and then make them think”. The name is a play on the word ‘ignobel’ (Nobel comes from Alfred Nobel) and everything from the name to the inventions/discoveries given the award mock the Nobel Prize. For instance, the 1991 peace prize was given to Edward Teller – father of the hydrogen bomb – for his lifelong efforts to change the meaning of peace as we know it!

Consider the case of the first Chemistry Ig Nobel – it was awarded to Jacques Benveniste for his discovery that water is an intelligent liquid (yes, you read it right!) and for demonstrating, to his satisfaction, that water is able to remember events long after all trace of those events has vanished. And how did he come to this incredible conclusion? His team diluted a solution of Immunoglobulin E (a human antibody) to such a degree that there was virtually no possibility that a



single molecule remained. Then basophil granulocytes were subjected to this solution. Surprisingly, they reacted (underwent degranulation) just as though they had encountered the original antibody. In Benveniste’s words, “It is like agitating a car key in the river, going miles downstream, extracting a few drops of water and then starting one’s car with the water.” He didn’t offer any theoretical explanation though. (Surprised, anyone?)

Considering the nature of the highly unconvincing predictions, Benveniste’s team was asked to repeat the experiments under rigorous scrutiny. But the

same results could not be observed in them or any of the subsequent experiments. Benveniste had to settle with a failed experiment and his first Ig Nobel. Research published in 2005 on hydrogen-bond network dynamics in water showed that “liquid water essentially loses the memory of persistent correlations in its structure” within fifty femto-seconds!

References:

1. J. Benveniste, *et al.* (30 June 1988). "Human basophil degranulation triggered by very dilute antiserum against IgE" (PDF). *Nature* **333** (6176): 816–818.
2. Cowan ML, Bruner BD, Huse N, *et al.* (2005). "Ultrafast memory loss and energy redistribution in the hydrogen bond network of liquid H₂O". *Nature* **434** (7030): 199–202.

Weblinks:

1. Ig Nobel home page: <http://www.improb.com/ig>
2. List of past winners: <http://www.improb.com/ig/ig-pastwinners.html>

Is Your Anti-Virus Reliable?

AVANI GOWARDHAN

The European Institute for Computer Anti-Virus Research is unique, to say the least. Though it specializes in IT security for all fields, it is unlike others since it has come up with a new virus, as contrasted to anti-viruses.

It has developed an Anti-Malware Test File. This can be created in Notepad on your PC, by simply typing in:-

```
X5O!P%@AP[4\PZX54(P^7CC)7}
$EICAR-STANDARD-ANTIVIRUS-TEST-
FILE!$H+H*
```

Now, this is actually a malware, though a strictly non-malicious one by itself. It is used for determining the effectiveness and quality of an anti-virus software. A good one will not let the text file be saved & immediately deletes or quarantines it. A large number of others simply let it lie, and detect it as a malware only on manual scanning. If, as in a few unfortunate cases, it does not even do that, then it is time for you to get another antivirus.

Check out: www.eicar.org/anti_virus_test_file.htm

For The Stargazer

AMEY APTE

Observing the skies at night, one finds many intricate patterns woven through the countless twinkling stars above. Add to it the subtle movements of the planets. For those who appreciate it, the heavens are filled with vistas of beauty. Let us kick off this month by seeing what is placed for viewing in the skies, this March.

The stars & constellations

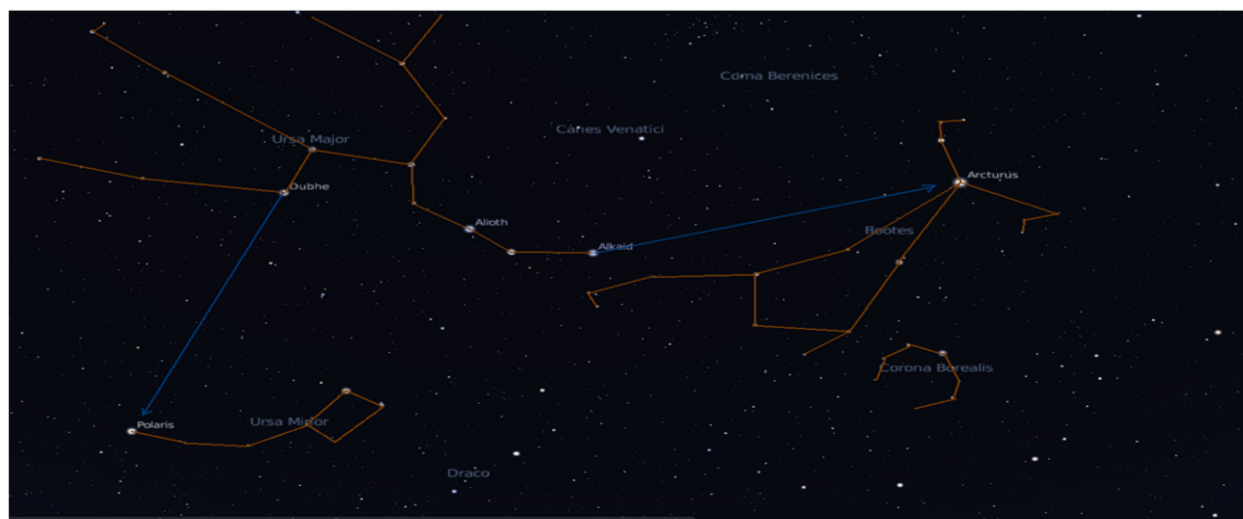
Get out in the open air at around 10-11pm, and start from the north. Low in the north-east, the familiar shape of the Plough (Saptarshi) in the constellation Ursa Major, with its seven stars is clearly visible. The second star from the tip of the tail is actually an optical binary (See if you can spot it with the naked eye!). The Plough is a key asterism useful in locating other important stars. The two brightest stars (Dubhe and Merak), point straight downward to Polaris (in Ursa Minor), while the 'handle', upon extension, points south toward Arcturus (an orange giant star in the constellation Bootes), and further south to Spica (a bluish white star in the constellation Virgo).

In the south-west is the magnificent constellation Orion (depicting a hunter), easily recognizable due to its two bright stars- Betelgeuse, a red giant (Orion's shoulder) and Rigel, a blue giant (Orion's foot). A line of three clearly visible stars make up Orion's belt, through which hangs Orion's 'sword' (a complex of stars called 'Trapezium' and the famous Orion nebula, or M42). The stars making Orion's arms, and the spear are fainter and hence usually challenging to see. Trace a line, first, down from Orion's belt toward Sirius, the brightest star in the night sky (in the constellation Canis Major), and then up towards Aldebaran, a red giant star in the constellation Taurus (the bull). A bright star named Procyon (in Canis Minor) above Orion and Canis Major, completes a large equilateral triangular shape with Betelgeuse and Sirius. This is known as the Winter Triangle, and is easily identifiable with the naked eyes.

In the north-west, we have the setting constellations of Auriga (the Charioteer) and Gemini (the Twins). Capella in Auriga, and Castor, Pollux in Gemini are readily visible stars northward of Orion. High up, near the zenith is a beautiful star cluster M44 (the Beehive) in the constellation Cancer. This, along with M42 in Orion and the Hyades cluster in Taurus (near Alde-



Orion, Taurus, Canis Major & Canis Minor



Ursa Major, Ursa Minor, Bootes, Corona Borealis, Canes Venatici

baran), are a great sight through medium-powered binoculars. Another object of interest through the binoculars is M81, a large spiral galaxy located in the constellation Ursa Major.

The planets

Venus rises at around 4:30 am and shines brightly in the constellation Capricornus (the Goat), above the south-eastern horizon till sunrise, and can be seen straightaway since it is the brightest object in the night sky.

Saturn rises in the evenings at around 8:30 pm, and is in the constellation Virgo. This yellowish planet is well

placed for sighting throughout March, and its rings are a treat to watch through high-power binoculars.

Mercury is always a little hard to spot, as its proximity to the Sun means that it won't linger around far apart from the Sun in the sky. However, Mercury achieves its greatest western elongation on 23rd March and will be visible on the western horizon, in the constellation Pisces (the Fish), quite a while, after sunset.

Jupiter and Mars are very close to the Sun (also in Pisces), and are not observable almost entirely throughout March. However Jupiter can be seen low on the western horizon after sunset, though it will go on setting early, as the month progresses.

Off the Rack...

Catch-22

Catch-22 is an extremely satirical account on life in the U.S Air Force. It revolves around the lives of a few main characters - pilots, commanders, medics - who are driven crazy seeing their comrades die brutal deaths. They are portrayed as lunatics who speak absurdities and who are reckless adventurers. It shatters any conventional thoughts of valour and nobility associated with the armed forces, offering a peek into the grim, sad realities of a servant of the nation.



As the title suggests, the book talks about a catch in the army propaganda - the extremely confusing Catch-22. This military rule allows retirement only on the grounds of insanity. Anyone unwilling to fly more missions would apply for retirement on the grounds of insanity. However, the fact that he is sane is evident from his very act of wanting to

leave the force, which prohibits him from leaving it! This catch and its 'extreme simplicity' form the basis of the troubles of the pilots in this fascinating tale.

Trust Heller to break the reader into uncontrollable spasms of laughter by narrating pages of confusing and paradoxical yarn or penning down bizarre constructions like "Why Hitler? Who Spain?". But even this (Wodehouse-inspired?) humour of his has an undertone of tragedy through the random ravings of the loony protagonist, Yossarian. The plot is not fast paced like a thriller but it is easy-going and casual.

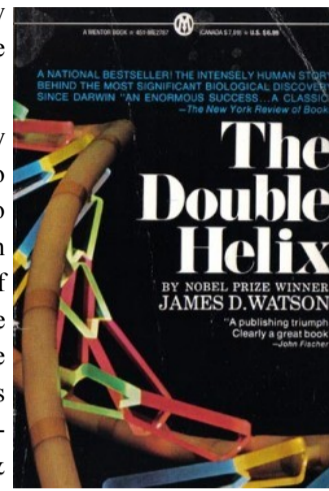
The unconventional style of writing, the absurd names of characters (which are also chapter names, by the way) and the constant nagging impatience, as if you live the story, keep the pages turning.

KRISHNA ANUJAN

The Double Helix

The Double Helix by Dr. James D. Watson is a good read for anyone and everyone interested in the field of genetics and the *secret of life* came about.

Written in extremely simple language, easy to understand and easy to relate to for anyone with basic knowledge of chemistry, it is a race against time, an intense rivalry among Linus Pauling, Maurice Wilkins and Watson & Crick to decode the structure of the DNA to reach the ultimate goal: *The Nobel Prize*. A story full of drama fuelled by the desire of Watson to win the *Nobel* at any cost, even if that meant getting hold of the X-ray photograph (which was the key to their success) without the knowledge of its photographer, Rosalind Franklin.



It is nothing like your conventional science book which tends to slow down its pace sometimes (before getting interesting again), but a bare account by Dr. Watson without mincing words which makes it difficult to put the book down.

The portrayal of Rosalind Franklin might seem unfair to some but well... that is the way the young James Watson saw her. "The Double Helix" often takes a peek at the social lives of the scientists which are at times amusing, to say the least.

To quote Dr Watson, "there was always time - even during the stomach-crunching final stretch - for a game of tennis, an afternoon at the movies, or a bottle of burgundy, anything at all to avoid narrow-mindedness and dullness."

SURABHI JIRAPURE

I Think, Therefore I Am

"Consciousness" Ooh! It is a "big" word. I don't wanna talk about it. This is how most of the people think. Others think of it as some unattainable 'thing' and relate it to all possible things they can relate it to.

Do you have consciousness? Does a bacterium have it? Does an electron have it? People usually say that they have consciousness and the other two do not. The dictionary gives us the meaning of consciousness as being 'awake and aware of one's surrounding'. If you consider this definition, then you have it, the bacterium also *has it* and the electron also *has it*. An electron *can sense* the presence of other electrons and a bacterium can sense the presence of other bacteria, so what is the difference?

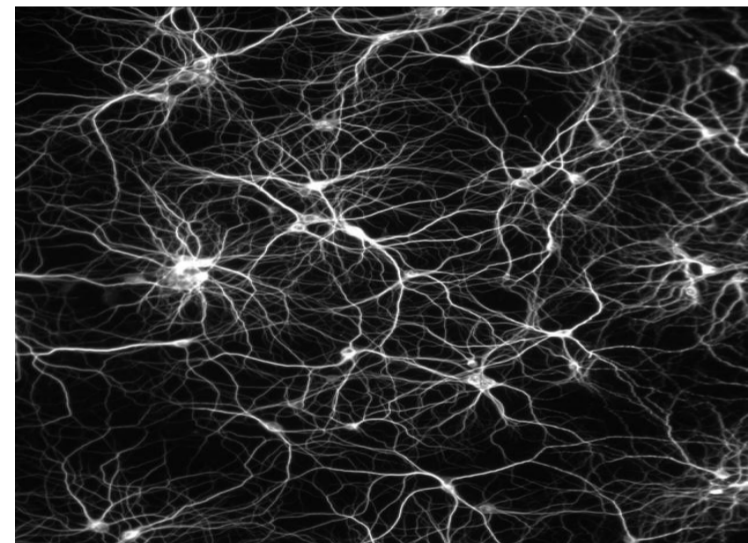
What about dreams? Are we conscious while we are dreaming? Dogs are also known to dream. When we talk about consciousness, we cannot pass through without pausing at artificial intelligence. Take a robot, which reacts when given an input. It can very well behave like a human in many aspects but it is not aware of its own self, it is not aware of what it is doing. Consciousness is a long standing mystery. There were other mysteries also like mystery of space, time, gravity, evolution, reproduction etc. These mysteries are not vanished but have been "tamed", as Daniel Dennett puts it in his book "Consciousness explained". But with consciousness we are still in a terrible muddle. The famous question "How do I know that I exist?" has an answer that "I ask this question thus I exist". Maybe when a robot starts

asking these questions, then it might become a conscious being.

There are frequent attacks on consciousness from philosophers, scientists and theists. There are different dimensions with which one tries to get rid of the mystery. Many people consider it as not achievable or understandable but then, by definition we obviously won't be solving the mystery.

There are many scientific 'expeditions' going on to unravel the 'thing'. A materialistic view of consciousness tells us that it is just a complex sophisticated synchrony of different neuronal circuits. They also claim that those complex neural networks and their sophistication can be achieved through computation/virtual machines. One such example is the theoretical 'Joycean machine' by Daniel Dennett. He views that all the processes in brain can be done by a computational program using a suitable algorithm. Let us ponder upon it. If we consider that a mere 'enaction' of appropriate algorithms evokes awareness then the printer which prints this article using an algorithm is also aware.

Dr. Tononi, a Distinguished Chair in Consciousness Science in the University of Wisconsin tells us that consciousness is nothing more than integrated information. This is indicated by two key phenomenological properties of consciousness: differentiation - the availability of a very large number of conscious experiences; and integration - the unity of each such experience. He not only proposes this theory but also aims at measuring



...complex neural networks... simulated through computation...

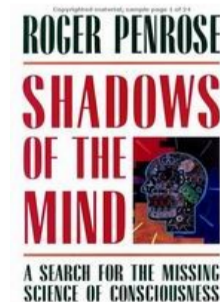
consciousness using instruments.

People who hunt it the other way have a view that just by computation, all complex processes in the brain cannot be carried out. Roger Penrose, a distinguished mathematical physicist holds this view. He believes that mere computation will not be sufficient for explaining consciousness but 'something' else is needed for it. He believes that quantum physics might help us to get hold of that 'something'. He integrates quantum computation and biology. He expects quantum coherence within microtubules. He also stresses for the need for new physics to understand mind and consciousness.

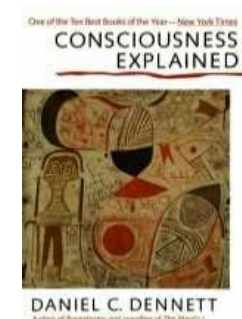
Instead of leaving it unquestionable or explaining with what we know, it will be good to take the view of Roger Penrose, because it may give rise to the discovery of a new science and will thus keep the quest alive. While you are consciously (hope so) reading this article, you might

be confused more about yourself. To clear it up or to get even more confused, refer to:

1. Shadows of the mind by Roger Penrose



2. Consciousness explained by Daniel Dennett



G AKASH

Look Before You Taste

Have you ever had green strawberry juice or blue sandwiches? I bet none of us would ever want to. The only people unfortunate enough to have eaten such weird-coloured food are probably subjects of neuroscience experiments which aim to find out the effect of colour on taste perception. Even though we have five senses, each sense doing its own specific job, these senses collaborate in some cases to affect our actions. So the flavour of something you eat actually depends on how it looks, smells and feels. This fact seems obvious, but future scientists as we are, we totally understand why people would want to test these results in a scientific way. A lot of experiments have been conducted in many different ways. One consisted of changing the amount of food colouring and the

sweetness of a particular fruit juice. It was observed that colour affected the overall perceptibility (how much the subjects liked it) and the flavour quality (how much it tasted like the original fruit juice). Also, changes in colour made people think the flavour of the drink was different. For instance, people thought orange coloured strawberry juice was actually orange juice. Experiments have also reported that colours like blue and grey in food repulse people while foods having certain shades of yellow and other colours may attract people more even though they might be less tastier than the weird-coloured food.

So now, think before you say no to blue food... it might just be tastier than your everyday yellow mess food.

KSHITI MISHRA



Which one would you like on your plate?



ScienArt– The Science Behind Kalamkari

NEHA M



A Kalamkari art

Have you been wondering about the foul smell near the multi-purpose hall last month? If you haven't figured it out by now... it was the paints from the Kalamkari workshop. For those who don't know about it, it is a traditional art from Andhra Pradesh which uses natural and organic dyes (which unfortunately stink).

Padmashri Gurappa Chetty was present at IISER Pune to conduct the workshop (For more info on him, read his interview on Page 2). Creating a piece of this traditional art involves a long procedure and even the smallest piece of art takes about 18 days to complete. What is even more amazing is that its a highly precise scientific process, where each step has is a vital one.

Every step in the procedure can be explained analytically. The cloth is made by treating it with milk and myrobalan. Myrobalan is high in tannin contents and acts as a mordant for the ferrous content present in the paint called the *kasami* used for the outline. The fat in the milk prevent the spreading of the paints on the cloth. The paint is prepared by fermenting jaggery with iron. It looks brown-yellow in colour and when put on the cloth almost instantly turned dark brown or black and the compound which gives the colour is the reaction between ferrous acetate and tannins. This is the 1st step, where outlines or shapes are filled in. The next colour to be filled in is red, with alum as its mordant. Fixing the mordant for a day, the red colour was added by boiling with the dye. The complete process takes around 3 weeks. Due to time constraints, the students did only 2 colours.

This old Indian tradition is a beacon of hope in these days of synthetic colours, as it obstinately sticks to the age-old natural & environmentally healthy methods developed in ancient India & passed on since time unknown.

KRISHNA ANUJAN

Hide And Seek

Long touted as an example of cryptic colouring, the female *Misumena vatiaspider* switches her body colour over the course of days depending on the flower where she lurks. Sitting on a bloom ready to pounce on pollinators, the spider supposedly shifts to match her background by switching between white and yellow. To human eyes, she looks as if she's becoming harder for her prey to see.



A crab spider hidden on a Geranium Flower

Contrary to the textbook scenario, though, a white spider on a white flower doesn't catch more prey than a white spider moved to a yellow flower, researchers report. Nor does a yellow spider on a yellow flower get a color-coordination bonus, says study coauthor Rolf Brechbühl of the University of Fribourg in Switzerland. He and his colleagues reached this conclusion after

videotaping some 2,000 occasions when an insect buzzed over to a flower that held a spider. After this research breakthrough, I'm afraid textbooks may have to be rewritten.

Researchers are now putting thought into the fact that we may be searching for answers in the wrong direction and protection from predators or advantage in trapping prey may not be the major rea-

son for camouflage in this species. It has been pointed out by Lars Chittka of Queen Mary that these spiders can see ultraviolet wavelengths. However, non-UV-reflecting spiders have been observed to sit on UV-reflecting flowers as well.

On a different line of thought, ecologists, like Thomas C. Ings, are trying to correlate the sex of the spiders with the colour change since only the adult females change colour. It has been speculated that the cryptic colour coding might even have a direct advantage in the egg-laying process! It could also be the case that it had a predation advantage in the past and it just stuck! So, till researchers figure out the why and the how, keep trying to spot them!

Check out: <http://goo.gl/R8ATf>

Opposites Do Not Attract!

At the US Air Force Research Laboratory, Vincent A. Billock and Brian H. Tsou explore "disastrous visual failures that they can arrange". They have studied an intriguing phenomenon which they call 'forbidden colours'. But what are forbidden colours and why are they called so?

Have you seen the colour bluish yellow? No, not green. Some shades of green can appear bluish and some can appear yellowish. But no shade can appear bluish and yellowish at the same time. Similarly there is no single colour that appears reddish and greenish at the same time, in the same place. This is called Colour Opponency. According to recent research, colour opponency has its basis in the retina and mid-brain. Raw colour



signals originate in the cone cells of the retina. Other cells add and subtract outputs from the three types of cone cells, producing signals related to four colours: red, blue, green and yellow. But it seems that our visual system is wired with two data channels for colour: a red-

minus-green channel and a yellow-minus-blue channel. These channels operate such that positive signals show the level of redness, negative ones- the level of greenness and zero signals, neither. The same goes for yellow-minus-blue channels. This wiring ensures colour opponency.

But work done by these two scientists (one of them actually being colour blind himself) has shown that under special circumstances, people can see opponent colours, implying that colour opponency in the brain might have a soft-wired stage that could be disabled.

KSHITI MISHRA

Have you ever heard about these colours before? Weird, aren't they?



Falu Red



Razzmatazz



Caput Mortuum



Feldgrau



Gamboge

KRISHNA ANUJAN

Weblink

<http://goo.gl/5ejvm>

gene EXPRESSION

the students' corner



Mayan Diary

I hate waking up with the Sun God. Not because I like sleeping, but the days around here are generally boring and I am stuck looking after my imp of a little brother. My father and elder brother leave for our corn fields as soon as the cock crows. Today, however, I jumped out from underneath my blanket because it is the day of my favourite festival. The Mayan city comes alive every 20th day with a festival in adoration of a different God when the citizens gather at the central pyramid and worship as the High priest performs a sacrifice to please the God.

I performed my daily cleansing ritual and my mother tied a ball of resin above my eyes. My head was nice and flat because my mother had tied a wooden board to it when I was a child. I have a perfect flat head and all the girls my age envy my beauty! Mother wants my eyes to be the most cross-eyed as well so that I would definitely marry the best suitor. Mother tells me that then I can have new clothes and shiny gold jewellery and the rarest of

gems from the treasury that the white bipeds call 'El Dorado'.

I had to fetch water from the river, so off I went happily with my new clay pot (I broke the old one when I tripped over a root last week). On the way, I stopped to stare at the potter's yard. I don't know if he uses magic on the pots or if it is as they say - a unique formula that our ancestors invented that gives the sculptures that he carves a brilliant azure blue, like a reflection of the great plate over our heads. Our clay sculptor has created a fascinating Stela* at the Temple of the Hero Twins, the valiant ancestor of all Mayans, at the last K'atun, the major festival which comes every 20 years.

I hurried back to my hut, hoping Mother wouldn't be angry for leaving the little one unattended for so long. All through the day, I waited impatiently for my kin to return so that we could go watch the games and the dances at the Great Pyramid. As the shadows began growing longer, they returned and before I knew it, we were

finding our way through a bustling city crowd of jewellers, cloth vendors, cattle (on sale, again), sacks of corn and kidney beans. I could hear the beating of the drums and the dance had begun when we reached there. A group of dancers, dressed in colourful head-dresses of feathers and bells were performing at the foot of the pyramid, their bells jangling in unison, both amazing and frightening me! I watched, with wonder, the high priest climb up the steps of the pyramid towards the man who was to please the Water God today. I couldn't see what happened but my father told me at night that the noble man pricked himself and let his blood onto a bark, which was burned so the fumes reach the heavens to the Gods above. I bet the Water God was extremely pleased with us, but who can tell until the next rains?

*(an etching in Mayan glyph)

KRISHNA ANUJAN

Foodie Corner

AASHAY PATIL

For those foodies who are interested in French food, Arthur's Theme in Koregaon Park is one of the best places to visit. In fact, it is the only restaurant in Pune that serves authentic French cuisine. It was started by Chef Navtej Sawhney, who was the winner of the "King Chef" title in 2004. The restaurant serves delicious speciality French cuisines made out of vegetables, pasta, & an exotic range of dishes including those of fish, beef tenderloin, duck and turkey. In addition, it has a variety of salads, starters, soups and desserts. For those with a sweet tooth, I recommend the Crepe Suzette. The expenditure per person for a 3-course meal will be around Rs.400. For the detailed menu and prices, visit the website.

So, if you are a fan of French food or want to try it out once, then do visit Arthur's Theme.

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Vigenère Cipher

The Vigenère cipher is this new, about-to-become-happening code to pass on your secret messages without being intercepted. The method was described by Giovan Battista Bellaso but unfortunately he was one genius who didn't get his due as the cipher was later misattributed to Blaise Vigenère.

To encrypt your message, you use this scary-sounding but very simple table called the *tabula recta* or *Vigenère table*. This is a grid of all alphabets and looks like the figure on the right.

Next, you choose a key, a word that will help you decode whatever word/phrase you have encoded. For instance, let the key be 'sleep'. Now we encode our message using the table. For the sake of simplicity, let's take our message to be a single word-Microsoft. First I repeat my key-word till it matches the length of our message:

M I C R O S O F T

S L E E P S L E E

Now, the first letter of our coded message will be the letter in the row having the first letter of the key (S) and the column having the first letter of our original word

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A
C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B
D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C
E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D
F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E
G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F
H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G
I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H
J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I
K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J
L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K
M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L
N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M
O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N
P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y

The Vigenere Table

(M). So here, the first letter of our code-word is the letter in the Sth row and Mth column i.e. E. Proceeding in a similar way for all letters, we get our code word as:

ETGVDKZJX.

For decoding, we follow the reverse process. Now, our word is ETGVDKZJX which looks like this bunch of

frustratingly unrelated letters to anyone who hasn't heard about the Vigenère cipher (see, that's why you should read the newsletter!). You somehow let the intended receiver know your key so that they can write the code and the key as:

ETGVDKZJX

SLEEPSLEE

Now the receiver takes the first letter of the key (here, S) and moves along that letter row till he/she finds the first letter of the code-word (being E here). They then go up that column. The first letter of the column is the first letter of the original message, being M here. They proceed till they find the whole message. For those of you who are willing to waste a lot of time to pass around total intercept-proof chits, this is THE cipher. Those who understood all the gibberish written above can proceed to solve the following code:

(Key = trap)

ARHPULSIXU!!!

KSHITI MISHRA

THE EDITORS AASHAY PATIL

ARSHAD ARJUNAN NAIR

YOUR ARTICLE COULD BE HERE

or maybe in a bigger and better spot?

To see your article in the next issue of Sentience, get in touch with the editors in person or submit your articles online at sentience.iiserpune@gmail.com