



SCHOOL OF LIFE SCIENCES
MANIPAL
(A constituent unit of MAHE, Manipal)

VIVUS

Vol 4, Issue 1

EDITOR'S NOTE

Hello!

We are happy to give to you **Volume4 Issue1 of Vivus**: The School of Life Sciences Newsletter! Being the newly elected Editorial Board, we progressively carry on the legacy set by the previous editors and are happy to present to you some new initiations:

A regularly updated website to bring together all events, talks, forms and media from all committees and student bodies under one umbrella – sites.google.com/site/everythingatsls

An open-to-all Editorial Notice Board on the first floor, where students can put up all sorts of content, including announcement post-its, art pin-ups, 'This Week in History' and sections for student bodies.

The Newsletter is now designed with a revamped layout and new sections like 'Know Your Labs' (Read inside to find out!)

We sincerely thank the authors of the articles for their contributions to make this issue a success.

We would like to extend our gratitude to **Dr. K. Satyamoorthy** for his encouragement and guidance, **Dr. T. G. Vasudevan**, **Dr. Saadi Abdul Vahab** and **Dr. Vidhu Shankar Babu** for their supervision and advice and the **Student Council** for their support.

We thank Mr. Harsh Ranawat (III year, BSc Biotechnology) for cover page photograph.

Lastly, we thank you, for having taken out the time to read through this issue.

For any queries and suggestions, please contact us at sls.edboard@gmail.com

Thank You!

-Harsh Ranawat and Tanaaz Khan

III year and II year, BSc Biotechnology

Co-editors (2017-18)

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Manipal Academy of Higher Education

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THE ZOMBIE ANT AND MIND CONTROLLING FUNGUS

Shraddha Gaonkar (III Year, BSc Biotechnology)

We all have heard, talked and have been fascinated by “**mind control**”. But, do you believe if it really exists? Well, it is true in the case of *Ophiocordyceps unilateralis*, which is also known as “**Zombie fungus**”. These are parasitic fungi hiding in the depths of tropical forests which target ants belonging to Camponotini Tribe (*Camponotus leonardi*), also called Carpenter ants.

“After their death, these ants turn into alien like structures where the sprouting of the fungus occurs on the head, these release spores for spreading of the infection to fellow ants. ”

Scientists led by **David Hughes** have conducted research to find out how these parasitic fungi manage to control the ants behaviour. When these ants are infected by this fungi they sacrifice themselves and allow the fungus to grow on them. These fungi mainly attack the head of ants which is very specific and start growing after their death. One week after the infection of this zombie fungi, the infected ants are separated from their nest and are made to move away from their nest guided by the parasitic fungi in search for optimum temperature and

humidity for the fungi’s growth. Another reason why the infected ants are made to move away from the nest could be because of their defence mechanism known as **Social Immunity**. The infected ants are recognized in the colony and are moved away from the nest to avoid spreading of the infection. This could be one of the survival tricks of the zombie fungi. These ants after moving away from their colony and nests, are manipulated to bite the veins of the leaves which leads to their death. This is also known as the “**death grip**”. After their death, these ants turn into alien like structures that release spores for spreading of the infection to their fellow ants. The death of the ants will lead the fungus to upregulate sugar metabolism and downregulate pathogenicity.

Studies conducted by the group of scientists to explore the bizarre behaviour of the carpenter ants observed that there was alteration in the gene expression before and after the “death grip”. The infected ants had downregulated sensory response. Increase in the secretion of **Sphingomyelinase** was observed which helps in the increased breakdown of sphingolipids leading to breaking of nervous system. Changes were also observed in dopamine levels. Earlier studies have shown that dopamine induces aggressive behaviour in ants and this explains the biting behaviour of the infected ants. Further studies are being conducted to

study the chemicals used by zombie fungi for mind control.

Though the situation sounds seemingly weird, such psychoactive behaviour is familiar to the fungi. *Claviceps purpurea* causes ergot poisoning leading to convulsions and gangrene. These

symptoms have been used as a source for accusations for Salem witch trials in the past.



A Thai carpenter ant, *Camponotus leonardi*, once manipulated and killed by the brain-manipulating fungus *Ophiocordyceps unilateralis*. The fungus is in prime condition with three large spore-producing bodies straddling the stalk. Spores are launched from these to infect other ants.

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IS IT 'SMART' TO TRADE OFF EVOLUTION FOR INTELLIGENCE?

Archica Gupta (II Year, BSc Biotechnology)

May 1873, the papers saw a column being printed every single day for months together. *"Missing! Stolen! Lost! Young Lumpfish from Brighton Aquarium."* City's finest detectives were called to solve the mysterious disappearance of the lumpfish. Everyone questioned, *"Who is the culprit?"*

It was the sly resident of Tank 27, Brighton Aquarium's famous aquatic creature, **the octopus**. The octopus would get out of its tank at night when no was around, climb into the next tank and eat one of the lumpfish and then quietly return to his own tank with a well filled stomach. As the morning arrived, it would demurely swim in its tank watching the perplexed detectives scratch their heads.

"This complex and yet, impressive behaviour portrayed by coleoid cephalopods may be attributed to a genetic quirk during post transcriptional processes. "

This famous true story is one of many that award coleoid cephalopods the medal for the **"Smartest Invertebrates"**. This 'genius' category includes octopuses that can open jars, squids that can develop their own Morse code for communication and cuttlefish whose camou-

flaging skills remain unparalleled.

In **2017**, researchers cracked the genetic oddity that gives these invertebrates their smarts. This complex and yet, impressive behaviour portrayed by coleoid cephalopods may be attributed to a genetic quirk during post transcriptional processes.

We have learnt how genetic information embedded in the DNA is faithfully passed to RNA which works as a messenger and helps in building proteins. However, studies have shown that octopuses, squids and cuttlefish do not follow these 'rules' perfectly. In the journal, *Cell*, researchers reported that these invertebrates extensively use a post transcriptional process known as **RNA editing** to help diversify proteins in their nervous system. The proteins generated as a result may contribute to a highly efficient neural circuitry and give these coleoid cephalopods their intelligence. RNA editing seems to be 'rule' followed by cephalopods that allows DNA to be used as a reference instead of a template for synthesizing new proteins, with nary an exception.

RNA editing uses certain enzymes (ADAR) that swap the nucleotides A, U, G, T during post transcriptional processes and thus create new proteins that were not originally present in the DNA. Usually, RNA's Adenosine (A) is converted to Inosine (I), resulting in the introduction of a new amino acid that could be held responsible

for the diversity in proteomes exhibited by cephalopods. The organism develops a new genetic blueprint which is different from the one encoded in the DNA boosting its complex neural behaviour.

Researchers were always aware of RNA editing and RNA editing sites where such changes of amino acids takes place. Many animals including humans have RNA editing sites present in our genome. However, they are mainly located in **untranslated regions** instead of the coding regions.

The 2017 study set to find out just how much these invertebrates were using this technique to tweak their original genomic blueprints. Results indicated that nearly 65% of the cephalopod edits were in the coding region and non-synonymous. The RNA editing in Squids is quite remarkable. Furthermore, it was observed that these regions were highly conserved suggesting that RNA editing sites were under a positive selection by nature.

Unfortunately, all good things come with a trade-off. When the researchers examined cephalopods genes, they found that these RNA sites showed an enormous depletion in DNA mutations in order to conserve these intense editing regions. This trend was seen in the majority of their genome and thus, monumentally decreasing their evolutionary rates. **Natural selection**, somehow, seemed to have favoured RNA editing in octopuses, squids and cuttlefish even though it leads to a potential decrease in DNA-based evolution.

Though the exact functional consequence of this editing has not been found, researchers are certain that RNA editing must be 'worth it' even if it means losing the evolutionary race.

This trade-off between genome evolution and transcriptome plasticity may highlight the importance of RNA editing as a strategy for developing new proteins. Particularly those associated with neural function but do you think it is *smart* to trade-off evolution for intelligence?

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GENOME REPROGRAMMING

Aron Iral Mathias (II Year, MSc Bioinformatics)

Synthetic biology goes from having a digitized DNA sequence to predicting its biological function. Genome editing tools help with this idea. Biologists are convinced that these genome editing tools can help explore the genomes better. One such technology is the **CRISPR-Cas9** system. **C**lustered **R**egularly **I**nterspaced **S**hort **P**alindromic **R**epeats (**CRISPR**) derived technologies have revolutionized the ability to target DNA manipulation in vivo. CRISPR-Cas9 is a unique technology that enables geneticists and medical researchers to edit parts of the genome by removing, adding or altering sections of the sequence.

“The bacteria snip out parts of the virus DNA and keep a bit of it behind to help them recognise and defend against the virus next time it attacks. This provides the bacteria with acquired immunity.”

There are two key components of the CRISPR-Cas9 system: A **Cas9 endonuclease enzyme** that cuts through DNA like a pair of molecular scissors and a small RNA molecule called **guide RNA (gRNA)** that directs the scissors to a specific sequence of DNA to make the cut. The gRNA binds to a specific sequence in the DNA. The Cas9 follows the gRNA to the same location

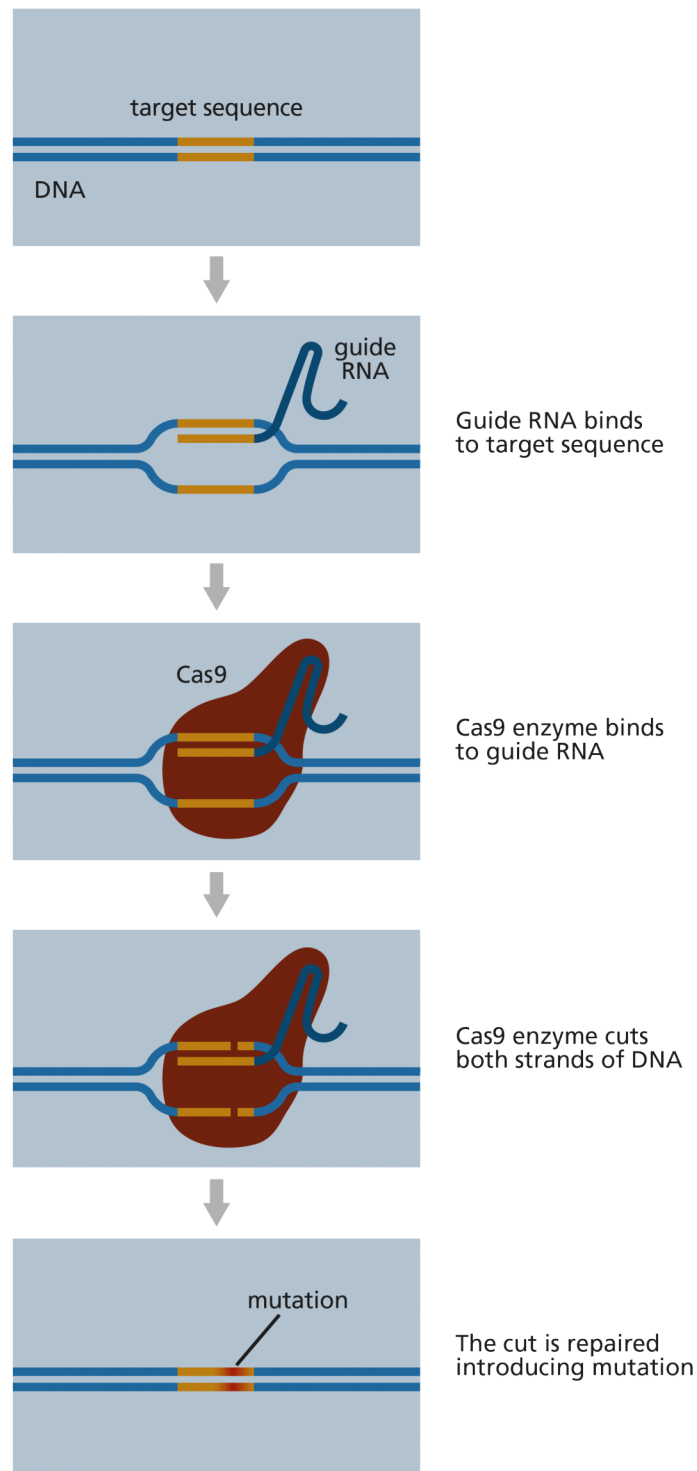
in the DNA sequence and makes a cut across both strands of the DNA. The cell recognises that the DNA is damaged and tries to repair it. The DNA repair machinery can be used to introduce change to one or more genes in the genome of a cell.

Using CRISPR, the bacteria snip out parts of an invading phage/virus DNA and keep a bit of it behind to help them recognise and defend against the virus next time it attacks. This provides the bacteria with acquired immunity. CRISPR-Cas9 has a lot of potential as a tool for treating a range of medical conditions that have a genetic component. For this, somatic cells are used as they are less controversial. The potential to edit reproductive cells has many ethical issues. The CRISPR-Cas9 system also has the ability to edit another location than what was intended to.

The guide RNA is a specific sequence of 20 bases. The gRNA is complementary to the sequence to be edited. However, not all 20 bases need to match for the guide RNA to be able to bind. The problem with this is that a sequence with, for example, 19 of the 20 complementary bases may exist somewhere completely different in the genome. This means there is potential for the guide RNA to bind there instead of at the target sequence. The Cas9 enzyme will then cut at the wrong site and end up introducing a mutation in the wrong location. While this mutation may not matter at all to the individual, it

could affect a crucial gene or another important part of the genome. Scientists are keen to find a way to ensure that the CRISPR-Cas9 binds and cuts accurately.

This can be achieved in two ways: the design of better, more **specific guide** RNAs and minimise the **'off-target'** behaviour of different versions of the Cas9-gRNA complex. The use of a Cas9 enzyme that will only cut a single strand of the target DNA rather than the double strand. This means that two Cas9 enzymes and two guide RNAs have to be in the same place for the cut to be made. This reduces the probability of the cut being made in the wrong place.



<https://www.yourgenome.org/facts/what-is-crispr-cas9>

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- <https://www.yourgenome.org/facts/what-is-crispr-cas9> (24 November, 2017)

THE LIVING STATUE SYNDROME

Tanaaz M Khan (II Year, BSc Biotechnology)

“Rare diseases are a natural experiment in human biology. A tiny alteration to a single gene can produce a radically different outcome, which, in turn, can shed light on how the body works in normal conditions. ”

-Dr. Frederick Kaplan, University of Pennsylvania

Do you ever wonder what it is like to have your body be locked into a fixed position slowly as you grow older? This was the case with Jeannie L. Peeper, who was diagnosed with **Fibrodysplasia Ossificans Progressiva** at the age of four. It all started when she was born with a short and crooked big toe. Not making anything of it, the doctors just put in a toe brace and sent her. As she grew up, her parents observed bulbous swellings on the back of her head without any injury. Also, she could not open her mouth wide enough to eat comfortably. These haphazard set of symptoms sent her parents to the doctors who were clueless as to what it could have been. Until they did a few blood tests and biopsies that is, after which they had a confirmed diagnosis -Fibrodysplasia Ossificans Progressiva.

As befits the name, the condition is an extremely rare autosomal disorder with an occurrence rate of **1 case in every 2 million** people. It is caused due to a mutation in the **ACVR1** gene. This gene encodes for the **Activin type-1** receptor which is a Bone Morphogenic Protein (BMP) receptor. The BMP family of proteins are from the transforming growth factor superfamily that forms the tissues of the bone. A mutation in the

ACVR1 gene causes substitution of **codon 206** from Arginine to Histidine leading to the abnormal activation of the gene. This leads to the conversion of endothelial cells to mesenchymal stem cells which later forms bone. Since this disorder is autosomal in nature, it has variable expressivity but almost **complete penetrance**.

Although the disorder shows autosomal inheritance most of the cases are due to sporadic mutations in the gene itself. The disorder mani-

“As the child grows older, the extra skeletal bone tends to fuse resulting in almost complete immobilization of the body. ”

festes at birth with the presence of malformed toes (**Hallux deformity**). By the time the patient is five years old, they experience painful swellings on the back of their head that turn into bone containing lumps. As the child grows older, the extra skeletal bone tends to fuse resulting in almost complete immobilization of the body. Some other features would include sparse hair, absence of toes/ fingers/ nails, cataracts, retinal detachment, glaucoma, cerebellar

abnormalities, presence of primary teeth in adulthood and mild cognitive deficits.

When Ms. Peeper received her diagnosis, she spent most of her formative years believing that she was indeed the only one who was affected by this disease. This was until she met **Michael Zasloff**, a Geneticist working in the **National Institute of Health**. At that time, he was working under **Victor McKusick**, one of the greatest clinical geneticists the world has seen. Dr. McKusick occasionally came across patients with rare disorders, but the cause of this disease eluded him as well. This gave him a reason to consider studying this disease. He looked into records from as far back as **1736** on the first reported cases of this disease. Slowly, he began gathering information from the very few cases that came to light. By the time Ms. Peeper had come to him for a referral for a hip implant, he had met only 18 people who were affected by this disease. Once he had realized he could not help her medically, he decided to put her in touch with the other patients he had known.

Ms. Peeper got in touch with the surviving patients and four times every year, she would send out newsletters with questions about basic things such as ‘How to eat with a locked jaw’ or ‘What can we do about surgery?’. But she had more in mind. She wanted to raise money for research. So, she along with 11 other members, founded the *International Fibrodysplasia Progressiva Ossificans Association* (IFOPA). Ms. Peeper did not realize how unrealistic her desire was at that juncture. The problem with rare dis-

eases is that, firstly, there are not many samples that can be taken since very few people are affected by this disease. Secondly, most companies would prefer putting their money into diseases such as cancer, diabetes which affects a greater population. To her fortune, **Dr. Frederick Kaplan**, a Professor and Orthopaedist at the University of Pennsylvania had decided to delve into this problem. With the money that had been raised by the organization through various fundraisers, he has been able to work on this for around two decades now.

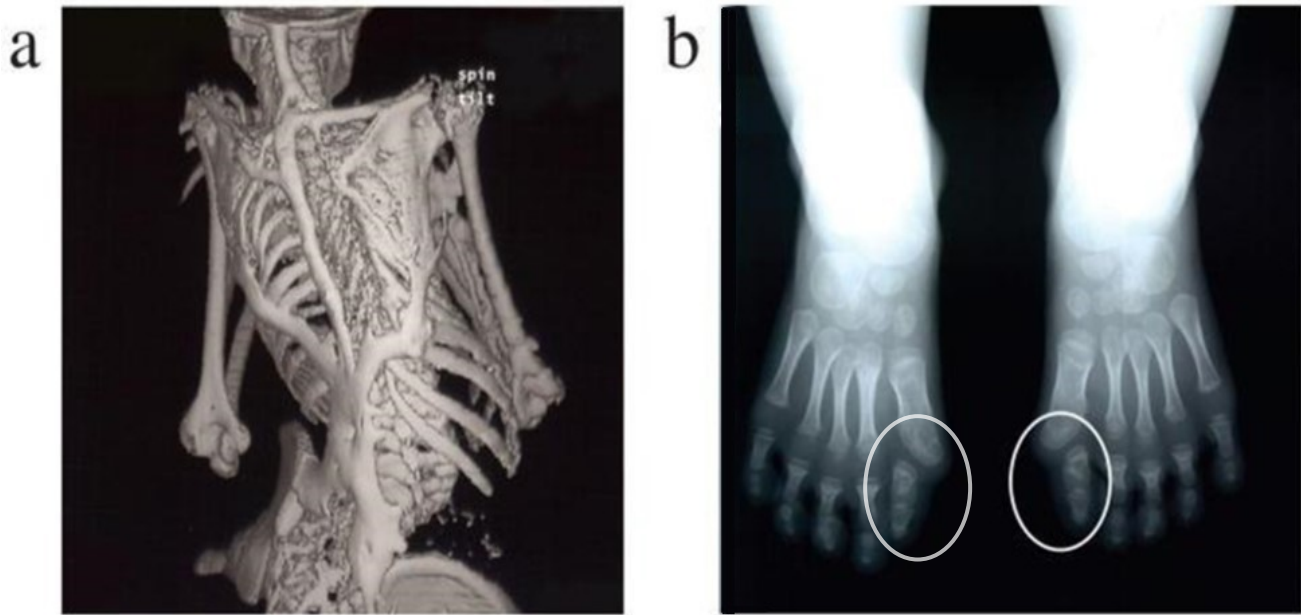
Due to the combined efforts of Zasloff, Kaplan and his students, they finally had their biggest breakthrough in **1996**, after almost two centuries of living in darkness. They had sorted through the entire human genome, bit-by-bit when they came across the mutation that caused it. This was a mammoth task considering that they did not have the genome sequencing tools that we have now. Their work did not end here as they still had to figure out its mechanism which took another seven years. They found out how the BMP proteins accumulated due to the **hyperactivity of the ACVR1 receptor**.

Once this hurdle was overcome, they still had to figure out a way to be able to manage the disease. Finding a pharmaceutical company to help was a challenging task back then but they were backed by the NIH program named *Therapeutics for Rare and Neglected diseases*. They are still looking into the nitty-gritty of the disease to help the 700-odd people afflicted by this debilitating syndrome. Research on this rare syn-

drome has also brought out many ideas for managing other diseases such as osteoporosis and the like where there is deficit in the formation of bone.

Even now, one could hope of a time where diseases like these could be managed as easily as

the most widespread diseases. Even though they are termed rare diseases, they affect a substantial number of people in the population, who deserve a chance to live with least mitigating circumstances.



A) 3-D Imaging showing extensive heterotopic bone formation
 B) X-Ray showing symmetrical malformed great toes

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THE NOBEL PRIZES - 2017

Harsh Ranawat (III Year, BSc Biotechnology)

The **Nobel Peace Prize 2017** was awarded to **International Campaign to Abolish Nuclear Weapons (ICAN)** "for its work to draw attention to the catastrophic humanitarian consequences of any use of nuclear weapons and for its ground-breaking efforts to achieve a treaty-based prohibition of such weapons".

ICAN promotes inclination to and the translation of the United Nations nuclear weapon treaty. The global agreement including non-governmental organisations from over 100 countries was adopted in New York on July 7, 2017.

The **Nobel Prize in Literature 2017** was awarded to **Kazuo Ishiguro** "who, in novels of great emotional force, has uncovered the abyss beneath our illusory sense of connection with the world".

According to the Swedish academy, the style of the now 62-year-old is of memory, time and self-delusion, the secretary of the academy calling it a mix of "Jane Austen and Franz Kafka and a little bit of Marcel Proust". He has written seven novels and numerous screenplays, song lyrics and short stories.

In one of his most famous works - dystopia themed *Never let me go (2005)* he introduced a cold undercurrent of science. This book was adapted into a film in 2005, as was his other book - *The White Countess*, in 2010.

The **Nobel Prize in Physics 2017** was divided, one half awarded to **Rainer Weiss**, the other half jointly to **Barry C. Barish** and **Kip S. Thorne** "for decisive contributions to the LIGO detector and the observation of gravitational waves".

LIGO - Laser Interferometer Gravitational Wave Observatory - is first of three such huge devices that detect compressions and expansions in the fabric of space-time when disturbances like gravitational waves propagate through it.

Weiss is an experimentalist who first conceived the idea of an interferometer for this purpose, *Thorne* is a theorist who helped to extract signals that astronomical phenomena produce and *Barish* is a master of instrumentation who led the project in vital developments. Though the prize was awarded to three individuals, the legend of LIGO is of all the 1000+ members who have worked for over 40 years to make one of the most elegant and innovative experiments by mankind.

The **Nobel Prize in Chemistry 2017** was awarded to **Jacques Dubochet**, **Joachim Frank** and **Richard Henderson** "for developing cryo-electron microscopy for the high-resolution structure determination of biomolecules in solution".

Cryo-Electron microscopy involves rapidly cooling water of the solution such that instead of crystallizing, it remains in a disordered state

(*vitrification*), much like how glass, a super-cooled liquid, is made. This enables retention of native structures of the protein in solution, a condition that was never achievable by conventional electron microscopy.

Frank devised methods to obtain 3D renders from 2D images, *Henderson* formulated this technique to visualise 3D protein structures to the atomic resolution and *Dubochet* completed the triangle by making vitrification for observing samples possible.

The **Nobel Prize in Physiology or Medicine 2017** was awarded jointly to **Jeffrey C. Hall, Michael Rosbash** and **Michael W. Young** "for their discoveries of molecular mechanisms control-

ling the circadian rhythm"

The trio had been successful in digging deeper into Benzer and Konopka's work of an unknown gene called "period" in *Drosophila*. They isolated the protein and observed the change in its levels through the circadian cycle, along with other regulatory proteins. The underlying mechanisms they discovered apply to all complexities of living organisms and have a huge impact in our understanding of disease and physiology, in what is now a growing field called *Chronobiology*.

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- Wikipedia— International campaign to abolish nuclear weapons

INTERVIEWS

Of those who know better.

DR. BIPIN NAIR

Russell Lorenzo Castellino (II Year, BSc Biotechnology), Tanaaz M Khan (II Year, BSc Biotechnology)



Prof. Bipin Nair, the **Dean of the Department of Biotechnology, Amrita University, Kerala** visited the School of Life Sciences on **14th September 2017** for a guest lecture. He obtained a PhD in Microbiology from the M.S. University of Baroda in 1986 and did his Postdoctoral research at the University of Tennessee, Memphis, USA. He moved into the Pharmaceutical Biotechnology industry by working for a company named MDS Pharma Services, Seattle, Washington DC, where he held the position of Senior Scientist of Lead Discovery. After returning to India in 2004, he took charge of the Biotechnology Department at Amrita University. Here are some excerpts from an interview conducted by the Student Council.

Student Council (SC): What are the current fields of research you are involved in?

Dr. Bipin Nair (BN): Our focus is on the development of low cost biomedical devices in diagnostics. Our choice has been Diabetes where we have developed a prototype for an **automated insulin pump** and had the first of its kind **non-enzymatic glucose sensing system** which are covered by US patents. Now, we are collaborating with Wipro Technologies in Bangalore and trying to commercialize it.

SC: What led you to work on Diabetes, especially, the area of low cost devices?

BN: In India, we are too dependent on importing high level systems. The cost of these devices makes it extremely prohibitive to do so.

The Insulin pump costs around 2.5-3 lakhs which is way beyond the reach of patients in any part of the developing world. The disease problem is there but the affordable care is not available. That's why we turned our focus on trying to develop indigenously low-cost devices.

SC: Do you have any advice for young scientists?

BN: Students should change their mindset. Gone are the days when only becoming an engineer, or a doctor was life fulfilling. Now, you have very good support systems where you can pursue a career in pure and allied sciences and still succeed in life. It's how you approach the problem and how well you have inculcated the training that you have received. Taking that for-

ward with a dedication and commitment and that is all that matters. There cannot be any half-hearted approach to anything in life. You must give it everything you have and go the extra mile. That is the approach, attitude and mindset that you must develop as students. In India, there is no dearth of facilities, infrastructure, resources anymore which used to be the case 30-40 years ago. So, you cannot as students say that only if we go to the US would we be successful. You should go to have that exposure as well, but you can be trained as well as any student in any part of the world, right here in India, at home, if you apply yourself well.

SC: What emerging fields of research, as of now,

do you see as having a very good future?

BN: We are working on **Multi Drug Resistance** as well. We, as a country have a population that is prone to infections and we may face a situation where common infections cannot be cured with the drugs that are available. People are looking at novel approaches to contain this problem. Another issue related to the infection problem is the **Management of Waste** and control of it in the environment. We have some work that is being funded by the **Bill and Melinda Gates Foundation** and the **DBT and BIRAC** looking to treat waste water. We are looking for a novel approach where we make the use of bacteriophages. We are also looking to reduce infection and potential foul smell and make things more favourable to manage our sanitation problem.

DR. PREM KUMAR**Bhargavi Karna (II Year, BSc Biotechnology)**

"I was always fascinated by science", said Dr. Prem Kumar.

Dr. Prem Kumar is the **Professor of Information Technology** in the Department of Electrical and Computer Engineering and Director of the Center for Photonic Communication and Computing in the **McCormick School of Engineering and Applied Science** at Northwestern University. He also holds an appointment as **Professor of Physics and Astronomy** in the **Weinberg College of Arts and Sciences** at Northwestern University. He obtained a Ph.D. in Physics from the State University of New York at Buffalo in 1980. He is the author/co-author of over 300 publications, including 115 papers in peer-reviewed journals. His research focuses on the development of **novel fiber-optic devices** for ultrahigh-speed optical and quantum communication networks. He is also the founder of **NuCrypt LLC**, a startup

company focusing on the commercialization of quantum encryption technology for securing the physical layer of fiber-optic networks.

At the **IONS conference** at CUSAT, Kochi, the students of SLS got an opportunity to interact with Dr. Kumar. In the interview, he spoke about his journey towards the road of Science.

"The first riddle that fascinated me was when I was 10 years old and we were introduced to Science and Mathematics.

My Mathematics teacher, while teaching geometry, would say, 'Parallel lines don't meet. Non-parallel lines meet at a point. And point is a zero-dimension entity.' In the very next lecture the Science teacher would say, 'Everything is made up of matter and matter broken down to its smallest form without losing its original properties is an atom. Atom is the smallest entity of existence.'

These two concepts puzzled me and that's where my curiosity began. I realized abstract and physical aspects of matter are equally important and related. I started with my thesis on theoretical physics and then moved on to experimental and applied physics.

Luckily, I happened to come across LASERS in 1977 in my first year of graduate school at University of New York, Buffalo. Before that, I had only heard about it while doing my undergraduate study at Delhi University. As I entered Buffa-

lo, I had no clue about what optic fibre or a photon was. On one occasion, I tagged along with some post doc students for a Quantum Optics conference. When we reached, we were late, I entered the big room of people and noticed the speaker: he had a high pitch squeaky voice. He said things I mostly didn't understand. Five years later, after meeting Professor Leonard Mandel, the curiosity to unravel the mystery of Quantum Optics had begun there. Quantum optics was a field in which I could bring both ab-

stract and physical aspects of matter together as we can visualize Laser to demonstrate the equations of quantum optics.

I did research on *Spectroscopy, classical optics* and eventually did a thesis on *Dye-Laser intracavity Absorption Spectroscopy*. After my Post Doc from Centre for Laser Studies, University of Southern California, I moved to MIT. Currently, I am engaged with Department of Electrical Engineering & Computer Science at Northwestern University."

ASHMI K J

Harsh Ranawat (III Year, BSc Biotechnology), Tanaaz M Khan (II Year, BSc Biotechnology)



‘Teach for India’ is a non-profit organization that mainly works on educating low income and socially disadvantaged children. The organisation provides fellowship for young teachers of these children. The Fellowship program is an initiative in which the recruits work for two years. The recruits are selected based on a rigorous three-month interview process.

Ms. Ashmi K J, is a **Fellowship Recruitment Lead** working for **Teach for India**. She visited the School of Life Sciences on **10th October 2017**, to give a talk on the same. She spoke about how the students could help with this initiative as volunteers and campaign leaders. She has been carrying out recruitment campaigns in many colleges in and around Karnataka. For the application process, once the candidate applies through the website, the names are sent to the recruitment heads. Next, the applications are

sifted through following which the candidate would get a call for their phone interview. After a few rounds, within a month and a half, the candidate would know whether they have made it through. The rigorous process is to ensure that only well-meaning and dedicated students are selected.

Apart from the Fellowship program, they also have volunteers and campaign leaders in colleges to spread the word and involve as many people as possible in their initiative. She encourages students who are interested in teaching to consider this option as it would be a very fulfilling job. She also added that the experience we would be gaining would build our skillset.

KNOW YOUR LABS

An attempt to inform you of the history, research and people here at the School of Life Sciences,

One Department at a time!

DEPARTMENT OF BIOPHYSICS

Dr. K. K. Mahato

Professor & HOD

▶ Laser Spectroscopy (Single & Multiphoton Spectroscopy of atoms and molecules in different phases)

Dr. Babitha K. S.

Associate Professor

Physical, Synthetic chemistry, Crystallography, Spectroscopy

Dr. Nirmal M.

Assistant Professor
Biophotonics

Bharat H. R.

PhD Scholar

Low Level Laser Therapy

Raghushekar C. R.

PhD Scholar

Auto-fluorescence in mitochondrial molecules



Jackson R.

Junior Research Fellow

Photo-acoustic Spectroscopy

Manasa S.

Junior Research Fellow

Anticancer Agents

Subhash C.

Assistant Engineer
Instrumentation

Spandana C.

Junior Research Fellow

Polarisation Microscope

This department of School of Life Sciences, started as **Center for Laser Spectroscopy** in the late 1990s, before being christened as the **Division of Biophysics** in 2006 and later as **Department of Biophysics** in 2014-15. In terms of research, the lab had started out by working on the **Early Detection of Cancer**. They developed an Oral Cancer screening tool with the help of *Philips Innovation Center, Bangalore*. The screening tool made use of a 325 nm Laser coupled with a Fiber Optic probe. The probe could be used to image any location in oral cavity and the emission profile was recorded. Later, they started working on ovarian cancer screening. This involved the use of Laser Induced Fluorescence and Photoacoustic Spectroscopy.

In **2010**, the department started working on **Early Wound Healing**. This brought in the use of Low Level Laser Therapy for the first time in Manipal. They made use of a 632.8 nm He-Ne Laser which showed promising results. In excisional wounds, the method showed healing a week earlier whereas in diabetic wounds, it showed healing around 12-13 days in advance. All that is known is that the mitochondria get stimulated and is responsible for inducing certain effects on the cells. But, the study involves understanding how mitochondria transports or activates any molecules or factors which are responsible for faster recovery or wound healing. The future prospects of the study would be to work on the mechanistic aspects and understand the role of wound healing, which can convince the clini-

cians in implementing them for the faster healing of wounds and better recovery of patients.

The department has also worked in the field of **Protein Characterization**. They tried using the intrinsic properties of the proteins. Tryptophan, Tyrosine and Phenylalanine were excited using specific excitation wavelength such as 280 nm and recording the corresponding Auto-fluorescence. The proteins are then analysed using 1D and 2D PAGE without staining and developing protein finger-print based on auto-fluorescence data. The extension of the study is now funded by *SERB, DST* to develop a portable system based on LED excitations.

A couple of other projects included the study of **Breast Tumour Development** which is being done under the financial support from *DBT, Govt. of India*. Breast tumours were introduced in nude mice by injecting MCF7 breast cancer cell line and the progression of tumour growth was studied using Photoacoustic Spectroscopy, which yielded promising results.

Since 2016, the Department has turned its focus on (a) biophysical properties of starch, (b) development and characterization of optical polarization microscope (c) smartphone based microscope, (d) design and development of anti-cancer drugs.

All the above work are carried out under the expertise of the faculty members - Dr. KK Mahato (Head of the Department), Dr. Babitha and Dr. Nirmal.

Currently, the department also has a MS student from the Department of General Surgery, KMC, Manipal who is working under Dr. Stanley Matthews on breast cancer detection and diagnosis. Similarly, every year, several Engineering students from MIT conduct their thesis work in the department along with our own B.Sc. and M.Sc. students allotted to them for conducting their thesis work.

On-going Research Projects:

- **Photoacoustic spectroscopy based objective assessment of breast tumor progression in-vitro & in-vivo** (DBT, G.O.I funded): Dr. K. K. Mahato, Jackson R.
- **Tissue Regeneration using Low Level Laser therapy** (DRDO and DAE, G.O.I. funded) - Dr. K. K. Mahato, Bharath H. R.
- **Interrogation of Proteins in Matrix by Stain free Light Emitting Diode (LED) Induced Autofluorescence** (SERB, DST, G.O.I funded): K.K. Mahato and team
- **Characterisation of Proteins in Mitochondrial Diseases** (MAHE funded)- Dr. K. K. Mahato, Raghushekar C. R

- **Development and characterisation of Optical Polarisation Microscope** (SERB, DST, G.O.I funded) -Dr. Nirmal M.,Spandana K.S.
- **Research on Anti-Cancer drugs** (DBT, G.O.I funded)- Dr. Babitha, Manasa G. Shetty
- **Biophysical Properties of starch** (MAHE funded) - Dr. Nimal M.
- **Smartphone Based microscope** (MAHE funded) - Dr. Nirmal M.

The department also conducts end semester projects for UG and PG students.

In terms of placements, the Department has groomed professionals who are in the research, teaching, investigation and related fields in the topics of biomedical optics, spectroscopy and biophysics. Currently two PhD scholars are on their way to completion and three Junior Research Fellows are newly appointed.

“There is no alternative to working hard. Don’t be superficial.

Whatever you do, do it honestly and you’ll get your reward in proper times.” - Dr. K. K. Mahato

COMPILED BY:

Aishwarya Bhat (II Year, MSc MBHG)

Megan D’Souza (II Year, MSc MBHG)

Megha Anchan (II Year, MBHG)

Shruptha Padival (II Year, MSc MBHG)

Harsh Ranawat (III Year, BSc Biotechnology)

Talitha Keren Kurian (II Year, BSc Biotechnology)

Tanaaz M Khan (II Year, BSc Biotechnology)

Yash Goel (I Year, BSc Biotechnology)

CREATIVE CORNER

Straight out of the right cerebrum.

CINEMA: THE MOTILE ART

Himanshu Goswami (III Year, BSc Biotechnology)

“ A story should have a beginning, a middle, and an end... but not necessarily in that order.”

– Jean-Luc Godard (French New Wave filmmaker)

Cinema has always fascinated me. I would sit for hours together reading about filmmakers, their craft and their experience and drift into their surreal and captivating world all by myself. Having been exposed to films from a wide range of genres and languages, and the appreciation of the same, I felt the urge to write something on the subtle yet powerful art form - **Cinema**.

From the visionary works of German Expressionism (*The Cabinet of Dr. Caligari*, 1920) in the first quarter of the twentieth century to the French New Wave and Italian Neorealism Post World War II and then to the surge of independent and experimental filmmaking, the world has seen several cinematic movements that are unique in their own form.

European cinema boasts of a significant number of influential directors that have made their mark on the map of world cinema. Direc-

tors like **Vittorio de Sica** and **Federico Fellini** (*Italy*), **Robert Bresson** (*France*), **Ingmar Bergman** (*Sweden*), with their shrewd observation of the human condition and the personal rhythms of life developed their own style of filmmaking which was highly influential in the moulding of European art cinema. There was the cinematic montage movement introduced by the Soviet filmmaker, **Sergei Eisenstein** (*Battleship Potemkin*, 1925). The surrealist movement by the Spanish filmmaker **Luis Buñuel** (*Un chien Andalou*, 1929) was characterised by non-linear narrative and shocking imagery consistent with his attacks on the bourgeoisie, whose hypocrisy and dissembling both amused and enraged him. *Citizen Kane*, 1941 by the great American auteur **Orson Welles** and *Rashomon*, 1950 by **Akira Kurosawa** are some classic examples of films that applied non-linear narrative. The widely popular French New Wave (*La Nouvelle Vague*) in the 1950s and 1960s applied narrative ambiguity, documentary style filming with long shots and close ups. (*Vivre sa vie*, 1962 and *The 400 Blows*, 1959).

The suspense films of Alfred Hitchcock had redefined the horror genre. (*Psycho*, 1960 and *Vertigo*, 1958). The character *Norman Bates* from “*Psycho*” is sure to give you the creeps. The film **Noir** genre is a style marked by a mood



Citizen Kane (1947)

of pessimism and fatalism in which the viewer has no idea of what to expect next. (*The Third Man*, 1949).

Names like **Martin Scorsese**, **David Lynch** and **Stanley Kubrick** are synonymous with American cinema which has churned some great actors like **Robert DeNiro**, renowned for his method acting skills and **Burt Lancaster**, the dreamy-eyed hunk. The independent American film scene is worth mentioning in this regard that has left a trail of some of the best films ever made on a shoestring budget.

Asia is home to some of the giants of world cinema among which **Akira Kurosawa** and **Yasujiro Ozu** (*Japan*), **Satyajit Ray** (*India*), **Wong Kar Wai** (*Hong Kong*) and **Apichatpong Weerasethakul** (*Thailand*) are highly revered. Wong Kar Wai's poetic filmmaking consisting of slow-motion shots coupled with a haunting soundtrack and an overwhelming cinematography is a visual treat. (*In The Mood for Love*, 2000). *The Apu Trilogy* about a young's boy journey to adulthood in rural India by Satyajit

Ray is an outstanding piece of work and a must watch for all film enthusiasts.

Watching and appreciating cinema is an acquired taste. Many aspects of a film like the cinematography, screenplay and the *mise-en-scène* play a significant role in presenting the ultimate masterpiece.



Still from the 1948 Italian film "*Bicycle Thieves*" by Vittorio de Sica

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- <http://www.openculture.com/2014/08/jorge-luis-borges-film-critic-reviews-citizen-kane.html>
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Antoine Doinel from Francois Truffaut's "*The 400 Blows* (1959)"

TO ALL THE MOTHERS OUT THERE

Shiksha Saraogi, (I Year, BSc Biotechnology)

Her eyes shine brighter than the sun
Her smile lights up the entire world
Her flaws, perfect
Her love is endless
Her hair flows like the river

She'll make you feel warm
She'll make you feel happy
She'll make you feel you

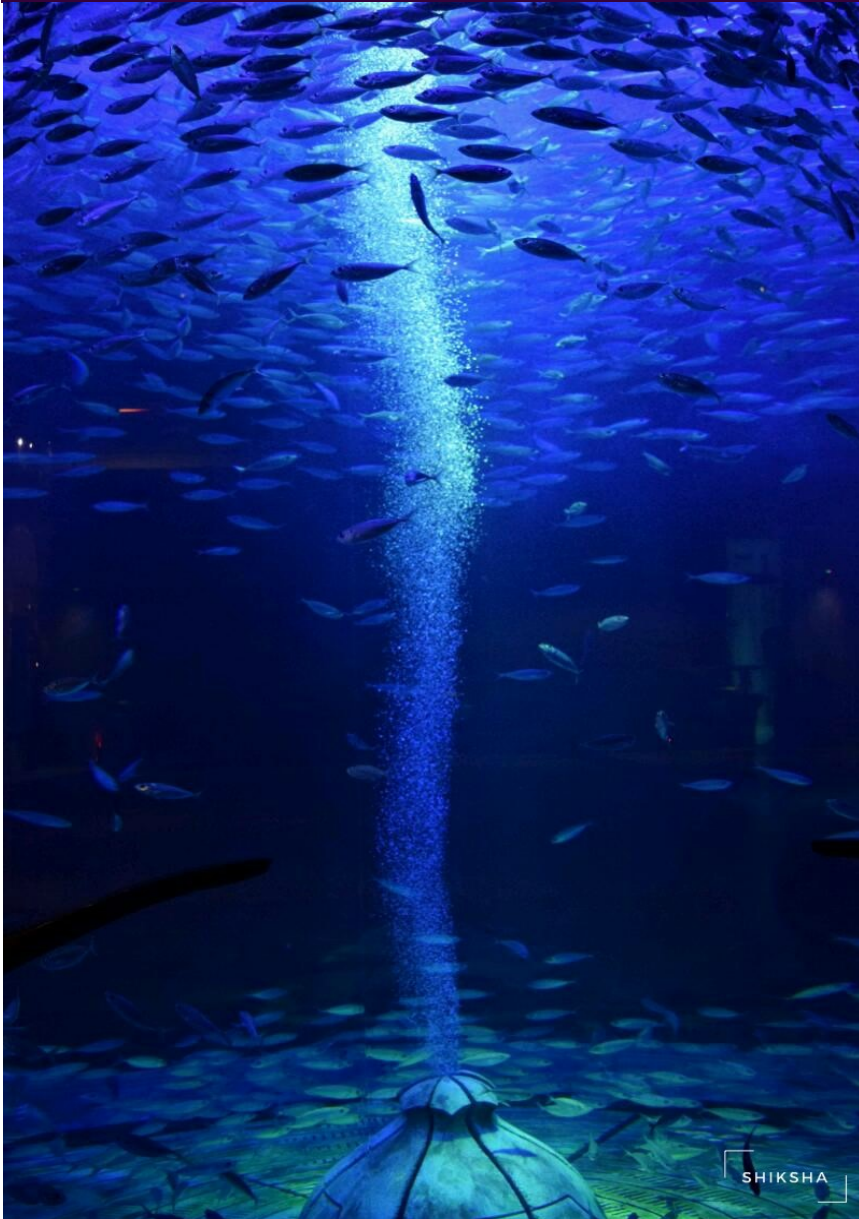
To be with her is to be home.

DO YOU BELIEVE IN THE AFTERLIFE?

Luke Da Costa (III Year, BSc Biotechnology)

No, of course not, I'm an atheist. I believe that life is fundamentally biology. Consciousness is just a really complex biochemical phenomenon. When we die, and we will, we simply cease to exist. Blood stops flowing, cells stop dividing and neurons stop firing, all marking the end of our existence. Our bodies will decay and nutrients will return to the soil only to harbour new life. There is no afterlife, no divine promise. The only thing we have is this life, here, now. Let us not live in hopes for another and compromise on this one. Let us not live in fear for we won't be here very long. Let us dare to live a life full of ambition and happiness, for when the time comes, for us to return to the ground, we shall live on only in the greatness we created and the hearts we changed while we walked this humble planet.

PHOTOS



You must crawl before
you learn how to fly

Luke Da Costa



Coming together is a beginning.
Keeping together is progress.
Working together is success.

-Henry Ford

Shiksha Saraogi



Paradigm | Sourav Patege

Entanglement | Harsh Ranawat



EVENTS

A lot has been happening.

TEACHERS' DAY

Harsh Ranawat (III year, BSc Biotechnology). Tanaaz M Khan (II Year, BSc Biotechnology)

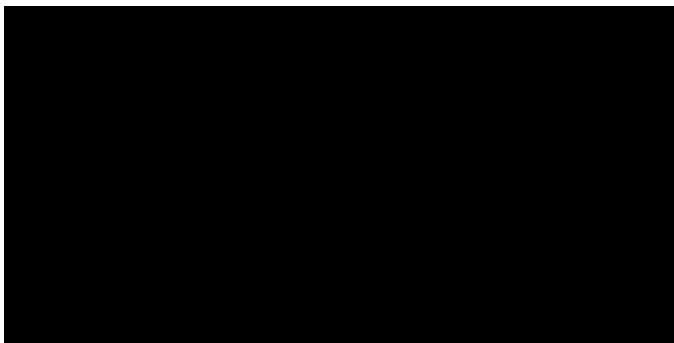
On the birth anniversary of **Dr. S. Radhakrishnan** on **5th September 2017**, students and faculty from The School of Life Sciences celebrated **Teacher's Day**. Celebrations begun with kind words from our beloved director **Dr. K. Satyamoorthy** followed by cake cutting by him and the faculty. The main programme for the day included a showcase of various clubs under the student-run **Cultural Forum**, this being the debut event of the same. Below, we have a list of performances that had taken place during the event:



CLUB	PERFORMANCES
DANCE CLUB	Classical, Semi classical and Fusion (BSc 2)
LITERARY CLUB	'When Will It Drop' – Nishtha Singh (BSc 2) , 'If' (Rudyard Kipling) – Harsh Ranawat (BSc 3)
MUSIC CLUB	Solo performance - Nazhad Farook (BSc 2), Western group performance (BSc 2)
ART CLUB	Speed Painting – Sourav Patagi (BSc 2)
DRAMA CLUB	Skit on the 'Life of a Teacher in the Laboratory'

WORLD LITERACY DAY

Syeda Inaas (II Year, BSc Biotechnology)

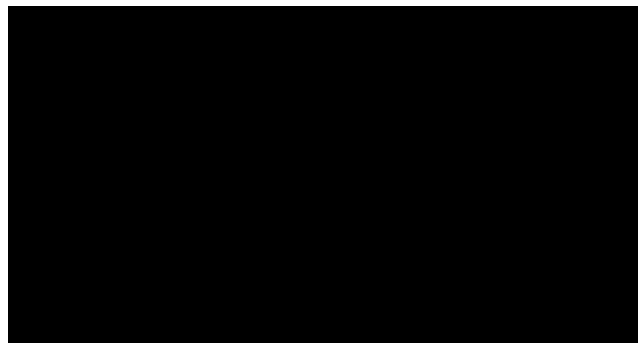


On the occasion of the **World Literacy Day**, the School of Life Sciences showed immense fervour. The **Social Committee** had come up with an idea to collect some stationary items and distribute it to the kids of nearby schools. Everyone contributed in their own way. Some gave away stationery while others provided monetary support. Some even volunteered all the way to the school. The overwhelming response to the idea filled us up with excitement. After the **stationary collection drive**, the idea was to make cute bundles of the stationary items.

The stationary was packed and taken to Madhava Kripa School where it was distributed amongst primary school children. Language has never been a barrier for something as beautiful as making conversation with kids. So, rounds of 'Hegidiras' and 'Heserenus' were spoken. On speaking to the children, we realized that happiness is indeed contagious.

ONAM

Ramya Gupta (I Year, MSc MBHG)



The School of Life Sciences celebrated the Keralite harvest festival **Onam** on **4th September 2017** with enthusiastic involvement of the staff and students. A lovely colourful **Pookkalam** was made by students who collected fresh flowers and leaves from the premises and the Udupi flower market. It was the biggest pookalam ever made in the basement area in the college. The canteen made their very own **Payasam**, which was relished by all. A **prayer ceremony** was also organized and sweets distributed to all members of the SLS family. People from all backgrounds and beliefs donned the traditional white or dressed up in vibrant colours to collectively celebrate the occasion. There was an overall feeling of festivity and togetherness.

DURGOTSAV

Shahina Mazumdar (II Year, BSc Biotechnology)



"Art attracts us only by what it reveals of our most sacred self." - Alfred Whitefield

Durga Puja is the festival that makes all Bengalis light up with joy. The promise of new clothes, festivities and making memories with friends is a joyful prospect for all those who celebrate it. The festival, though religious in origin, is no longer strictly religious in relevance.

We, as members of the **Art Collective** under the **SLS Cultural Forum**, decided to dull the homesickness and get our creative spirits put to use.

Sand is a commodity found on the streets, near beaches, next to roads. Truly, these silica crystals are more than often not given enough importance. We incorporated **Sand Art** as the theme. Sand and colours played the main part in this medley of artwork.

Yellow is an auspicious colour. Often, idols having pride of place in marvellous hand-crafted pandals with their faces radiant with this colour. The main piece, had the Goddess's face framed by a dark, decorated frame. All the Art Collective members put their hands together for this beauty.

The Art Collective members Aseema Mishra, Sourav Patagi, Pragathi P., Akash Rajagopal, Neha Acharya, came up with beautiful subsidiary pieces to surround the main piece.

A TALK ON STRESS MANAGEMENT

Tanaaz M Khan (II Year, BSc Biotechnology)



On the **9th of September**, Dr. P. V. Bhandary, **Director of Dr. A. V. Baliga group of Institutions** delivered a talk on stress management. The talk was inherently directed at the first-year students on how to deal with the several aspects of college life. He started out with the general problems that students face like acclimatization to an unfamiliar environment, dealing with expectation from parents and teachers, peer pressure and so on. He also spoke about how students tend to deal with their problems using detrimental ways such as **Substance Abuse** which over a period leads to physical and mental health issues. He addressed the root cause of the common problems faced by this age group and that was **Depression** and **Suicidal Tendencies**. He concluded that these were a collective result of an inadequately managed lifestyle. Dr. Bhandary also shared some first-hand experiences from his college life as well as his career as a Psychiatrist. The talk ended with an interactive session with the students.

BACCHA PARTY

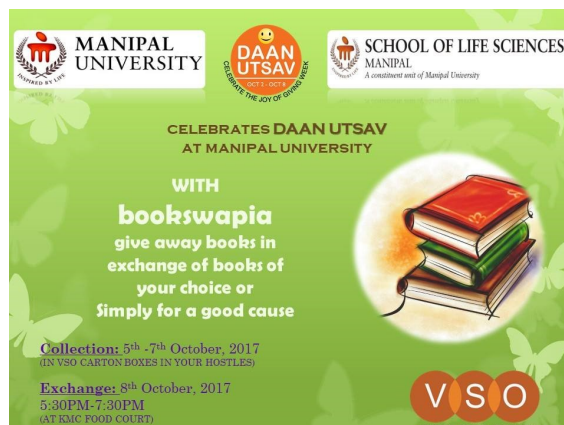
Bhargavi Karna (II Year, BSc Biotechnology)



The **Social Committee** of School of Life Sciences in collaboration with **VSO** organized a pre-Children's day celebration called "Bachcha party" on **1st of November, 2017** wherein the kids of the teaching, non-teaching and housekeeping staff of the institution were invited. The event started with an introduction round where the kids introduced themselves in English/Kannada and were given balloons. Soon after, the game of "**musical chairs**" was played. The enthusiastic kids then were engaged in art and craft activities where they made their own drawings and sketches and were taught **Origami**. The volunteers also made Origami swans as gifts to all the kids. Alongside, kids were also engaged in "**blindfolded catching**" and "**balloon catch-throw**". A few volunteers taught **dance** to the kids as well. The event concluded with a group picture of all with their artworks in the background. As they said goodbye, all the kids received a children's day surprise present and the VSO '**happy dots**'.

DAAN UTSAV

Bhargavi Karna, Syeda Inaas (II Year, BSc Biotechnology)



Daan Utsav is a national festival which is celebrated for a week every year, from **2nd - 8th October**. The festival celebrates the '**Joy of Giving**'. The **Social committee** of the School of Life Sciences, VSO project coordinators and volunteers conducted a **BookSwapia** for the Daan Utsav week.

The project required people to drop any book (s) they'd like to give away in exchange of another book or simply for a good cause. It all began on the **5th of October**. About 12 cartons were decorated beautifully and '**the Joy of Giving**' stickers were put up on the carton. They were placed at 12 locations including two at the School of Life Sciences for a duration of a week. At the end of the week, we collected a few good reads! The proceeds of BookSwapia were given away to the **Psychiatric ward of KMC**.

SWACCH BHARAT PAKHWADA

Luke Da Costa (III Year, BSc Biotechnology)



The **Swachhata Pakhwada** program was conducted from the **1st to 15th of September 2017** here at School of Life Sciences and other universities all around the Nation with the objective of spreading the message of cleanliness, not only among the students but also in the surrounding areas. The Swachhata Pakhwada program is a step towards a cleaner and healthier nation and a way of helping the Government successfully achieve the initiative of **Swachh Bharat Abhiyaan**.

A multitude of events were conducted as part of this program such as the **Clean Campus Day** where the students went around the college campus and cleaned it up. Gloves were provided to the students for their safety while handling trash and colour coded garbage bags were used to ensure proper segregation of the waste. Similarly, **Clean Surroundings Day** was held where the students cleaned the roads leading up to the institution.

Competitions such as the **Cleanest Hostel Room** competition were held where the students cleaned up their hostel rooms and the cleanest hostel room was awarded with a prize as decided by our faculty judges. An **Essay Writing Competition** was held to bring out concerns and potential solutions regarding waste and it's management, and an **Elocution Competition** was held to give the students a chance to speak out on cleanliness and its impact. A **Short Film** was produced by the students on the various events conducted as part of this program. Eager student participation and support of the faculty made this event a success.

The Swachh Bharat Abhiyaan is an initiative to make India a clean and prosperous nation. We must all play our part at contributing to this noble vision. No matter how small, we can all make a difference.

SWACCH BHARAT PAKHWADA

To mark the beginning of the event , a beautiful speech was given by **Aadhya Setya** (I Year, BSc Bio-technology) which can be found below:

“ देश की सफ़ाई एकमात्र सफ़ाई कर्मियों की ज़िम्मेदारी नहीं है । क्या इसमें नागरिकों की कोई भूमिका नहीं है? हमें इस मानसिकता को बदलना होगा। “

These words by our honourable **Prime Minister Shri Narendra Modi**, which raises a concern within all of us and is a matter of heed. The words say that **“The Cleanliness of our nation does not solely depend on the workers of the society. Are we as citizens not responsible for the same? Do we not have any role to play towards our country’s cleanliness? This misconception of ours needs to be changed.”**

Cleanliness, as we all are aware of is both the state of being clean and free from dirt and the habit of achieving and maintaining that state. **Health** is the most valuable thing one can possess. Almost all of us look after our personal hygiene but often ignore the surroundings which are as equally important as our personal care.

No historical monument in India is free from the graffiti posted by unscrupulous Indian visitors who are more interested in recording their arrival than in safekeeping and maintaining our rich heritage, which has been given to us by our ancestors. Every nook and cranny of our country houses plastic litter, half eaten corn, leftovers and what not!

We are the same Indians who when traveling/living outside India take utmost care not to drop even a toffee wrapper on the roadside. Many are the ones who love to keep their houses clean but would not mind dumping wastes into the neighbouring surroundings. It is an appeal to all present here that each of you become one such and makes the country a graceful one. To people who think what good will it do to them, I would like to mention that whatever mess you create in your surroundings will ultimately pose harm and health risks to you. Big factors that contribute towards cleanliness are **education and awareness**. **Environmental education** of the people can improve the sanitation of their immediate surroundings. In the end I would like to say:

साफ़ सुथरा मेरा मन

देश मेरा सुंदर हो

प्यार फैले सड़कों पर

कचरा डिब्बे के अंदर हो ।

स्वच्छ भारत सशक्त भारत

जय हिन्द।

PhD Defence Ceremony of Dr. Lada Leyens

Dr. Angela Brand,

HOD, Public Health and Genomics, Maastricht University

Dr. Lada Leyens recently received her PhD from Maastricht University for her work on “Personalised medicine and drug development: analysis of the current landscape, flexible regulatory pathways and decision supporting tools”.



Here we have a speech by **Ms. Angela Brand**, Maastricht University during the PhD Ceremony of **Ms. Lada Leyens** conducted on the **11th of October, 2017**:

Innovation Management and Regulatory Science - We want to see progress and we want to see this progress happen in a fair manner!

The new genomic knowledge will lead to the development of new therapeutic approaches - if we like it or not. How to manage this in the best way for industry and for the citizen/the patient?

We want to avoid a "**Diesel Scandal**" in Health: that something works under testing conditions but not in real life. On the one hand, we want progress in helping to treat or cure diseases, but we need rules that make this treatment safe and also affordable. Regarding a "**Save**" treatment. In the past we often underestimated the risk a patient is willing to take. Perhaps we have to rethink our sometimes paternalistic approaches?

The aspect of "**Affordability**" gets even more important in times of demographic change: More of us will live longer and will experience illness. We will learn to live with illness as we are able to keep diseases "under control". But we have to find the right prize for this: In terms of money but also (and even more) in societal terms.

This is what Lada's PhD work is about. She had to cover both: the **Management of the innovation and the Regulation of it**. This is a new science in itself i.e, **Regulatory Sciences**. This new science

PhD Defence Ceremony of Dr. Lada Leyens

does not only have to balance between the interests of patients and industry, but also between old and new forms to generate evidence. Researchers often stick too long to what they have learned or inaugurated. They often develop a methodology further and further without realising, that this will lead to an dead end. If the evidence check by a RCT, for example for E-health applications, in most studies fails! Then the research would conclude that E-health applications do not work. But can't it also be the case that the RCT approach is not the right method to test E-health applications?

Dear Lada, when thinking of you, I think of a **“Solitaire”**, - a **Unique jewel**:

And I think of three forms/features (“cuts”) of a solitaire: the Round Brilliant solitaire, the Heart Solitaire and the Marguise solitaire .

1. The Round Brilliant Solitaire means persons, circles and “rings” surrounding you: There are so many wonderful people surrounding you, and they all compare you to a “jewel” (and even call you “a jewel), Marisa Papaluca (unfortunately she was not able to join today), Wilma Coenegrachts, Erica Hackenitz, your PhD sisters and brothers, and of course your lovely family: your husband Juan, your parents, your mother in law, and “little star”, your beautiful and smart two year old daughter Ela Sofia, my beloved godchild (your mother, “Nonni” takes care of her during your PhD defense)!

2. The Heart Solitaire means romance, means passion: You have so many passions, you are such a creative person! And I am thinking about your wonderful goldsmith work, about your paintings, your art work and I am also thinking about your creative and innovative and visionary approaches in your professional work.

3. The Marguise Solitaire means “boat shaped” and “pointed ends”! This means “targeted ends”! You are very much outcome oriented in your professional work and career!

And you have such a curiosity, dear Lada, - you search for and visit unique places all over the world! You have the “travel gene” (by the way, - one of the many things you share with Juan), you have seen already so many countries around the globe. Even Sofia, “little star”, already celebrates her 10th travel destination, since she has visited already 10 countries (Germany, Switzerland, France, Spain, Iceland, UK, Cuba, etc.) and now – the Netherlands! I guess she already has a frequent flyer card.

Dear Lada,

Let me include your second supervisor, Dr. Nuria Malats, in my final words: Please, go on with your motto **“If you want to build a ship, don't herd people together to collect wood and don't assign them tasks and work, but rather teach them to long for the endless immensity of the sea!”**

SPORTS WEEK

Rudranath Ghosh (I Year, MSc MBHG)



The School of Life Sciences hosted its first sports week for the year 2017-18 from **20th October to 24th October 2017**.

The inauguration was done by **Dr. K. Satya-moorthy** (Director, SLS, Manipal) and **Dr. T.S. Murali** (Sports adviser, SLS, Manipal). This was followed by a Yoga demonstration by Padmini Pai (1st year M.sc).

The first event held was a **6-side cricket match** on **20th and 23rd October** where 5 teams participated, in which the Research Scholars were declared winners and the Staff, runners up.

The second event was a **3-side Basketball match** on **22nd October** where 3 teams participated, in which BSc Third Years were declared winners and BSc First Years, the runners up.

The third event was a **6-side volleyball match** where 4 teams participated, in which the Research Scholars were declared winners and the Staff, runners up.

The First sports week of this academic year (2017-2018) saw active participation from various students and faculty members.

OSA DIWALI CELEBRATIONS

Malavika Raj, Siddhi Jain (I Year, BSc Biotechnology)



On **23rd October**, the **Manipal OSA Student Chapter** in collaboration with the **Student council** of School of Life Sciences hosted a Diwali celebration.

The premises was filled with twinkling lights and an ethereal aura. **Lanterns** were skilfully hand crafted with utmost precision and care, lighting up the college beautifully. A blue lighted area was made to exhibit **Fluorescent Bubbles**.

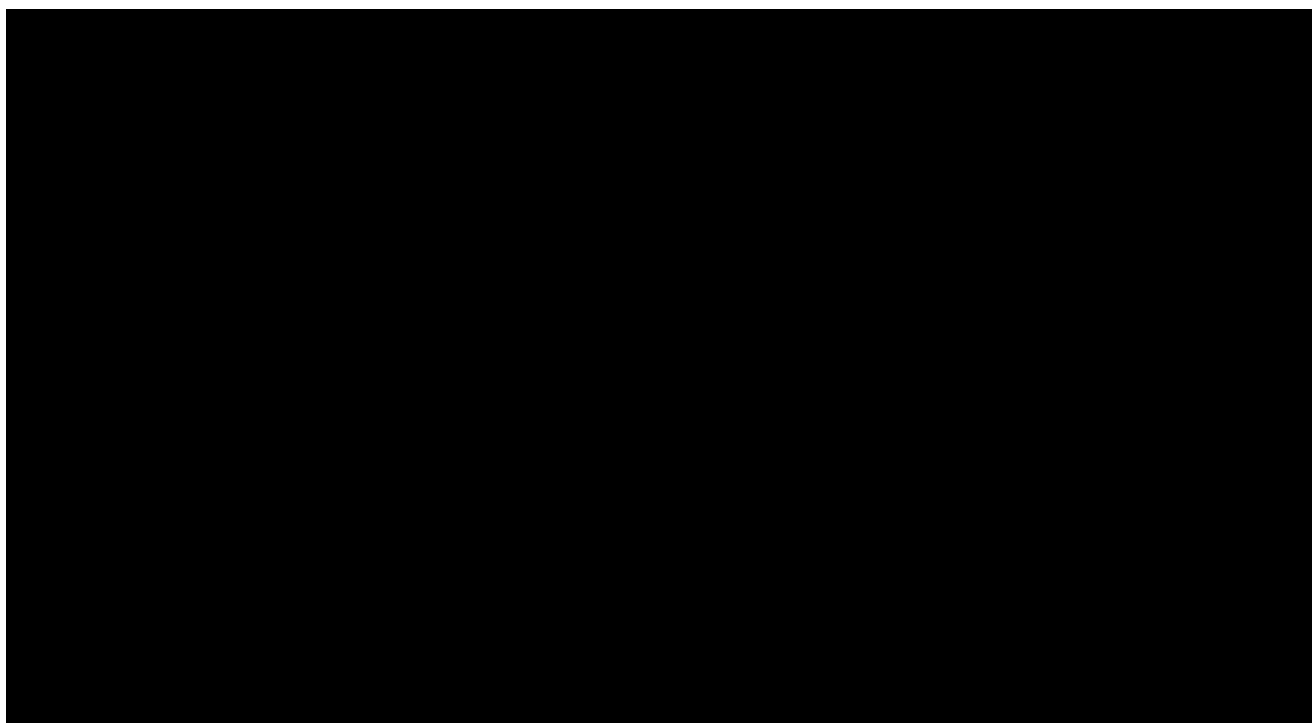
At the college entrance a **Rangoli** was made with **LED lights** of vibrant colours and an exciting firework show was projected. The main event was the **Hologram screening** showcased by the OSA members.

After a week of planning, trial and error and a whole lot of physics and calculations, the hologram display was finally presented. The audience was mesmerised by the enchanting animations and music that went with it.

All in all, the evening was a magical one and everyone enjoyed experiencing a colourful and lighted Diwali.

HIGH VOLTAGE 2017

Tanaaz M Khan (II Year, BSc Biotechnology)



On **28th October 2017**, the School of Life Sciences organized its very own rock concert “**High Voltage**” for the third consecutive year. The event entailed performances by seven bands from colleges in and around our University. About **five hundred** people including students and teachers attended the event to show their support. The event was headlined by major bands such as “**Cloudburst**”, “**Under the Cross**” and our very own, “**Opiate**”.

The evening was kicked off by a performance by **Sama** followed by **Opiate** featuring our very own, **Nazhad Farook** as the lead singer who blew the minds of the audience. Our second headliner, **Cloudburst** drew the attention of the crowd with their enthralling set and kept the show going. We also witnessed performances from popular bands such as **The Scenes**, **Angie and the Flames** and **The Spirit Amplified**. Last but not the least we had our final act, **Under the Cross**, who had headlined for us last year as well, give us their final and most breath-taking performance ever before parting ways.

All in all, the event turned out to be the most bittersweet yet spectacular night for everybody who had come out in the spirit of music and to experience great entertainment.

RASHTRIYA EKTA DIWAS

Tanaaz M Khan (II Year, BSc Biotechnology)



To mark the Birth Anniversary of **Sardar Vallabhbhai Patel**, every year on the **31st of October**, India celebrates **Rashtriya Ekta Diwas** otherwise known as **National Unity Day**. Sardar Vallabhbhai Patel, also known as the **'Iron Man of India'** was one of the founding fathers of the Republic of India. He is accredited for the integration of 550 princely states into India. The Government of India introduced this event in **2014** to mark and respect his contribution to our country. The School of Life Sciences conducted a short program to commemorate his memory, emceed by **Nidhi Singh** (1st year, BSc). The program involved a talk by **Abhimanyu Ray** (1st Year, BSc) on the life of Sardar Vallabhbhai Patel. This was followed by a beautiful solo musical rendition by **Apoorva Dinesh Rao** (3rd Year, BSc). We also had a presentation by **Mayukha** (1st Year, BSc) on the various kinds of festivals that are celebrated in our country. The audience was treated to a dance performance on Desh Rangeela by **Aditi Mehra** (1st year, BSc), followed by a street play on 'What is unity' by the **Drama club**. The program ended with a heartfelt talk by Prof. **Angela Brand**, Maastricht University on the importance of unity.

HALLOWEEN

Kanaya Bhattacharya (II Year, BSc Biotechnology)



On the of **3rd of November 2017**, The School of Life Sciences organized its traditional – **'Halloween Night'** in collaboration with our very own - **SLS Art Collective**. The décor in the college ranging from spooky bat invitations to spider-webs everywhere was created from scratch by the students. This time there was something new in store for Halloween – A (scary) make-up stall and a Photo-'boo'th with props.

The preparations for the evening started before dusk when everyone started coming in, in costumes, requesting a variety of make-up from Harley Quinn to The Joker, Zombies to Skulls, the mood had been set.

For the main event of the evening, we had two movie screenings – **'Annabelle : Creation'** for the adrenaline rush lovers and horror fans and **'Zombieland'** for the 'too-good (scared)- for-horror movies' kind of people.

***"THE JOURNEY OF A THOUSAND MILES,
BEGINS WITH A SINGLE STEP"***

HAPPY NEW YEAR!