SCHOOL OF LIFE SCIENCES
MANIPAL
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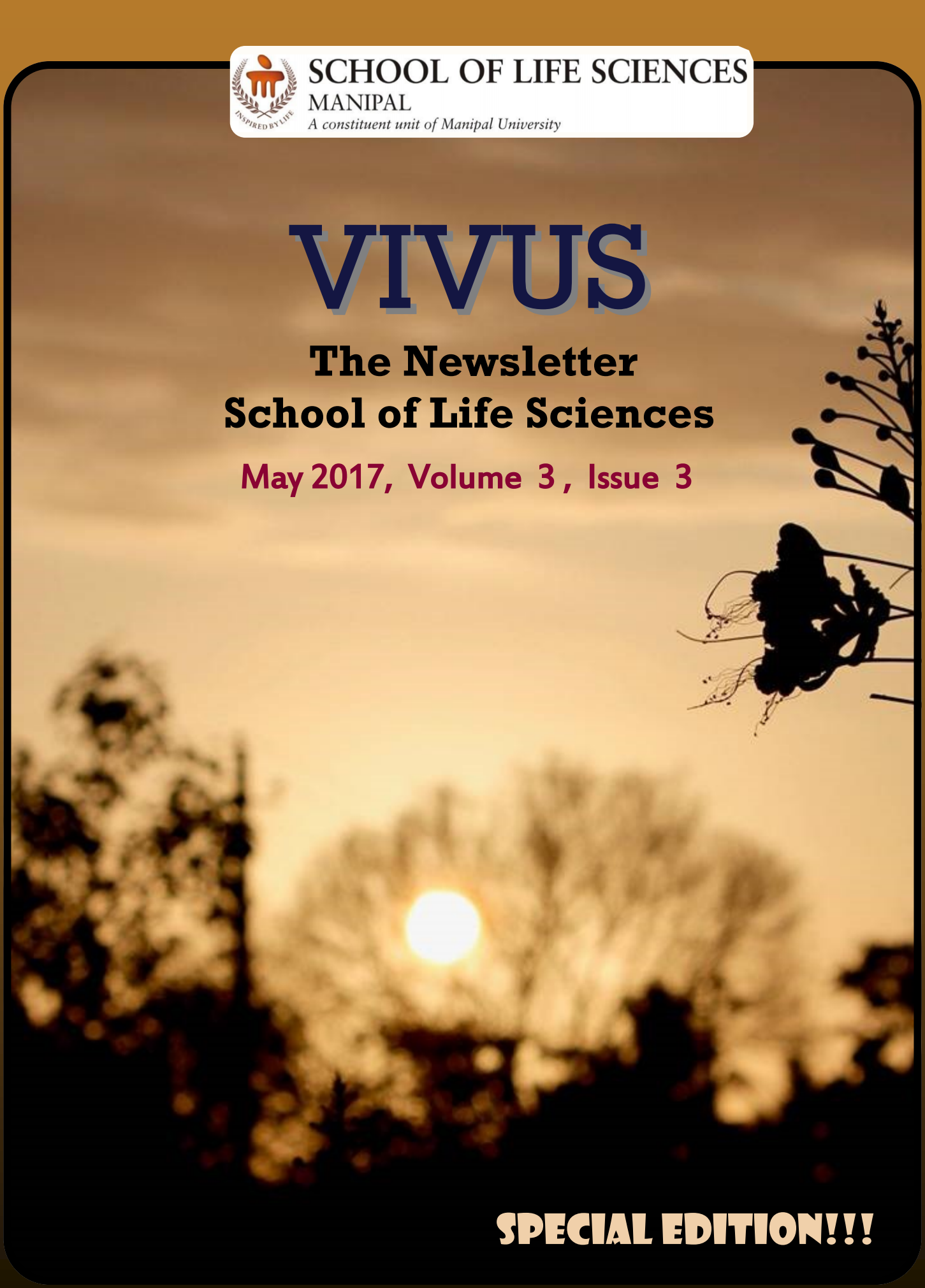
VIVUS

The Newsletter
School of Life Sciences

May 2017, Volume 3 , Issue 3



SPECIAL EDITION!!!

FOREWORD

DEAR READERS,

Greetings!

We arrive to the end of one more academic year with **Vivus: Volume 3, Issue 3!** The number clash deserves a cliché celebration. So here we are with a **special edition** of Vivus where we have compiled more than just articles; we've compiled talents within and beyond science. Our main aim is to appreciate the **versatility** in our writers and to provide a **variety** to our readers.

We would like to extend our sincere gratitude to **Dr K Satyamoorthy**. His encouragement and support has proved extremely vital to this edition of ***Vivus: The School of Life Science Newsletter.***

Furthermore, we are extremely grateful to **The Student Council** of the School of Life Sciences (2016-2017) for their kind support.

We thank **Mr. Harsh Ranawat** (2nd year BSc Biotechnology) for contributing the photographed picture for the cover page

Also, we would like to thank everyone (including our **readers**) who has directly or indirectly contributed to the success of this issue.

Lastly and most importantly, we would like to extend our heartfelt gratitude to our respected teachers **Dr TG Vasudevan**, **Dr Saadi Abdul Vahab** and **Dr Vidhu Sankar Babu** for their inevitable supervision and advice!

Thank you one and all!!

Note: This edition of Vivus comes with some **Fun Facts** from
http://www.sciencealert.com/18-science-facts-we-didn-t-know-at-the-start-of-2017.
Please enjoy!

-Bhargavi Karna and Russell Lorenzo Castelino
1st Year B.Sc. Biotechnology
Co-editors
Editorial Board
School of Life Sciences
2016-2017

The Unknown Side of the Genome

Tanaaz M Khan
(BSc Biotechnology, 1st Year)

One of the biggest successes in the world of Science has been the completion of the **Human Genome Project** which involved the publishing of the first draft of the complete sequence of the entire human genome. While the results put the several long pending questions with respect to the makeup of our genes to rest, it seems to have given rise to more questions than previously asked. For instance, it was found that there are only **19,000-20,000** genes which is far less than the estimates. This constitutes barely 1-2% of the entire genome. It was previously thought that close to 70% of our genome consists of junk DNA which has little to no function. But recent research has led scientists to believe otherwise. This is where the concept of the dark genome came about.

So, what is the **DARK GENOME**? As ominous as it sounds, it is basically the non-coding part of our genome whose function is not yet known. For a gene to function, there are many elements at play such as regulatory genes that help in the expression of a gene. These regulatory genes can be enhancers, promoters, silencers or insulators. The **Encyclopedia of DNA Elements (ENCODE)** project which was a result of the Human Genome Project is looking to resolve this mystery by figuring out all the functional elements of the genome irrespective of whether they form genes or not. Tackling this is a daunting task considering that these regulatory elements have numerous functions and forms.

The use of popular gene editing tool **CRISPR-Cas9** has pushed the pace of the project enormously. Multiple copies of regulatory sequences can be edited and tested at the same time to see whether a regulatory element is at play. These regulatory sequences were taken from the results obtained from ENCODE. After this, they would sequence the DNA of that cell to find out which regulatory element is responsible for the change in the gene expression. Various other bioassays such as **lentivirus based massive parallel reporter assay** (using DNA barcodes) to identify enhancers, **DNAse-seq** to map all exposed regions of the genome, **ATAC-seq** that detects and sequences the sites of chromatin accessibility etc. are used to assess the function of certain regions of the DNA. The major disadvantage with these techniques including **CRISPR cell screens** is that they cover very small portions of the genome. Many computational techniques have also helped the process of decoding by interpreting biochemical data. These algorithms predict the transcription-factor binding sites which would give an insight into the function of the element.

While most of the experiments and tests have supported the predictions made by ENCODE, there have been contradictory results as well. When these predicted enhancers were mutated using CRISPR they did not change the gene expression. On the other hand, scientists also discovered multiple veiled sections of sequences which they named **Unmarked Regulatory Elements** (UREs) that do not fit in to any existing category of regulatory elements. There is a possibility that there are elements that have been missed by existing biochemical assays. Next Generation Sequencing (NGS) has been the backbone of these projects and will remain as such. Once advanced techniques such as **live cell imaging** in real time using specific markers will be brought out, it would become much easier to get more accurate results.

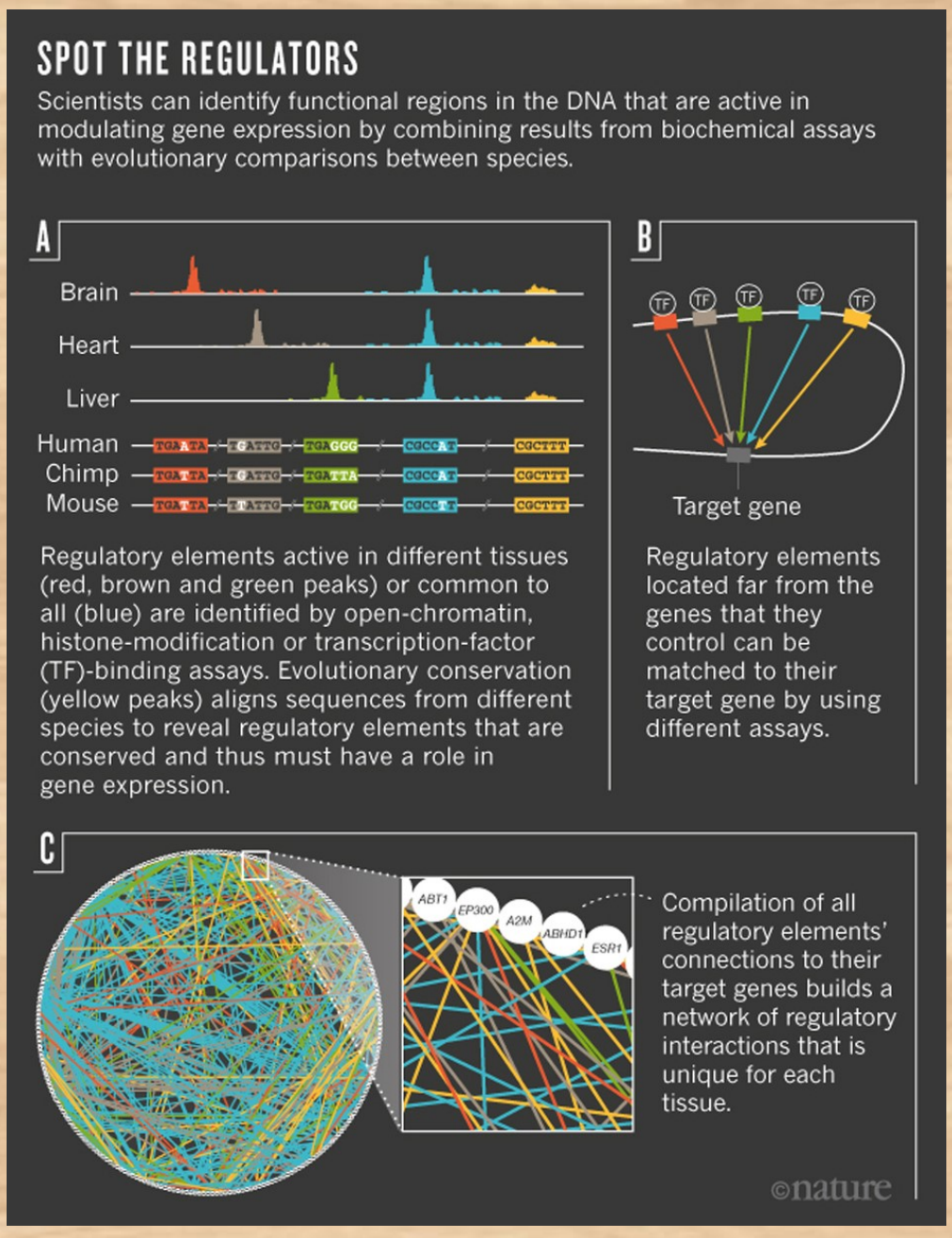


Image: Adapted from Khurana *et al*. *Nature Rev. Genet.***17**, 93–108 (2016).

The various projects dedicated to decoding the dark genome hope to treat complex diseases in the near future. It is known that most common diseases such as Diabetes, Cancer and Autism are caused not only because of mutations in the genes but also due to mutations in the regulatory sequences which in turn affect the gene. As of now, the National Institute of Health, UK has launched the **4D Nucleome** project which looks to predict the target genes for each regulatory element. Knowing the functional elements of the non-coding region would shine light on the dark genome and open new arenas of research for the treatment of diseases.

REFERENCES:

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Money Management!

Aditi Kandlur, Harshitha Kothari, Anju Aravind
(MSc, 1st Year)

As students most of us rarely are aware (or even bother) about the ways to manage money, except on those days when we are in danger of running out of cash. It is even rarer that we think of investments or savings to a large extent. However, recently (March 16, 2017) there was a presentation on these aspects towards better **financial management** at the School of Life Sciences, by Ms. Mrin Agarwal, founder of a financial education organization called **FinSafe**. She is also the co-founder of Womantra, a financial awareness program for women, professionals or otherwise. Her aim is to educate and address the country's **financial literacy gap** and transforming the economy through empowering people to make **informed choices**. FinSafe is focused on equipping Indians with strategies to handle their money based on **goals, growth** and **safety**. Their mission is to transform 1 million Indians into **intelligent investors** by 2025. Their vision is to usher in a new era of wealth building for the nation. It was founded by Mrin Agarwal.

Her talk on **'Money Management'** focused on three main topics: **managing expenses**, **investing principle** and **loans.** She spoke about how teenagers or students staying away from parents for pursuing education are typically dissatisfied with pocket money and have huge financial demands. They face intense peer pressure and would like to own a credit card. She emphasized that it is essential to teach teenagers financial responsibility which will make them self-sufficient and independent as they grow up to be financially independent. She gave the lowdown on investments made according to compound interest, insurance, stock and fixed deposit. Here she highlighted about **PPF (public provident fund)** which has beneficial features for public such as well governed deposit, being flexible towards the requirement, tax free and has guaranteed returns. She spoke about the importance of having insurance such as medical/ health insurance and life insurance. She advised avoiding the reaching or exceeding maximum credit limit by loans through the credit card billings and online loans, which would help **reduce unwanted expenses**. She concluded the informative talk by stating that teaching financial prudence can help our children be charitable and give back to society.

A Visit to the Old-Age Home

Humaira Shah
(BSc Biotechnology, 1st Year)

Some of our **elderly citizens** of the society are unfortunate in being isolated from their family due to various reasons. With the sole conviction of being able to spend quality time with such senior members of the society so that we can learn a few **wise aspects of life** while also relieving them a little, of the **bitter and disillusioned realities** of life (hah!), some of the students of our college visited **Sandhya Dham**, Goretti Hospital in Kalyanpur, Udupi district on March 31, 2017. The visit to this old age home was organized by the **Social Committee** of the Students Council of SLS. The students shared time, stories and anecdotes from lives and also provided the elders with some material help. The visit was an opportunity to analyse and contemplate certain aspects of the modern society.

So What is Vortex?

Nishtha Singh
(BSc Biotechnology, 2nd Year)

Vortex is a **FREE one-week event** where you will come to SLS and take some super-cool **classes of your choosing** taught by students from the Manipal University.

The initiation class of Vortex was held on the 1st of April 2017. It was taught by me on the topic of **"Moods, Hormones and Pheromones".**
Around 25 to 30 students attended the class along with some teachers. It was a success and the students participated enthusiastically.
Feedback forms were also provided to each student so they could express their thoughts on the **interactive session**. The response was positive and it gave us the encouragement to take this initiative forward.

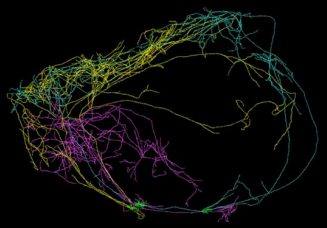
As students were extremely interested in being a part of Vortex, we've decided to have a committee and include the masses next semester.
Vortex week will be conducted in the month of **September/October**. Students from all over the campus can be invited to **attend, teach, learn** and **critique.**
Interested teaching faculty from SLS and other colleges will also be welcome to attend. This will help the students of SLS in many aspects, such as:

1) **Interaction** between students from different colleges. (Leads to the formation of ideas and further initiatives)
2) **Networking** between students and teachers from different colleges.
3) **Inclusion of SLS** in many university events organised by students from different colleges.
4) An increase in **awareness** of many activities taking place at Manipal University.

The idea entails that the class be less formal and more interactive/discussion-like in nature.

1) Students interested in teaching a class can disclose the topic 2 weeks prior.
2) The topic will be chosen by the student. It can be **multidisciplinary or diverse** in nature.
3) For the students of SLS who wish to attend the class, there will be a **sign up sheet** on the notice board.
4) For the students of MU, a website can later be created to make it easier to sign up for classes.
5) Student teaching can assign a class size he/she is comfortable with. They can also mention the pre-requisites that might be required to understand the topic.

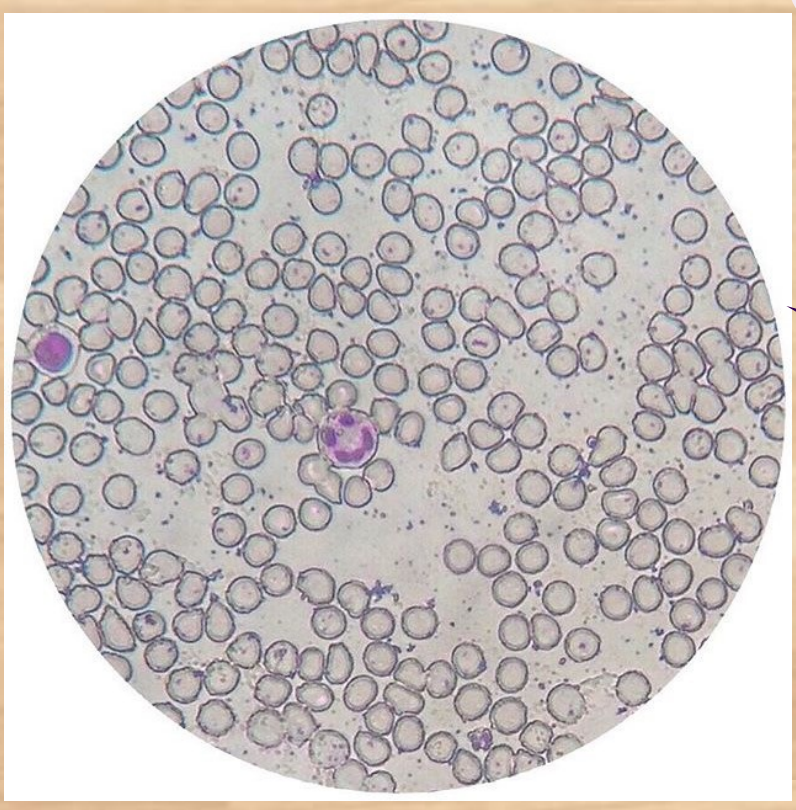
Fun Fact!
One giant neuron wraps around the entire brain!



Out of the three newly discovered neurons around the brain, the largest one wraps around the entire circumference, across both hemispheres, like a 'crown of thorns'. This giant neuron is seen emanating from one of the best-connected regions in the brain (the claustrum) and it could be coordinating signals from different areas to create conscious thought.

"WHAT IF GARDEN OF EDEN EXISTS FOR REAL?"

Sudipta Pathak
MSc Molecular Biology
and Human Genetics
1st year.



"ON A GOOD DAY, EVEN YOUR BLOOD CELLS SMILE AT YOU."

Utsav: My view from the info-desk

Bhargavi Karna
(BSc Biotechnology, 1st Year)

"Manipal University is a brand name. And Utsav is the **University fest**. There is absolutely no space for flaws. You volunteers have to make sure that whatever may come, every event starts and ends as per schedule", the head of the Cultural Coordination Committee said.
That very moment, I realized that the few days to follow (the **3rd to 7th April,2017**) had a lot in store for me.

For my first Utsav in Manipal, I had plans: to sit back in the audience and enjoy the show. That the second sessional was to follow, I had an excuse to execute my plans. Unfortunately then, someone withdrew from the **Utsav core volunteers** and I was put in. Fortunately now, that week became my **"most memorable event"** of late.

We were assigned the **"info desk"** that came as a **chair with responsibilities** of keeping an account of winners, scores and food-coupons, a desk with an intercom telephone, two laptops, a printer and all the fancy stationeries, meals to nourish the inside of our bodies, a cooler to nurture the outside and plenty of acquaintances who ended up as buddies.

On the 3rd day, when we were just in the middle of Utsav, my day started normally: I woke up at 7.45, got ready by 8 and reached the KMC greens by 8.15. By 8.30, I set up the info desk, had my breakfast in some five minutes and DID NOT go back to the info desk.
Why?
Oh, because I was a participant for the day. ***English Poetry*** *it was.*

P.S. All Rights for the photographs rest with SLS.

I do write poems but it's very personal. I never wrote for an audience. More like, I never thought it was worth it. Having someone read my piece was still not a big deal, but 'recitation' was beyond my abilities. I was too sure I wouldn't bag a prize but I was **anxious** because the info-desk had made my face a familiar one and like everyone else, I hate being **judged**.

"It's poetry. You love poetry. And no one can take poetry away from you. Go get them sailor."

That is all I needed to hear before I took off. I wrote my poem, watched the **proficient** others perform and performed my own **amateur** piece. In the end, I was just glad; glad that it happened and glad that it was over.

Call it a **privilege** or a **misfortune,** the info desk gets the first hand over the results for every event *(including English poetry)*. Trembles and blushes and a little bit of tears were my only reactions to my name on the winners' list.
"It wasn't a likely prize."
"But you still made it happen!"

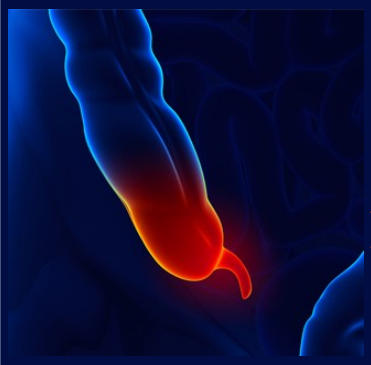
I had only gotten out of this news when another hit my ears. This one wasn't big, it was HUGE. *"The **first prize** for the Western Vocal Solo category goes to Nazhad Farook from SLS."* I was galvanized when he had sung and flabbergasted when he won. I screamed so loud, the cameras bothered to zoom on my face and embarrass me on the **huge screens**.

A lot among us had taken part in various events and who hadn't, had their **fingers crossed** for the former. **Satisfaction** with our performances was all we wanted but **acknowledgements** added to its essence.

The info desk had a view of people practicing with **minimal disclosure** every morning, of people sitting back to **cheer and hoot** for their favorites and people **running and pacing** in anxiety. There were **MCs** addressing the crowd and **volunteers** managing the events. We saw **dignitaries being honored** and **winners being awarded**. From people preparing props, costumes and tracks to the crowd keen for the results, those five days had a lot to showcase. The opportunity to see the famous persona, **Chef Vikas Khanna**, came like a reward in the end.

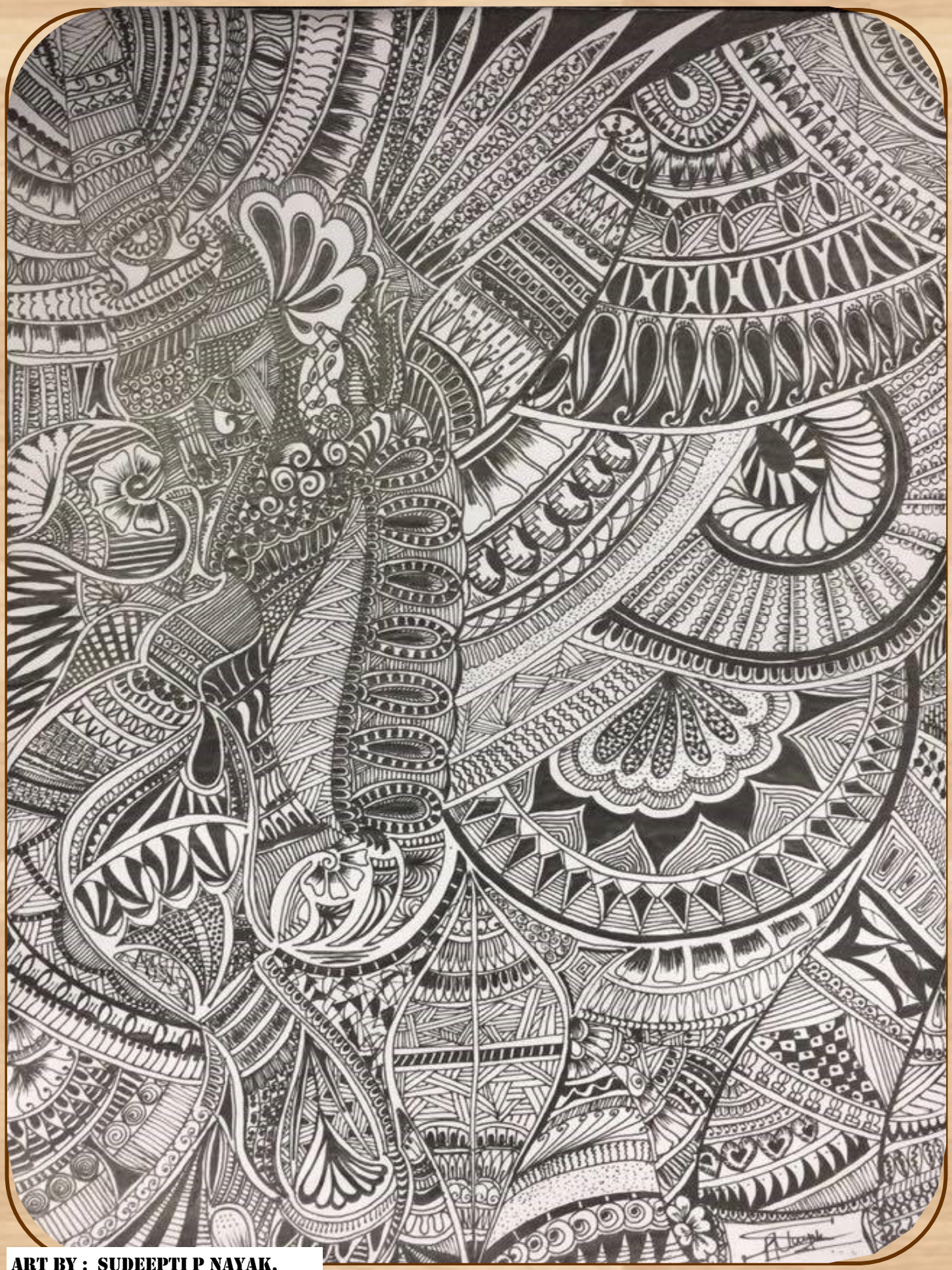
That week! I am glad it happened, sad it came to an end.

Fun Fact!
Appendix is not as vestigial as you thought!



The Appendix has evolved at least 29 times - possibly as many as 41 times - throughout mammalian evolution and has only been lost a maximum of 12 times. This suggests a selective value for this structure.

Among the possible functions of the organ under research, the leading hypothesis is that it's a haven for 'good' intestinal bacteria that help us keep certain infections at bay. According to a study in 2012, recurrence of *Clostridium difficile* colitis- a bacterial infection was 31% less in individuals with intact appendix than with ones that had it removed. In 2017, having found higher average concentrations of lymphoid (immune) tissue in the cecum of individuals with retained or regained appendix, researchers predict an important role of the organ in a species' immune system, particularly as lymphatic tissue is known to stimulate the growth of certain types of beneficial gut bacteria.



ART BY : SUDEEPTI P NAYAK,
BSc Biotechnology, 2nd year

"STAND OUT, DON'T CAMOUFLAGE."

Aditi Kandlur
M.Sc. Molecular Biology
and Human Genetics
1st year.

"EVOLVE TO CATCH UP WITH TIME"

March for Science

Harsh Ranawat
(BSc Biotechnology, 2nd Year)

April 22, 2017 (Earth Day!) was marked on the Calendars of many as a day to get dressed up and hit the streets, to put their voices out there, to make the cause be heard – **The cause of science.**

What?

Scientists, physicians, Youtubers and every **patron of science** were part of the crowd. Bill Nye, Bernie Sanders and Derek Muller were some of the famed figures there. The march included speeches, information booths, signboards and open protests with **the know-how of science**. In the subsequent week, the group took to an action plan where there would be a topic of focus for the day.

Where?

The **head march** took place in **Washington D.C.**, with more than **600 satellite marches** around the globe. While there was a huge turnout of attendees at places like **Boston** (~70,000) and **New York** (~40,000), marches were even held at the **North Pole** (3) and **Antartica** (6). The spirit of the movement was what mattered.

Why?

The Donald Trump administration announced in the budget plans that there would be **funding cuts** made in **research and academia** from institutions like The Environment Protection Agency ($2.55billion), U.S. Dept of Energy ($900million) and National Institutes of Health ($5.68billion) to name a few. The entire administration has known to be far from acknowledging the fact that **global climate change** is a cause of concern. In his early days at the office, the president announced the withdrawal of support to the **Paris Climate Agreement of 2016**. He is known for rather bold comments and tweets on social media, too:

"NBC News just called it the great freeze - coldest weather in years. Is our country still spending money on the GLOBAL WARMING HOAX?"
-6:48pm - 25/01/14 @Twitter

Part of the reason that drove the march was also a feeling shared by those engaged in science and those enthusiastic about it, that ***Science Matters***.

While on the one hand it was **a wakeup call** for people around the globe to review and inquire about the science policy in their country, governments and agencies, on the other hand, **voiced their opinions** on the movement.

"I have no doubt about climate change and how committed we have to be regarding this issue…I invite you to come to France and join researchers here to work on climate change."
-Emmanuel Macron (President, France)

It was a call for everyone out there in the world to stop for a moment and to **acknowledge the effort, diligence and nature of the scientific process,** of all the countless people who spent their lives to push our understanding of what there is and to make things that everyone can benefit from.

So-Yeah!

Megan D' Souza, (MSc., 1st Year)

Come **Monday** and a visit to the **canteen** in the Planetarium campus, sometime around 12 noon will tell you that it is the turn of the weekly special to make its appearance. Order an ***oota*** (meal) and amidst the rice, sambhar/dal/rasam, papad, curd and buttermilk, you will find, in one corner of your plate, a small bowl filled with the humble, *sundar*, *susheel*, **soya chunk** *sabzi* (or *upkari* as we call it in this part of the world). The non-vegetarians may have egg to make-up for the protein in the diet, but vegetarians can boast of soya chunks. Ever wondered how it is made??

Also called **soy nuggets** or **vegetarian meat**, soy chunks are produced by processing **de-fatted soy flour**, which is made by grinding **soy beans**, obtained from the **soy plant** (*Glycine max)*. During the processing of the de-fatted flour using extrusion technology, the protein in the flour is said to undergo structural changes. On soaking in water, this texturized product absorbs the same and develops a chewy character.

Nutritionally, soy products are **high in protein content** and de-fatted soy is no less. According to soyfoods.org, 1/4th cup of de-fatted soy flour has, 82 calories, **ZERO TOTAL FAT**, 10g carbohydrate, 12g protein, 5g dietary fibre and minerals like sodium, calcium, potassium and phosphorous. For all those watching their waist-line, soy chunks could be one of the few things they could go easy on.

The health of those at SLS and the other souls at the Planetarium campus and beyond, seems to be in the good hands of **Mr. Ashok and his family**, who run the canteen with much enthusiasm. So the next time you find yourself in the canteen on a Monday afternoon having an *oota*, be sure to sit-back, relax and enjoy that **chunky *soooyaaah* goodness!**

Image source: https://ichef.bbci.co.uk/news/624/cpsprodpb/1637D/production/_90150019_3d330911-7c7a-40ab-88c3-82a6cd05c4db.jpg

The Big Picture

Shahina Mazumder
(BSc Biotechnology, 1st Year)

INTRODUCTION

In the past five decades, there has been a *tremendous* growth in the field of biological sciences. Biology as a stream of science is probably best defined as an integrative platform where all fundamental streams of science intersect. Due to the delicate complexity of biological systems, they require much investigation and generate much information.

PRESENT SCENARIO

The past few decades have dealt with biology using a reductionist approach. **Reductionism** is defined as the practice of analysing and describing a complex phenomenon in terms of its **simple or fundamental constituents**, especially when this is said to provide a sufficient explanation.

According to reductionism, biology can be understood completely using the more fundamental sciences: physics and chemistry; and computational techniques: Biostatistics and Bioinformatics. This approach has been fruitful in the past. Usually by reducing a biological phenomenon too, for example, a biochemical pathway, scientists have laid bare the bones of a problem and mapped out its veins. However, the problem with reductionism is that it has a narrow scope and renders everything discrete.

Reducing a problem to a few variables can help explain a phenomenon to a certain extent, but a complete explanation requires far more variables. For example, we can say that **cancer** depends on *age, lifestyle* and *exposure to radiation*. Hypothetically, we have reduced cancer to **three** variables. We can independently study the effect of each factor on cancer in detail. That gives us three factors and their **independent** effects on cancer. What that does not tell us, is how these factors *interact with each other*. What we also ignore, is that there are *many other factors* that influence cancer.

So what are the two mistakes that we are making?

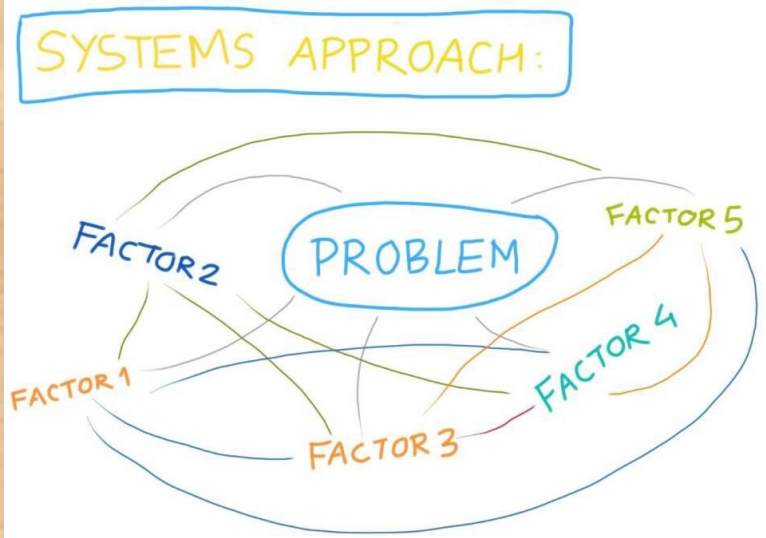
1. We are not taking all the variables into account in an effort to simplify the problem.
2. We are not studying the effect of each factor with respect to each other factor.

When we take both these points into account, what we get is a completely different approach. This new approach is called the '**systems**' approach.
Systems biology is the computational and mathematical modelling of complex biological systems. An ever-developing engineering approach applied to biological scientific research, systems biology is a biology-based interdisciplinary field of study that focuses on complex interactions within biological systems.

OUR ROLE

Obviously, this means that in order to explain a system, we need enormous amount of data. Every day, in scientific research, so much data is generated through so many papers, review articles, posters and scientific articles that are there on the internet. That is an overwhelming amount of data.

Unless we learn how to present and utilize data, the accumulation of scientific data is pointless.



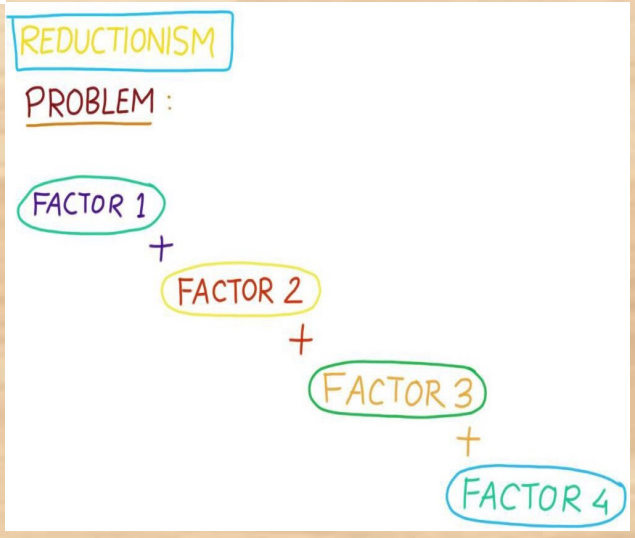
What is our role, then, as the next generation of scientists? Our role is to take biological research from the reductionist approach to the systems approach. Like every generation of scientists, our role is to be the nodes in a vast network of information processing.

For us, that is, the next generation, to take every aspect of a system into account, data presented to us must be in a *clear and concise fashion*. Fancy words sound very… well, fancy; but they do not do justice to their purpose. The point of scientific writing is not to sound learned.

The point is to get the point across.

Once we have concise, clear bits of information within the reach of our hands, we can do so much more with them. We can join the dots and string them together to form networks. We can put the pieces together to form the big picture.

Unless we look for the big picture, we can be quite lost in a minefield of information. In an effort to know where we are exactly, what we are doing, where are we going; in this field where no venture has a precedent, we need to look outside the set framework. We need to look at the big picture.



Fun Fact!
The most ancient dogs rediscovered!

The New Guinea highland wild dogs, feared to have been extinct for over half a century, have now been seen in a remote central mountain spine of NG as a healthy, viable population.

The existence of the most ancient *canids* are critical to understand the *canid* evolution and their co-evolution with human.

Interview: Dr. Srinivas Kaveri

Aditi, Namitha, Sudipta, Padmavathy (MSc. 1st Year)
Sagnik (BSc 3rd Year)

Dr. Srinivas Kaveri, Director of the **French research organization, The National Centre for Scientific Research (CNRS),** in India, visited School of Life Sciences, Manipal University on May 18 & 19, 2017 and interacted with students, researchers and faculty members through lectures and discussions. On the first day of his visit, he explained about the various **opportunities** available for students, young researchers and experienced scientists in France, highlighting the strong **Indo-French collaborations** especially in the areas of scientific research. An accomplished researcher of merit, he described the concept of immune response and its relation to the environmental changes, in a lively talk on the second day of his visit.

We had the opportunity to interview **Dr Srini** (as he calls himself) for 'Vivus'. Here are some vignettes from the interaction.

He had always dreamt of becoming a scientist since childhood but lacked proper counselling as he grew up in a small town. He said that he would feel successful if he is able to **influence** students to enter the field of science. He expressed his desire to possess the **passion** that his teachers had and motivate the young crowd.

His early education resulted in a B.Sc. degree in Veterinary Science followed by Masters in **Microbiology**. He recalled how he had opted for veterinary science: not by choice, but through peer pressure. He however gave credit to his friend circle as he planned to join veterinary science along with them and that played a major role in shaping his future. His inspiration to enter the field of science came from the **'contagious'** passion of the teachers in Veterinary school, he stated that their goal was to spread knowledge and to them teaching was not just a job. By the third year of the undergraduate course, he was intrigued by science and decided to pursue it further. **Immunology** was a paper under microbiology during postgraduate course and the professors teaching that very paper also were well versed in that subject making his interest grow even more.

Shortly after Masters, he obtained a PhD fellowship to go to France. During this period, he met a scientist in **Indian Veterinary Research Institute (IVRI)** in Uttarakhand, who spoke on monoclonal antibodies and Dr. Srini was drawn to the very same field.

Talking about his area of expertise that is the biology of antibodies he still thinks that there are a lot of mysteries behind antibodies. He strongly suggested that there is a lot more to know about antibodies and in science we have just superficial knowledge - structure, Fab, Fc but the functional aspects still have a mystery surrounding it. We get a timely reminder that he has been working in this area for only 30 years.

He recalled contributions by Dr. Paul Ehrlich and Dr. Emil von Behring discovering the promise that antiserum therapy experiments held, while studying diphtheria toxin, proteins in the plasma were neutralized by ***"Antikörpe"*** (German word coined by Dr. Ehrlich for antibody). They realized animals could be healed and took it very soon (within 3 years) to humans: the beginning of passive immunization which saved many lives.

It was hassle free at that time/era but now the very same experiments will involve a lot of procedures-trials, ethics clearance and toxicity tests.

When asked if there was a way to evaluate how strong an individual's immune system is, he responded saying that there is still no clear demonstration on how the immune response should or should not be and no criteria to classify one's immunity as strong or weak. So far, it cannot be evaluated at the population level. He said that **immune-deficient individuals** are great exemplars to study immune responses – where one can understand the processes, involvement of certain factors/ molecules during the response. This will also provide an understanding of genetic defects in such individuals.

Immune responses vary from one individual to another and the intensity also varies depending on factors present at that time. **Antibodies** not only take part in immune response but also maintain **homeostasis.**

Talking more on immune responses, he compares thymic education with a room full of books, where books have chapters, chapters have words which have letters. The **lymphocyte** enters it, if by chance it recognizes any word/ letter from any book it would be killed as it is not supposed to recognize the host system it belongs to as a foreign one.

Answering the question of what drives him to work every day, he conveys that scientists work in three ways: they try to do something new or out of passion or to face imminent challenges. The more one does, the more questions one raises. This draws one to learn and seek the answer. He then claims "Never ending **challenges** drive me to work harder."

Advising next generation of youngsters entering the field of science he says "Be **inquisitive** and ask questions. Do not be afraid it might be labelled a stupid question." In his lab, he encourages questions by having rounds of presentations and where each one of them has to put across a question. This motivates the individual and also sculpts a chiselled mind to question and builds their rationale.

He then says that in today's world, younger generations are not restricted to only go into academic or industrial research but new arenas have opened to allow opportunities of entrepreneurship and other occupations related to science. This is the time where one will have to decide what to do in life, so that one does not follow the set trend. One must talk to people and share dreams with an experienced person who would be ready to guide the individual through some portions at the least.

Interview: Dr. Bennet Bosco Dhas

Malavika Meloth Jayaram, Roshni Raghu Shetty
(BSc Biotechnology, 1st Year)

During the 41st Annual Conference of EMSI, we had the privilege of interviewing Dr. Bennet Bosco Dhas, Scientist, CIDRF, Punducherry. During the conference he presented his work on the newly emerging topic, Exposomics. Later, he kindly consented to our request for an interview. Here is an excerpt from the interview.

Good afternoon sir. Could you please tell us what made you choose exposomics as your research topic?

Dr. Bennet Bosco Dhas (BBD): I am actually working on personalised medicine in which we are looking into certain factors. In particular I am looking into genomics and proteomics. So through exposomics we are putting everything into personalised healthcare. This is why I am interested in exposomics.

In your presentation why did you refer to exposomics as the missing link?

Dr BBD: Mainly because there is not much study being done on this topic. There are only 4 research papers on exposomics. It was started recently in 2012 and is still going on. It is a missing puzzle. See only if there are at least thousands of research publications can we call it complete. If we take pharmacogenomics for example everything is known about it but exposomics is completely new.

What is the practical aspect of your research in a common man's life?

Dr BBD: Application is mainly personalised medicine. Based on what you are exposed to, you can modify your drug. One can change or adjust your drug.

Sir, are you currently involved in any kind of research regarding this?

Dr BBD: I am working on translation research. I am currently working under Dr. Adithan (from JIPMER, Puducherry). He has been doing 15 years of research on pharmacogenomics. So now we are interested in transitional research. We are trying out clinical trials now. We have all the data and algorithms so we need to check if all the algorithms are correct. Till now there has never been a clinical trial on this in India. So most probably we are the first ones to do.

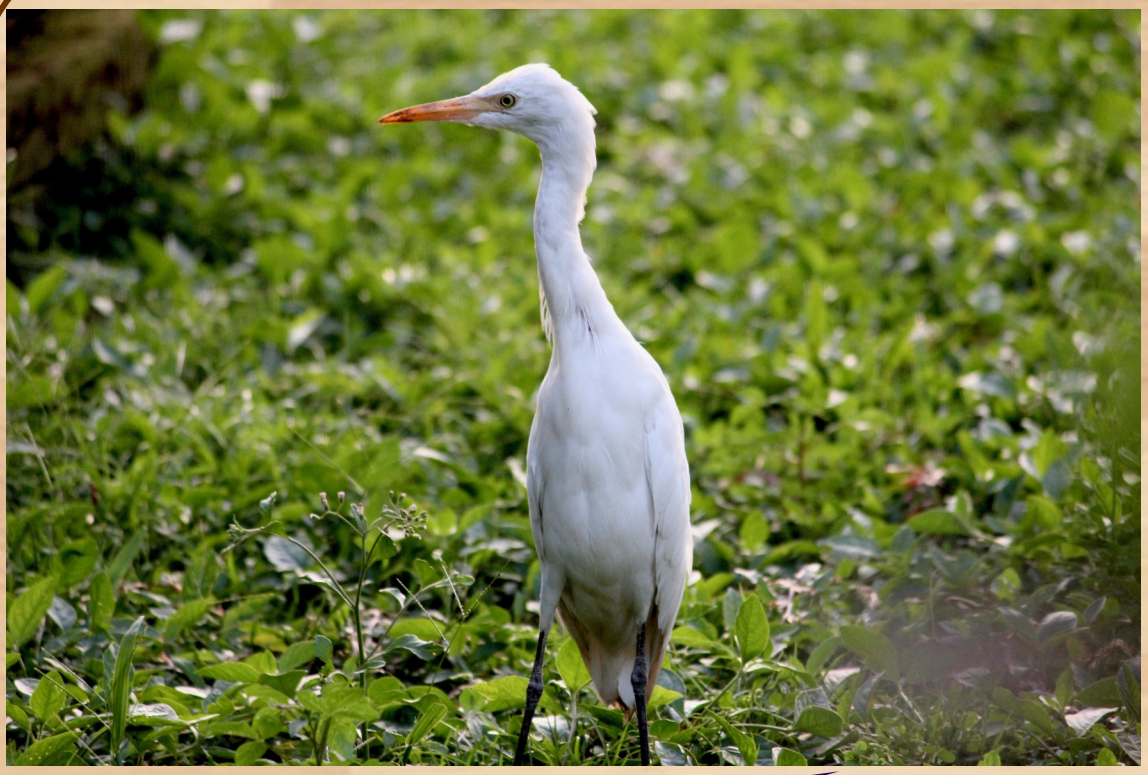
Is the process of personalised health care time consuming?

Dr BBD: On September 24, 2016 we started pharmacogenomics centre for patients. It is very cheap and it will maximize cost around Rs. 5000. And it will hardly take around 2 to 3 working days. As of now we have real-time PCR it takes 6 to 8 hours to give a result. Now we are putting up some pyro sequencing to get a more valid result.

Fun Fact!
New state of matter: Time-crystals!

Proposed in 2012, time crystals are the first example of the hypothesised, but unstudied 'non-equilibrium' state of matter and they could revolutionise how we store and transfer information via quantum systems. And this was made real in 2017.

A time crystal, space-time crystal, or four-dimensional crystal, is a periodic structure that repeats in time, as well in space. Normal three-dimensional crystals have a repeating pattern in space, but remain unchanged with respect to time; time crystals repeat themselves in time as well, leading the crystal to change from moment to moment. Without reaching a thermal equilibrium. This allows for the crystal to be in perpetual motion. And thus, it is said to exhibit time translation symmetry breaking (TTSB).



"ELEGANCE DEMANDS A HIGH HEAD!"

Harsh Ranawat
BSc Biotechnology
2nd year.

"HOW WOULD YOU NOTICE ME IF IT WEREN'T DARK?"

Shrouded

Akhil K A
(BSc Biotechnology, 1st Year)

I have always had a silent wish to publish a book of my own; a book with stories from my imagination. The one below is just an excerpt of how my book would start.

Introducing the trouble child....

The dining hall was filled with people, businessmen, big ones, VIPs, scientists, doctors, friends, media and the press. There was pleasant music being played and the most important thing, FOOD; the atmosphere in the dining hall was filled with the delicious aroma of the food they were about to serve for lunch. The microphone suddenly came on with a screech that caught everyone off guard.
"Check.. check... ahrmm ahrmm...Is this thing on? Ok. "
A really beautiful woman in red; a brunette in her early twenties, took over the mic.,
"Ladies and gentlemen", her voice captured the crowd's attention. "We have all gathered here to celebrate the 21st wedding anniversary of Mr And Mrs Anderson". Everyone started applauding and the spotlight focused on the ones sitting at the first table; at the charming couple in their late forties. Mr Andrew Anderson, a well built gentleman in his best suit, was sipping on his glass of wine and Mrs Anna Anderson, a fine calm looking woman with sharp eyes and raven hair, was just enjoying the party.

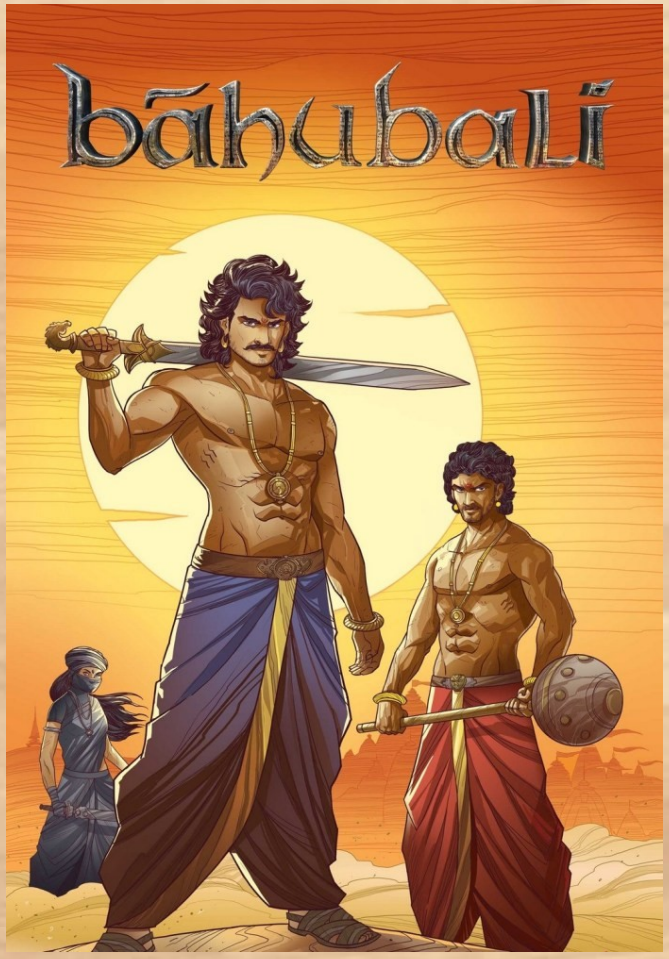
"It feels really good to see you both not wearing your lab coats", the woman in red said and everyone gave out a chuckle. She continued "All of us are aware of the epidemic strikes in several countries and the death toll was massive. Many scientists were working on the remedy but these two great people discovered the cure and saved a lot of people from dying. We have another reason to celebrate... due to their great deed, they have been nominated for this year's Nobel prize for medicine. We congratulate you both.'' The whole hall applauded.
"I'm sure both your sons will do great things and help the society just like the both of you", she added.

The Andersons smiled back at her and looked at each other with a sigh. Well, they knew Alex, their second son, the obedient one, would do just fine but their first son, not so much. That was because he was always a fun oriented guy, in every sense.
"Why is it so calm!" mentioned Mrs Anderson and turned back to the table behind her only to find Alex a fine looking boy, 17, with black hair that resembles his father's.
"Where is Axel?", she asked.
"He went over to the counter to get some tacos." relied Alex "Oh! Here he comes."
A boy, 19, fit, he had his father's skin tone and black raven hair, just like his mother's, approached the table. He came closer and Alex was dumbfounded.
"Congrats to the both of you!", he said and Mrs Anderson took one look at him and asked "Who are you??"
"Oops! Shouldn't have talked, or was it the nose? Uurh.. my nose always gives me away", he babbled.
"What is the meaning of all this? And why are you dressed up like Axel? Even your hair... everything looks similar, where the hell is Axel?!" Mr Anderson demanded.
"I'm still going to get paid right?", he asked.

The Andersons gave him a really cold glare and he froze as though he was paralyzed thinking about his imminent doom.
"Can I at least take these tacos? Ummm.. this Food it's to die for!!", he managed to speak up in a funny Mexican accent hoping they wouldn't kill him.
"Where is Axel?! You better tell me where he is or you will not leave this place in one piece!!'' roared Mrs Anderson but suppressing it so that the guests wouldn't notice. He tried to gulp down his anxiety but in vain.
"I'm sorry Mrs Anderson. I'm just a paid actor; $50 an hour, here's my card just in case you need it. I don't know where Axel is!", he said giving her the card.
"Axel you dumbass, you are so dead bro!", thought Alex.
"He was talking something about taking your private plane to his butler though.", he added.
"What!!", roared Mr Anderson. "This is the second time without my permission and David too!!?"
"He is so grounded when he comes back!!", asserted Mrs Anderson.

Reviewing the popular movie: BAHUBALI

Akhilaja Pratyusha
(MSc., 1st Year)



Why did Kattappa kill Bahubali? A question that had plagued most of our movie buffs' minds for the most part of last year, (even in the face of sessionals and university examinations for us students-like we could help it!) has finally been answered. The conclusion to a **cliff-hanger** beginning offers us **bone-cracking action** that might be too hard to believe for some, but seems negligible considering the genre, romance, drama, all portrayed by a **star cast** who have made believing in and watching larger than life characters, easier. The background score is as befits a period drama and even manages to cause **goose bumps** however momentarily, but isn't as hummable as that of the first instalment.

As Kattappa (Sathyaraj) narrates to Shivudu /Mahendra Bahubali (Prabhas) about the powerful yet kind, honest and dutiful son, husband and ruler, that his father Amarendhra Bahubali (Prabhas) was, the story exposes more of the **treachery** conspired against him and Rajmatha Sivagami (Ramya Krishnan) by Bijjaladeva (Nasser) and his son Bhallaladeva (Rana), in order for them to take over the kingdom of Mahishmathi.

Watching Prabhas portray the role of a king known for his **righteousness** towards his subjects, love and admiration for his queen and being the quintessential son to Rajmatha Sivagami, reels you back to those times of Amar Chithra Kathas. He has translated all the facets of a king bound by duty and love, very naturally on screen. Described by the Director, SS Rajamouli, the character Bijjaladeva is a person with "**Venom** in every word, resentment in every step and envy in every thought", while Bhallaladeva is the "Tyrant King with strength unmatched, power unchallenged and a mind unread". It is these two characters indeed who have taken the grandeur of the story a notch higher than it already exhibited. Taking the centre and well, most part of the stage, in the second instalment, is Devasena (Anushka). Finally rescued by her son Shivudu/Mahendra Bahubali, from the evil clutches of Bhallaladeva, the story goes back in time showcasing how the charming, beautiful, smart and strong, princess came to fall in love with Amarendhra Bahubali. Defying all **odds** to support her love and yet standing true to her beliefs and ideals, a princess's journey to becoming the queen (of the kingdom and Bahubali's heart) couldn't have been portrayed better.

Carefully and very artistically **intertwined** into the movie are the aspects of equality, respect for women and loyalty. Often mistaken to be the same, these three aspects have been portrayed by both men and women of the movie, in ways that without being overly emphasized, had managed to garner much **appreciation** (and by that I mean whistles, hoots, claps and may be even 'happy' tears here and there).

For those who seek a decently realistic but an entertaining cinema, overlooking certain technical lapses and few of the **unbelievable stunts** will help them enjoy the movie better. And as to why Kattappa killed Bahubali…

Let's just say Kattappa Uncle's jealousy out-weighed his love for Bahubali, which lead him to think that he himself can rule over Mahishmathi!

Well, of course not! There is a reason as to why **Bahubali- the movie** is called **'Epic'** and how it is a testament to the fact that not every Director and his/her crew thinks and works the same! You might have to find out the answer yourself!

Fun Fact!
Semi-synthetic organisms are now real!

Scientists have engineered the first ever 'semi-synthetic' organisms, by breeding *E. coli* bacteria with an expanded, six-letter genetic code. These modified *E. coli* carry an entirely new type of DNA, with two additional DNA bases, X and Y, nestled in their genetic code along with A,T,G,C.

Scientists altered the nucleotide transporter to make it less toxic, changed the molecule for Y base to make it easily recognizable by enzymes and used a revolutionary gene-editing tool, CRISPR-Cas9 to engineer *E. coli* that don't register the X and Y molecules as foreign invaders.

"This semi-synthetic organism constitutes a stable form of semi-synthetic life and lays the foundation for efforts to impart life with new forms and functions", researchers reported.

School of Life Sciences bids Farewell to Dr. P Gopalakrishna Bhat

Ms. Supriti Ghosh,
Research Scholar

On 3rd April, 2017, School of Life Sciences, Manipal honoured one of the most **dynamic** and **beloved** professors, Dr. P Gopalakrishna Bhat, or as his pupils affectionately call him, G.K.B sir, as he retired from his official duties.

Dr. Bhat dedicated four precious decades of his life towards imparting knowledge in the field of Biochemistry and inspiring students to pursue research at Manipal University. His **zealous approach** towards teaching and research motivated numerous young minds. After his retirement from Kasturba Medical College, he could not part from his interest in seeking and imparting knowledge and hence, he extended his tenure at School of Life Sciences. "One year became two, two became four and five years of my job extension passed in a blink", said Dr. Bhat when we met him for an interaction. His **happy-go-lucky** nature, **charming** smile and **infectious aura** always spread happiness among everyone at the school.

As a tribute to his extraordinary service at Manipal University, School of Life Sciences organised a farewell function which began with a brief introduction to his dynamic career followed by short messages from his colleagues and **heartfelt thanks** from his dear students. While sharing his experience with Dr. Bhat, Dr. K Satyamoorthy (Director, School of Life Sciences) reminisced about his first encounter through his publications. "During my post-doctoral tenure at Philadelphia, I used to read the articles published by the pioneer group on adenoviruses when a name in the authors' list caught my attention 'G K Bhat'. I used to wonder who this person was and wanted to meet him. I was fortunate enough to finally meet him after several years, right here, at Manipal University." Such is the inspiration imparted by Dr. Bhat. On this occasion, Dr. B S Satish Rao, (Head, Department of Radiobiology and Toxicology at School of Life Sciences) took the pleasure of calling him **"Encyclopaedia of Biochemistry".** He added that all the good adjectives from a dictionary would appropriately describe Prof. Bhat. His students shared their fond memories of how his simplicity, immense knowledge and the time he would dedicate to discuss their work-related issues fascinated and motivated them.

A down to earth, humble teacher of such **calibre and charisma** will be dearly missed by everyone at School of Life Sciences. We wish him a very happy and prosperous retired life and good luck for all his future endeavours.

Interview: Dr. Gopalakrishna Bhat

Aditi, Nidhi, Shruptha, Harshita, Padmavathy
MSc. 1st Year.

This is a special interview with Dr. Gopalakrishna Bhat (popularly known as '*GK Bhat sir*'), Professor at School of Life Sciences, after his recent retirement, reminiscing the past and highlighting the present.

The interview begins with a cliché question - What was his inspiration to get into the field of science, to which Dr. Bhat states that he entered it by default rather than having a specific career plan or with a particular interest. He joined his B.Sc. degree with **Zoology** and **Botany** as the major subjects and **Chemistry** as the minor one and during the course of this program, he enrolled into the **College Science Improvement Program (CoSIP)** in botany, which was sponsored by UGC at the MGM College, Udupi. When asked how students of this generation could choose particular subjects for pursuing higher studies amidst a whirlpool of many, he says it should entirely be up to the students since it would be their choice and explained that about 50 years ago, the options were less but now the options in front of students are plenty.

When asked how students of this generation could choose particular subjects for pursuing higher studies amidst a whirlpool of many, he says it should entirely be up to the students since it would be their choice and explained that about 50 years ago, the options were less but now the options in front of students are plenty. Asserting that it would be better to be happy with what we get in life, he enthusiastically shares an analogy: "If we don't get oranges, have mosambis, if not then have *some* fruit."

He then says that in science, we will feel happy when we realize that we have done something (worthwhile) ourselves. To a question of his experiences of working abroad, he emphasizes that **hardships** and **experiences** come in different ways wherever one goes and now, at the age of 65, when looking back, he realizes there are many sorts of people in the world; some will go out of the way to help us, encourage us while at the same time there are those who pull us down. We must learn to take it as it comes, at the same time not to worry much because nothing is a part of "Ramarajya" – not just the sweet but the bitter must be experienced too. When it comes to handling **emotions** and **profession**, he quips "We all have different faces, only few are seen by people" and that the best way to face life is to smile.

As the discussion veers towards his experiences as a teacher, he sums up with "As far as there are people to listen to what you have to offer, there will be an interaction. Sometimes it is as simple as a mother answering a child's repetitive questions" and that there are moments that makes one feel disheartened but that is something everyone will have to face in that career – when students do not listen to what is being taught. All said and done, he says he has no regrets about his decisions in his career. He agrees with the statement that science is one field that would definitely give **satisfaction** especially in terms of being a teacher. He then says that living life as a human, to be happy one does not need too much and that happiness does not come with money.

As we are to conclude the interview, he comes up with yet another analogy: "Oranges or mosambis, all that matters is that we would want to eat fruits and that we would get grapes only at a particular time of the year…"

Was 2016-17 Sporty enough?

Compiled by: **Russell Castelino** (BSc, 1st Year)
Inputs by: **Athira Sunil** (BSc, 3rd Year)

The year 2016-2017 has been a great year for sports and athletics at the School of Life Sciences, there was a notable **enthusiasm** in the **involvement** of all the students, research scholars, faculty and staff. A break-up of all the events that took place can be seen below.

Our students have actively participated in various inter-collegiate events. Sourav Patagi of BSc 1st year won second place in 1500m **swimming** event held in September 2016. Students cricket team led by Mr. Abhijith Shankaran participated in **Inter-Mahe Cricket Tournament** held on Ist February 2017. In the **Badminton Tournament** held on 6th February 2017, teams led by Ms. Alfa Rodriguez (Women's) and Mr. Sahil C (Men's). We emerged as Champions of **Inter-college Basketball Tournament** held on 15th and 16th February 2017 through the team led by Ms. Padmavathy Ramanarayanan of MSc Ist year. We also enthusiastically participated in **Athletic Meet** held on 17th February 2017 and **Inter-college Throwball** tournament held on 12th March 2017 led by Ms. Athira. We started our inter batch sports event with a **cricket tournament** between teams from student batches, research scholars and faculty. Research scholars team led by Mr. Shreesha Bhat K emerged as the champions in this tournament by beating staff members led by Dr. Murali TS in a tense final match.

The following tournaments were held between teams from student batches, research scholars and faculty. In the **basketball tournament** held on 10th February, A team lead Ms. Padmavathy Ramanarayanan won the tournament by defeating the team of BSc 2nd years led by Mr. Sahil C .In the **football tournament** held on 7th February, The team lead Mr. Sagnik Pal won the tournament by defeating the team led by Mr. Risheek S. Kumar. In the **throw ball tournament**, the team lead Ms. Alfa Rodriguez won the tournament by defeating the team by Ms. Aron. In the **Six-a-side cricket tournament**, Students team emerged as the winners by beating research scholars in a tense final match.
In the **Volleyball tournament** which was held, the staff team led by Dr. Shamaprasad K comprehensively beat the research scholars team led by Mr. Shreesha Bhat to claim the championship.

The **Badminton matches** had an intense competition amongst students , staff and research scholars. In men singles, Dr. Kamalesh D. Mumbrekar emerged as a winner by beating Mr. Sandeep Mallya in the finals. The Women singles event was a well fought victory won by Ms. Alfa Rodriguez (BSc 1st year) by beating Dr. Babitha K S. The men's double's event were won by Mr. Sandeep Mallya & Dr. Kamalesh D. Mumbrekar by beating Mr. Vaibhav Shukla & Mr. Vinay K V.

On the 8th of March 2017, SLS organized an inter-collegiate **Best Physique competition** where we had not only a participant for the first time but also bagged the first prize in the category of participation (60-65 kg).

The **Annual Sports Meet** of our college was held on 30th March 2017. Sports Meet was inaugurated by our Director, Dr. Satyamoorthy K. Various events were held throughout the day. The events were 100m , 200m 400m, shot put, discus throw, javelin throw, long jump, high jump, 4X100 m relay and friendly throw ball and 6-a-side cricket matches. The last event of the day was Tug of War which was won by Students, followed by the valedictory function whose chief guest was Dr. Poornima Baliga, Pro-Vice Chancellor of Manipal University.

The title of **Best Throw ball player** was awarded to Ms. Alfa Rodriguez for her effective performance. The title of **best cricket player** was awarded to Mr. Shreesha Bhat K. The title of **best volleyball player** went to Mr. Sahil C. Ms. Padmavathy Ramanarayanan was named as the **best basketball player**. Mr. Saswata Hore was named as **best football player.** Luke D'costa was named as **best athlete** amongst the **men** and Rachel Kurien was named as **best athlete**

Fun Fact!
Lungs do more than just breathing!

Researchers discovered that lungs produce more than 10 million platelets per hour, equating to the majority of platelets in the animals' circulation.

Based on two-photon intravital imaging, by inserting green fluorescent protein (GFP) into the mouse genome, researchers traced the paths of mouse platelets in real time. They noticed a surprisingly large population of platelet-producing megakaryocytes inside the lung tissue, which was previously associated only with the bone marrow.

Further experiments revealed vast amounts of previously hidden blood stem cells and megakaryocytes progenitor cells sitting just outside the lung tissue - about 1 million per mouse lung. On further research, they concluded that megakaryocytes travel all the way from the bone marrow to the lungs to produce platelets.

There's a major pulmonary role in platelet-related hematopoiesis!

"A DROP OF LIFE"

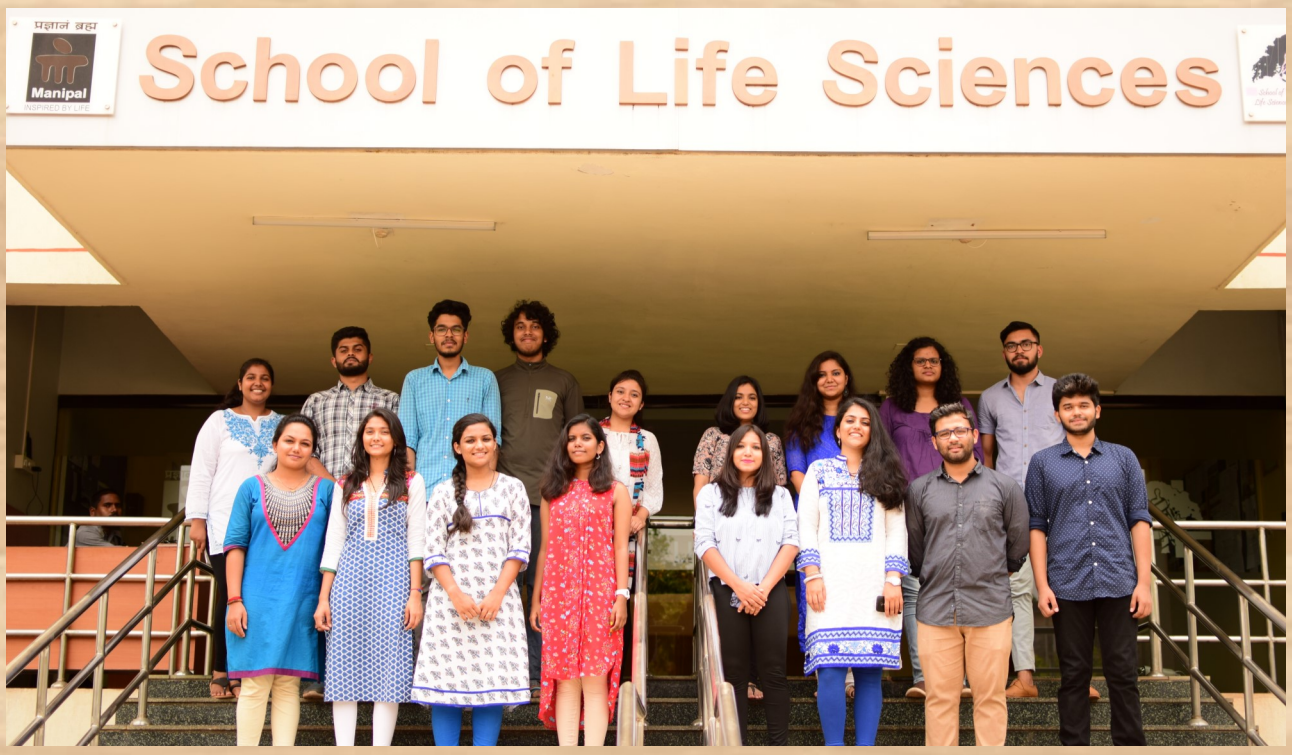
Thyagarajan
BSc Biotechnology
1st year.

"IF I STAND, AM I STILL A FLY? "

How the Student council wrote the story of 2016-17!

Compiled by: **Bhargavi Karna** (BSc, 1st Year)
Inputs by: **Aditi Kandlur** (MSc, 1st Year)

The **Academic year** July 2016 – April 2017 was eventful for the School of Life Sciences. A new Students Council was elected with the following members:



Designation	Name	Designation	Name
President	Aditi Kandlur	Cultural Committee Heads	1. Sudipta Pathak 2. Ramya Gupta
Vice President	Arpitha Suresh	Sports Committee Heads	1. Risheek Kumar 2. Sahil Cadiri 3. Athira A P
General Secretary	Sagnik Pal	Editorial Board Heads	1. Russell Castelino 2. Bhargavi Karna
Treasurer	Poompozhil Alagupandian	Financial Committee Heads	1. Harshita Kothari 2. Anju Aravind
Joint Secretary I	Luke Da Costa	Social Committee Heads	1. Vaishali Todi 2. Humaira Shah
Joint Secretary II	Aditya Menon		

The new council of students introduced and improvised events in the college for the better. A summary of these events is as follows:

The council activities for the year officially took off with the **Independence Day** on 15th of August 2016. A group of BSc students from SLS marched for the country's pride at the parade organized by Manipal University in front of the .edu building. Following that we celebrated another patriotic event **'AZADI-70- Yaad Karo Kurbaani'** on 23rd of August 2016 marking the 70 years since India got its independence.

Phase I and II of **Swachh Bharat Pakhwada** kept up the nationalistic feel. These events were conducted on 15th of September 2016 and 9th of November 2016 respectively to encourage students and others to keep clean and promote a green environment.
Onam was gracefully celebrated by the students and teachers of SLS by wearing traditional costumes, drawing rangoli with flowers and sharing Payasam on the last day of Onam, 15th of September 2016.

It was the month of October 2016 that was the most happening for School of Life Sciences.

High Voltage, the popular rock concert organized by SLS was held on 1st of October 2016 for only the second time. Bands from in and around Manipal University, including Under-the-Cross, put up memorable performances in the Amphitheatre. Alongside High Voltage, the Social Committee of the Student Council held the **'Drop the coin Pick up the Ribbon'** event with the motive of creating awareness about cancer to the public and helping breast cancer patients. It was an initiative for contributing to a better tomorrow. The cash donation collected for the cause was Rs.1775.

From 2nd to 3rd of October 2016, SLS participated in **DAAN UTSAV**, an initiative by VSO, Manipal. The Social Service Club of SLS donated pollution-protection masks to the Traffic police in the local police station.

On 8th of October 2016, **Sharda Pooja** was observed in the college to worship the Goddess of Knowledge.

In the last week of October, SLS conducted **sports week** with games like six-a-side cricket, volleyball and throwball competitions.

The *Optical Society of America* (OSA) approved **'Manipal University OSA Student chapter'** as an official student chapter in October. Under this chapter, students can develop technical knowledge, leadership experience and lasting relationships with the peers and mentors. The OSA offers many unique chapter benefits to achieve the desired goal of the society and take care of its financial requirements.

The Social Committee under the Student Council of SLS celebrated the auspicious festival of **Diwali** on 30th of October 2016 with the kids at Sri Krishna Balaniketan in Udupi.

The **National Unity Day** on 31st of October 2016 was celebrated to mark the birth anniversary of Sardar Vallabhbhai Patel. With the enthusiastic participation from students and the pledge to keep up the unity in diversity, Rashtriya Ekta Diwas marked the end of an eventful October.

On the 4th of November 2016, a post-**Halloween** event was celebrated with the screening of horror movie, along with photo 'booth' installation, food stalls and fancy Halloween props – all by the students.

The quarterly e-newsletter of SLS published by the Ed-Board of the Students Council received a new and apt name in the month of November 2016: **VIVUS** (meaning *life*).

We then had the **Constitution Day** on 26th of November 2016 reminding us of our rights and duties.

In the new year, on 26th January 2017, our dedicated BSc students formed yet another contingent to march at the **Republic Day** parade organized by Manipal University at the KMC Greens, spreading the feeling of national and institutional pride among our students and faculty.

The OSA Student chapter was inaugurated by the honourable Vice Chancellor, Dr. H Vinod Bhat at SLS on 13th of February 2017, opening doors to learning opportunities for students.

On 21st of February 2017, **Matribasha Diwas** was celebrated to pay tribute to our mother tongues, our first language that binds us to our tradition despite the advancements rocketing around us.

The School of Life Sciences over-served the **National Science day** on 27th and 28th of February 2017. The theme for the year was **'Aid the disabled'** and hence along with the demonstrations of chemistry and biology, we had "The talking gloves", "The walking stick" and "The note detector" – meant to help the deaf and the blind people and to make their life easier. The Optical Society of America also put up their show to add essence to Science Day. The two-day program saw students and faculty from several schools and colleges in and around Manipal coming to experience the wonders of science.

Then, the all-inclusive cultural event of SLS – **PRIMER** – was organized from 2nd to 3rd March 2017. The college was enlivened with group as well as solo dance, songs and mad-ad performances. Primer also included Pot Pourri, Rangoli and a lot of online events like Cartooning, painting, literary competitions and spot photography that allowed students to explore their artistic and verbal talents.

After a series of sports tournaments (inter-collegiate and intra-collegiate) like swimming, badminton, football and table tennis, SLS conducted its **Annual Sports Day** on 30th of March 2017 where all staff, students and scholars, participated in various track and field events to celebrate the talents and interests of people for sports.
On 31st of March 2017, Social Committee made yet another noble visit to the **Sandhyadham old-age home**, Goretti Hospital in Kalyanpur, Udupi. With fruits and lots of love, students exchanged good company and made good memories in the visit.

Students actively promoted **Green (R)evolution** by selling Beej pencils from the Plant-a-seed campaign during the period of March- May 2017 under the Climate Counsellor of our college, Ms. Nicole Lobo. These pencils are made from recycled paper and have seeds at one end in a capsule that can be planted after use. They also created awareness regarding climate change and about the efforts of **International Centre for Culture & Education (ICCE)** under the United Nations Framework Conventional on Climate Change. (These students will have to write an exam that tests their knowledge on climate change and other such global issues by the end of May 2017.)

Lastly, the grand Manipal University cultural fest – **Utsav** – organized from 2nd to 7th of April 2017. Students from SLS enthusiastically participated in a wide range of events from solo and group singing, duet and group dancing, poetry writing, Mad-ads, mime, JAM, Antakshari to events like fashion show. SLS students were winners in western solo vocal and third in English poetry competitions.

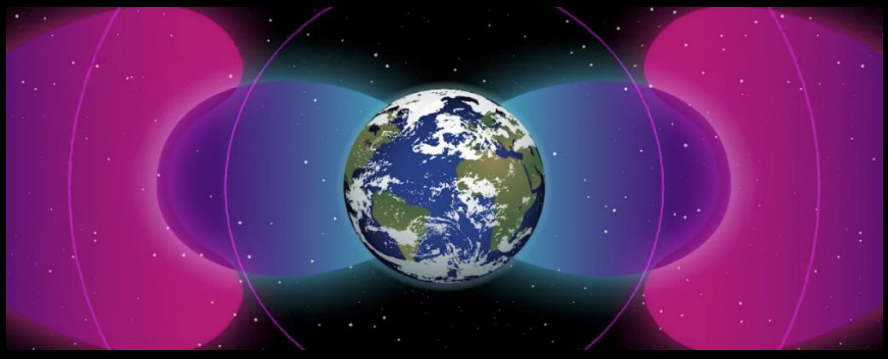
On the 1st of April 2017, a student pioneer of SLS performed a demonstration class on "Moods, Hormones and Pheromones" for **Vortex,** an initiative to start from September 2017 aiming to involve students from all colleges in Manipal University in teaching and learning activities. This involves an open arena of subjects from in and around the University.

On 3rd of April 2017 we bid **farewell to Dr. P Gopalakrishna Bhat**, a teacher who taught more in conversations than textbooks of curriculum could teach. It was a bitter-sweet feeling to say goodbye to someone who imparted knowledge with smile and passion. We were glad we got the privilege to have him around, we are sad we wouldn't see him around anymore as a beloved teacher.

The very same day, we had our esteemed senior ex-faculty members Dr. Gopinath and Dr. Bhat inaugurate the **Table tennis** and **Carom Board** for the overall development of students: academic and extra-curricular activities are both encouraged in SLS.

The students were also active participants of the various conferences and other academic events including guest lectures in the past year.
The year has been thrilling with events of academic importance and of cultural and social values. We hope to carry them with us and reach greater heights in the upcoming academic year (2017-2018) with new council, new members and new experiences.

Fun Fact!
A Man-made bubble surrounds the earth!



NASA space probes have detected a massive, human-made 'barrier' surrounding Earth and tests have confirmed that it's actually having an effect on space weather far beyond our planet's atmosphere. Unlike other impacts we cause, this particular one is in our favour.

A certain type of communications, called Very Low Frequency (VLF) radio communications, have become far more common now than in the 60s and they can influence how and where certain particles in space move about, thus affecting the properties of the high-energy radiation environment around the Earth. The impenetrable barrier that these VLF radiations form, pushes away the Earth's Van Allen Belts and hence, keeps many dangerous solar discharges at bay.

Such huge impacts of anthropological activities demand a new geological epoch named after us!

ANNUAL DAY 2017: The SLS Family get-together

Class Dances

Best clothes!

Staff Plays

Class Skits

Solo Performances

Delicious Food!!

Traditions and Culture

Awards And honors

Speeches