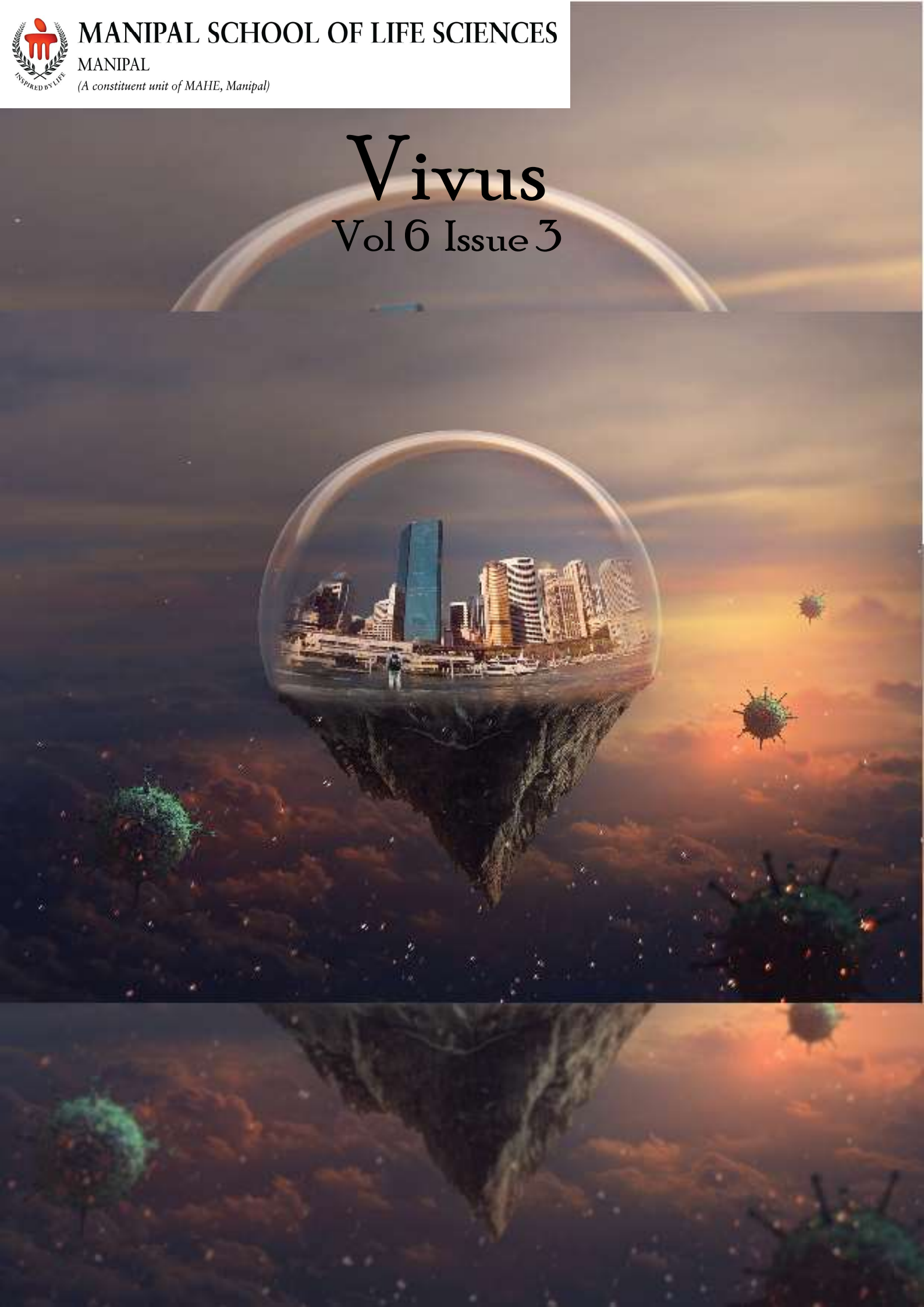
MANIPAL SCHOOL OF LIFE SCIENCES
MANIPAL
(A constituent unit of MAHE, Manipal)

Vivus

Vol 6 Issue 3



Editor's Note

Dear Readers,
2020 has gone and 2021 has been no different. The surge in the second wave of the pandemic has left us all in lockdown once again. With uncertainties looming large yet again, the need to maintain a positive mindset and hold strong is now more than ever. In the midst of these unprecedented times, we bring to you, this issue of Vivus.

The dark clouds had a shimmer of silver lining in the few events like Mr. MAHE 2020, National Science Day 2020, Prof J V Bhat Memorial Oration, Primer 2020, International Women's Day 2020 about which you will read in the 'What's up MSLS?' section. The team spoke to **Mr. Annamalai, IPS** on his experiences as a Ted-X motivational speaker and his guidance to students. In the 'Get Scientified' section, read more on Covid-19 by our alumna, and we congratulate **Ms. Supriti Ghosh** for being awarded the Newton-Bhabha Ph.D. Placement Fellowship. Poems, sketches, illustrations by our budding artists have yet again made this issue a colourful one.

We are immensely grateful to our Director, **Dr. K Satyamoorthy** who has been a constant support and has guided us through every step in bringing out this new volume of Vivus. We would also like to thank our faculty advisors, **Dr. T. G. Vasudevan, Dr. Vidhu Sankar Babu** and **Dr. Saadi Abdul Vahab** for their reviews and advice. We also extend our thanks to the various committee heads for their help and to all the students who represented us at the interviews.

Let us firmly believe that this too shall soon pass.

Designing and Cover page design by- **Shalon Pinto**
Presenting Vivus – Volume 6, Issue 3
Preksha Mandlecha, Sanjana Bhat, Prahlad Rao
Editorial Board 2019-2020
Manipal School of Life Sciences
MAHE, Manipal

WHAT'S IN THIS ISSUE

What's up MSLS?

MAHE Inter-Collegiate Best Physique Competition

A bodybuilding and best physique competition for the "Mr. MAHE-2020" title was held at MIT Library Auditorium on February 26, 2020 organized by Manipal School of Life Sciences. The competition was inaugurated jointly by Dr. D Srikanth Rao, Director of MIT, Manipal and Dr. K Satyamoorthy, Director of MSLS, Manipal with the lighting of the lamp.

Fourteen contestants competed in five different weight categories - below 55kg, 55-60kg, 65-70kg, 70-75kg, above 75kg. The judges explained the rules of the competition and each contestant was given a minute to show off specific muscles as asked by the judges, followed by a minute of freestyle posing of their choice.

The winners of each weight category, Mr. Rajat Kumar (MIT), Mr. Vishal K Sanil (MIT), Mr. Rehan Riyaz Shaikh (MIT), Mr. Abhishek Bhandari (MCHP) and Mr. S Vishnu Vinayak (MIT) then battled in a common title round for the "Mr. MAHE" title, in the presence of an excited and energetic audience. The title of Mr. MAHE 2020 was won by Mr. Vishal K Sanil (MIT, Manipal).

A live demonstration was given by Mr. Soujan Shetty, a renowned bodybuilder. This competition showed the interest of the youth in bodybuilding and fitness.

-By Preksha Mandlecha (M.Sc. MBT)

National Science Day 2020

The National Science Day dawned bright at MSLS, having inaugurated by by Dr. H Vinod Bhat (Vice Chancellor, MAHE) on the evening of February 27, 2020. There was a lively atmosphere at the College as several students and faculty members alike could be seen running around setting up the models for display. National Science Day is celebrated in India on February 28 each year to mark the discovery of the Raman Effect by the Indian physicist Sir C. V. Raman on this day in the year 1928. The college had been decorated with a large banner of late Dr. C V Raman, with other colourful banners flanking it to liven up the surroundings. About five hundred students from various different schools visited MSLS along with their teachers on the day, learning interesting facts and knowledge in science.

Like previous years, 2020 also saw some great scientific creativity among students of various age groups, as the models depicting different ideas and concepts were set up for display in the first floor of the building of MSLS. The models ranged from a fascinating 4D set up to the already notorious novel coronavirus model to a working model of an electric guitar. Students in groups of four could be seen enthusiastically playing the handmade Micropoly board game, which was similar to snakes and ladders but had "good microbes" and "bad microbes" in place of the former. There was a brightly done model depicting the water cycle and a hydroponics model to display the popular style of growing plants without the use of soil. The working model of the Solar Powered Drip Irrigation System attracted students due to its colourful and immaculate setup. Bunches of students and teachers could be seen reading the various displayed chart posters depicting the myths, precautions, mechanism, and symptoms of the disease caused by the novel coronavirus. Among other eye-catching models, was the chloroplast model describing the various components of the plant chloroplast and the vertical gardening model made using a series of plastic bottles. The models focussing on physics included the working model of the basic electric guitar (which worked on Faraday's law on electromagnetic induction and was built with just wooden planks and magnets, and the music could be heard through earphones), the piezoelectric model, the handmade kaleidoscope and the hydroelectric power plant with turbines made from bottle ends. An interesting exhibit was the demonstration of phagocytosis using just slime jelly, a metal sphere and a magnet. Besides these, there was also a section where creative puzzle pieces of the brain and various other images were competitively put together by enthused students and teachers. The genome sequencing model was an innovative method of explaining the concepts of sequencing and DNA nucleotides to younger students.

There was also a chemi-café where, on entering, one was greeted by the sight of a bright wonderful "chemis-tree", made colourful using glassware such as test tubes, flasks, etc. filled with colourful chemical solutions. Various chemical reactions were performed by the exhibitors, most of which involved a colour change to make it easier and attractive to explain the concepts. An interesting piece was when the students showed how to bounce bubbles using glycerine and sugar. The biology lab displayed various fascinating mounts of specimens ranging from the white eye mutation on fruit flies to neurons of mice under the microscope to kidney cells, all of which were observed in awe by the school children. There was also a fun and informative movie screening and a game zone in the basement, which mainly consisted of games like hangman, dumb charades, Pictionary, jumbled words, and puzzles, all of which were related to science. The movie screening included videos on various areas of science including chromosomes, wildlife and animal species found in Karnataka.

The science exhibits held in the MSLS Annex were those that were compiled by the Manipal Student Chapter of the Optical Society of America. A brightly lit OSA signboard signalled the entrance, and all those who entered were immediately greeted with various optical illusions and experiments. The illusion box gave an infinity view into its depths while Jell-O Petri dishes and water bottles showed the reflective and the bending properties of light. The miniature hologram set up, the microscope and experiments from the

OSA repertoire such as the refraction discs and the polarization glasses were also present; the experiments described different aspects of light such as refl ection, refraction and diffraction while simultaneously entertaining the audience. A brilliantly handcrafted model of the sensory neuron in a reflex arc was also presented while the spectroscope was shown in action by a student attending the Science Day residential program. The main attraction of the OSA segment however was the Laser obstacle course. Everyone from school kids to the professors got to live out their spy fantasy in the dark room with intricately spaced laser lines that came to life with a fog machine. Dr. Nirmal and Dr. Mahato were a constant source of support and enthusiasm and the OSA student chapter members along with many volunteers worked tirelessly to make all these experiments and projects come to life and bring smiles to all those who visited. There was a greenhouse and planetarium visit scheduled for the students and teachers of various schools who visited MSLS. On entering the greenhouse, the students enthusiastically tried to guess the names of as many plants as they could. Dr. Guruprasad then explained the concepts behind photosynthesis and the greenhouse effect. The working of the greenhouse was also explained with the aid of turning on the sprinklers, which caused water to be sprinkled on every student present in the greenhouse resulting in immediate gasps and shrieks.

Poster and model presentation competition was organized by MAHE for higher primary and high schools on different themes judged by Dr. Aravind Kumar (Director, DGIR, MAHE) and Dr. Arun Maiya (Dean, MCHP, MAHE) The themes allotted to Higher Primary Schools and High Schools were 'Eclipse' or 'My Dream Planet' for poster presentation and for model presentation were 'Rainwater harvesting' or 'Recycling and Reuse of Plastic'. Students of various schools presented beautiful posters and working as well as non-working demo models on types of rain water harvesting methods like roof-top,

reservoir and different ways to reuse and recycle plastic by making plastic bricks, roads, drones, speakers, plastic shredder models and what not. The schools that participated in the presentation competition were SRS Higher Primary School, Madhava Kripa Higher Primary School, Mukundakripa Higher Primary School, Indrali English Medium Higher Primary School, SLNP Higher Primary School, SBRS Higher Primary School, Vasudevakripa Higher Primary School, SBRS High School, Indrali English Medium High School, SVS High School, Agumbe, AVM High School, SRS English Medium High School, SLNP High School, Kamala Bai High School, TA Pai English Medium High School, Sharada High School, Dr. TMA Pai High School, Peradoor High School, Madhava Kripa High School.

After all the presentations and demonstrations, the students who presented the models and the teachers accompanying them were taken to Hotel Fortune Inn Valley View for lunch and the Valedictory function along with students of MSLS. The chief guest and guest of honour for the valedictory function were Padmashree awardee, Dr. Y S Rajan and former IPS officer, Mr. K Annamalai, respectively. Both the esteemed guests motivated and inspired the audience with their words. Mr. Bharath Prasad, faculty member, MSLS proposed the vote of thanks to bring the curtain down on the successful celebration of National Science Day 2020.

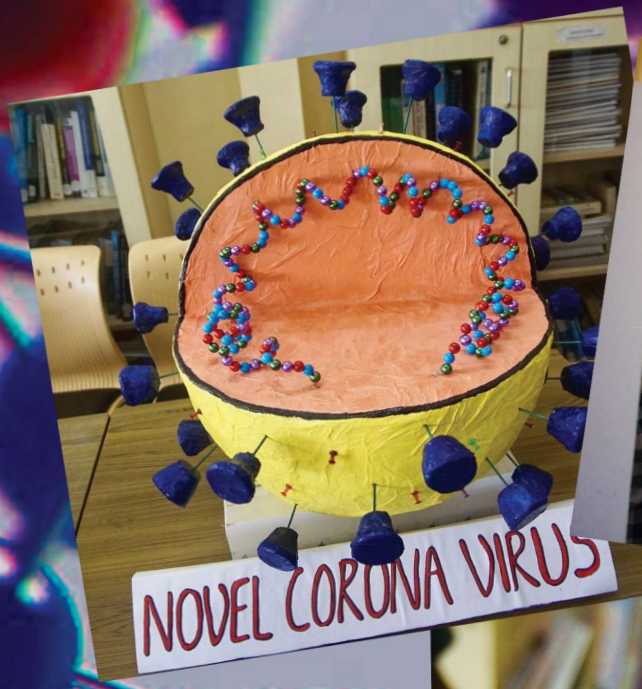
-By Sanjana Bhat (B.Sc. BT)
Preksha Mandlecha (M.Sc. MBT)


Genetics
CYTOGENETICS


Withania somnifera
Ashwagandha
Coco peat
Hydroponics
BENEFITS OF
HYDROPONICS
No Soil
Water-Saving
Fast Growth
Higher Yields
Less diseases
Less pesticide use
Affordable


Smart Agriculture
Drip irrigation
using Solar energy
NEW
ones
DRIP LINE
WATER PUMP
PLEASE DON'T TOUCH

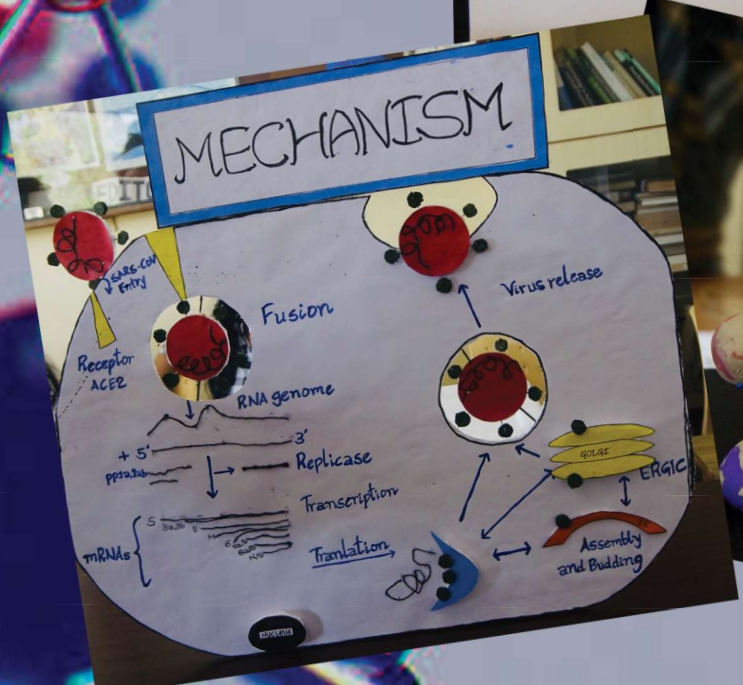

DRIP LINE
WATER PUMP
PUMP CONTROLLER
SOLAR PANEL


NOVEL CORONA VIRUS


EXIT

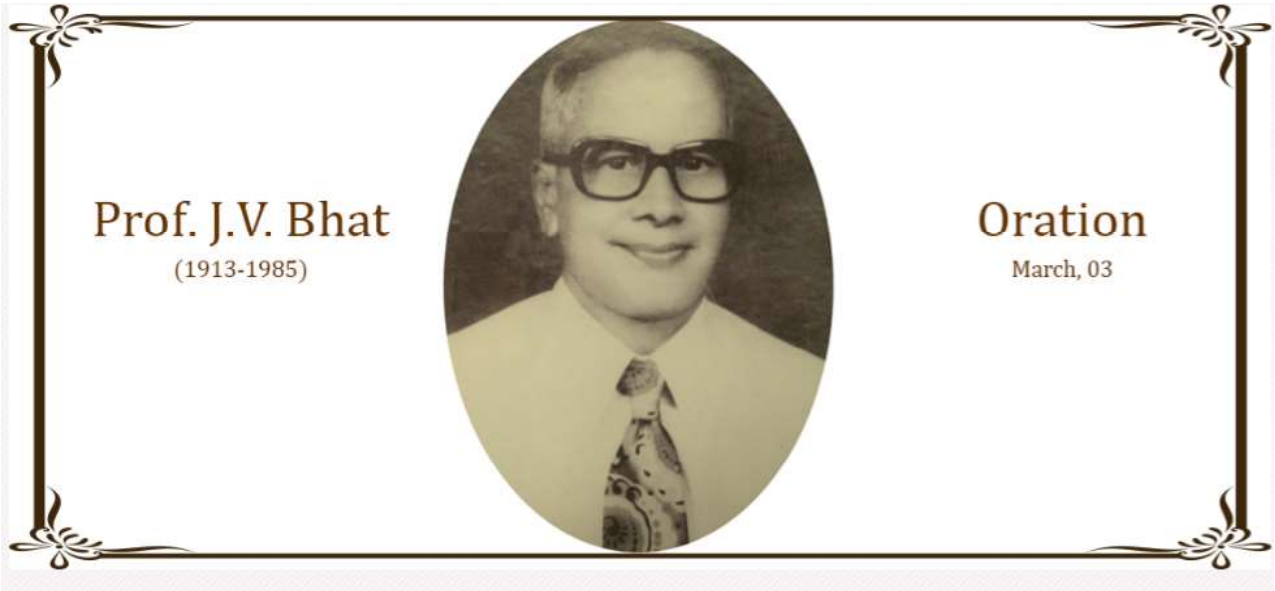

S-Protein
HE Protein
Envelope
RNA

COVID-19


MECHANISM
SARS-CoV Entry
Receptor ACE2
Fusion
RNA genome
+ 5'
3'
pp1a,1ab
Replicase
Transcription
S
E
M
N
mRNAs
Translation
Virus release
GOLGI
ERGIC
Assembly and Budding


S-Protein
HE Protein
Envelope
RNA

Prof J V BHAT MEMORIAL ORATION

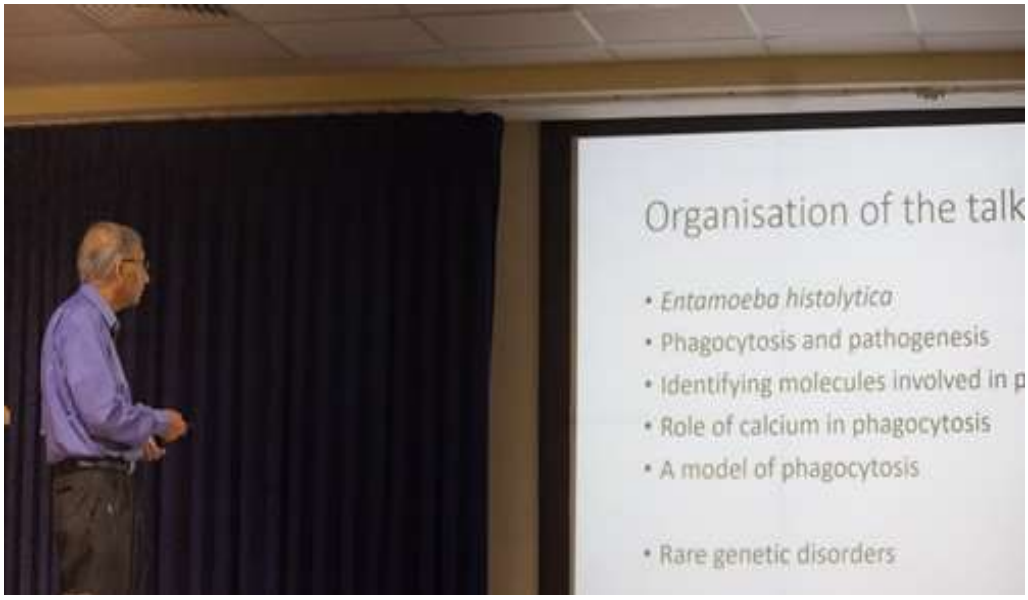


Prof. Janaradhan Venkatesh Bhat was born on March 3, 1913 at Thalassery, Kerala and had his early education at St. Aloysius College, Mangaluru. Throughout 1935-1953, he worked as a research worker and as a tutor at St. Xavier's College, where he obtained his MSc Degree. From 1953, Prof. Bhat was at Indian Institute of Science for twenty years, initially as Head of Fermentation Technology Laboratory and later as academician and Head of the Department of Microbiology and Pharmacology. Throughout his residency at the institute, he was also a visiting faculty at the National Institute of Health, Bethesda, Maryland, U.S.A. On his retirement from Indian Institute of Science in 1973, Prof. Bhat joined Kasturba Medical College faculty as an experienced academician and director of research. Prof. Bhat had received an astounding variety of awards and accolades. MSLS, MAHE celebrates the legacy of Prof. JV Bhat by organizing an annual memorial oration in his name on his birthday, delivered by an eminent microbiologist in the country.

Dr. Alok Bhattacharya (Head, Department of Biology, Ashoka University, Haryana) was the recipient of the Prof J V Bhat Memorial Oration award in 2020 and graced the event with his oration. He obtained his Masters degree in chemistry from the Indian Institute of Technology, Kanpur in 1972. Subsequently, he completed his doctoral research at the School of Life Sciences, Jawaharlal Nehru University in 1976. During his tenure at JNU, he held various positions including that of the Coordinator of Bioinformatics Centre, Dean of School of Life Sciences, and the Dean of School of Information Technology. He is also a Professor of Life Sciences at Shiv Nadar University, Dadri and a visiting faculty at Banaras Hindu University.

The event started with a welcome address by Mr. Bharath Prasad (Senior Grade Lecturer, MSLS). Mr. Sandeep Mallya (Senior Grade Lecturer, MSLS) introduced Dr. Alok Bhattacharya, in the presence of Dr. Vinod Bhat (Vice-Chancellor, MAHE) and Dr. K Satyamoorthy (Director, MSLS). Dr. Bhat, in his presidential address, enlightened the gathering with few words on the importance of scientific collaborations, education and research.

Dr Bhattacharya presented an inspiring lecture on his research on *Entamoeba histolytica* and species-specific calcium-binding protein and its gene". Delivering the oration on the topic "The mechanism of phagocytosis in *Entamoeba histolytica*", he showed that calmodulin-like calcium-binding protein: CaBP3 of *E. histolytica* is directly involved in disease pathomechanism by its capacity to participate in cytoskeleton



dynamics and scission machinery during erythrophagocytosis. By using imaging techniques, CaBP3 was found in phagocytic cups and newly formed phagosomes along with actin and myosin IB. Thus, his team suggested a novel pathway mediating phagocytosis in *E. histolytica,* and an unusual mechanism of modulation of cytoskeleton dynamics by two calcium-binding proteins, EhCaBP1 and EhCaBP3 with mostly non-overlapping functions.

His oration enlightened the audience with insights on his research and various techniques used in the lab. This was good exposure for the students on the limitless scope of the vast and diverse fields of research

Further, he interacted with students of BiSEP (Biotechnology Skill Enhancement Program) program and the members of the Student Council. Students asked various questions pertaining to his study and about life as a scientist and a researcher. Dr Bhattacharya very patiently answered all the queries with a touch of humour imparting knowledge to all.

-***By Shruti Thergaonkar (M.Sc. MBHG)***

Dr. Vinod Bhat (Vice-Chancellor) with Dr. Alok Bhattacharya

Dr. Alok Bhattacharya interacting with the Student Council

PRIMER 2020

Manipal School of Life Sciences celebrated PRIMER 2020 from March 2 to 5, 2020 organized by the cultural committee and the student council. PRIMER, meant to be a stepping-stone to UTSAV, MAHE's biggest cultural fest, was primarily a week meant to celebrate and recognize the talents and enthusiasm of the MSLS student population.

The events held on March 2, the first day of PRIMER, were Painting, Spot Photography (with the topic "emotions"), Installation Art and Antakshari. The enthusiastic contestants of Antakshari made the event especially fun-filled with an evening of singing songs both old and new.

The second day of PRIMER held specific interest for the literary freaks and the musical fanatics of MSLS. Events held included Hindi and English poetry, extempore, debate on the topic "Was the government's plan to legalize marijuana over tobacco in 1922 a bane or a boon?" and vocal singing.

The last two days of PRIMER were for the students who enjoyed an exercise in creativity. The Cartooning, Clay Modelling and Collage competitions proved a success, courtesy of the immense talent and skill displayed by the participants. The topic for the cartooning competition was "If humans were phones", which was beautifully illustrated by the participants. The evening of March 4, marked for mime and the dance competitions - western and non-classical, group and solo - witnessed a large gathering of enthusiastic students ranging from participants to supportive friends, faculty members, research scholars, and staff to judges. The hours spent practicing with immense dedication and hard work finally paid off, as every group and individual that stepped in front of the audience left the viewers spell bound and awestruck by the performances. A quiz was also held with questions from different genres.

Winners of Primer 2020

Event	First place	Second place	Third place
Antakshari	Dinesh Reghunathan Sowmya Prabhu Ipsita Pujari	Manish Naik Poonam Bhandari Supriti Ghosh	Gunjan Singh Suhana Shiya Shruti Krishnan
Painting	Chandana	Priyasha De	Devika
Collage	Priyasha De Priyal Dhawan Maria Sona Jerome	Sanjana Bhat Rachna Adiga	
Installation Art	Kanaya Bhattacharya Vishnu Sanai T Sajai		
Cartooning	Sonam Fathima	Priyal Dhawan	Bhagesh Hunakunti
Clay Modelling	Sonam Fathima Chandana	Bhagesh Hunakunti Aathma	Kanaya Bhattacharya Soumyabrata Banik
Spot Photography	Soumyabrata Banik	Ankshita Dasgupta	Koushik Shetty
Western Vocal (Solo)	Meagan D' Souza	Renita	Akhil
Non-Classical Vocal	Shruthi	Sahithi	Kaavya Surianarayanan
Indian Classical Vocal	Shruthi	Kaavya Surianarayanan Shreeramana	Anupama
Poetry (English)	Ummuabhiha Karim	Ruqaiya	
Poetry (Hindi)	Anupama		
Extempore	Ummuabhiha Karim	Ankshita Dasgupta	
Debate	Ummuabhiha Karim	Mehreen Saigal	
Non-Classical Dance (Group)	Preksha Mandlecha Namanpreet Kaur Aditi Khamamkar Neha Choudhari Ankitha S Kanaya Bhattacharya Aparajita Sarkar Dharshini Shweta Akanksha	Medha Bairy Neha Acharya Namrata Abeegayil Divya Kulala Prathvi Shenoy Deeksha Shreya Kunder	Kausalya and team
Indian Non-Classical (Solo)	Shreya Kunder		
Western Dance (Solo)	Sai Praneeth	Greeshma Joy	

Western Dance (Group)	Sai Praneeth and team	Mridula Shreya Kunder Rajkumari Nikita Keerthana Abeegayil Smitha Nayak	
Indian Classical Dance (Solo)	Medha Bairy	Chandana	Shruti Thergaonkar
Quiz	Prahlad Rao	Maria Sona Jerome Priyasha De Priyal Dhawan	Dinesh Reghunathan Satyajit Dey

-By Sanjana Bhat (B.Sc. BT)


FIRE EXIT

International Women's Day, 2020

On the seventh day of March 2020, the eve of International Women's Day, Manipal School of Life Sciences (MSLS) organized a programme on the importance of women in society. The event was held in the Auditorium, MSLS-Annex with students and staff in full attendance.
With the theme for the year 2020 being 'Each for Equal', the School called upon two women achievers who have broken numerous barriers in their respective fields - Ms. Preeti Gehlot, IAS, Karnataka Cadre and Zilla Panchayat officer (Udupi) and Dr. Padma Rani, Director, Manipal Institute of Communication, MAHE, Manipal.

The two experts spoke wonderfully about the contemporary meaning of equality among genders, with various valid points. With a brief overview of the history of the struggle to achieve female empowerment, the speakers opined that while progress has been slow, it is most definitely there to see. In fact, disparity has, albeit gradually, weaned off to the extent that there may be a day in the future that equality may truly be obtained. While cynical of the happenings of the past, the women ended their talks with their hopes for the future.

Their talks were followed by a play on the theme of 'Women breaking barriers in all aspects of life' by the first year students of the B.Sc. program, and a recital of a poem by Ms. Ummuabiha, which was enacted by Ms. Kaavya and Ms. Mehreen (all B.Sc. first year students). A poem composed and recited by Ms. Rukaiyya of M.Sc. (Bioinformatics) program concluded the event.

Mr. Osborne Pereira (B.Sc. third year) welcomed the gathering and Ms. Dinika Gowda (B.Sc. second year) conducted the event and proposed the vote of thanks. Dr. K Satyamoorthy (Director, MSLS) and Dr. Padmalatha Rai (Associate Director-Academics) presided over the event.

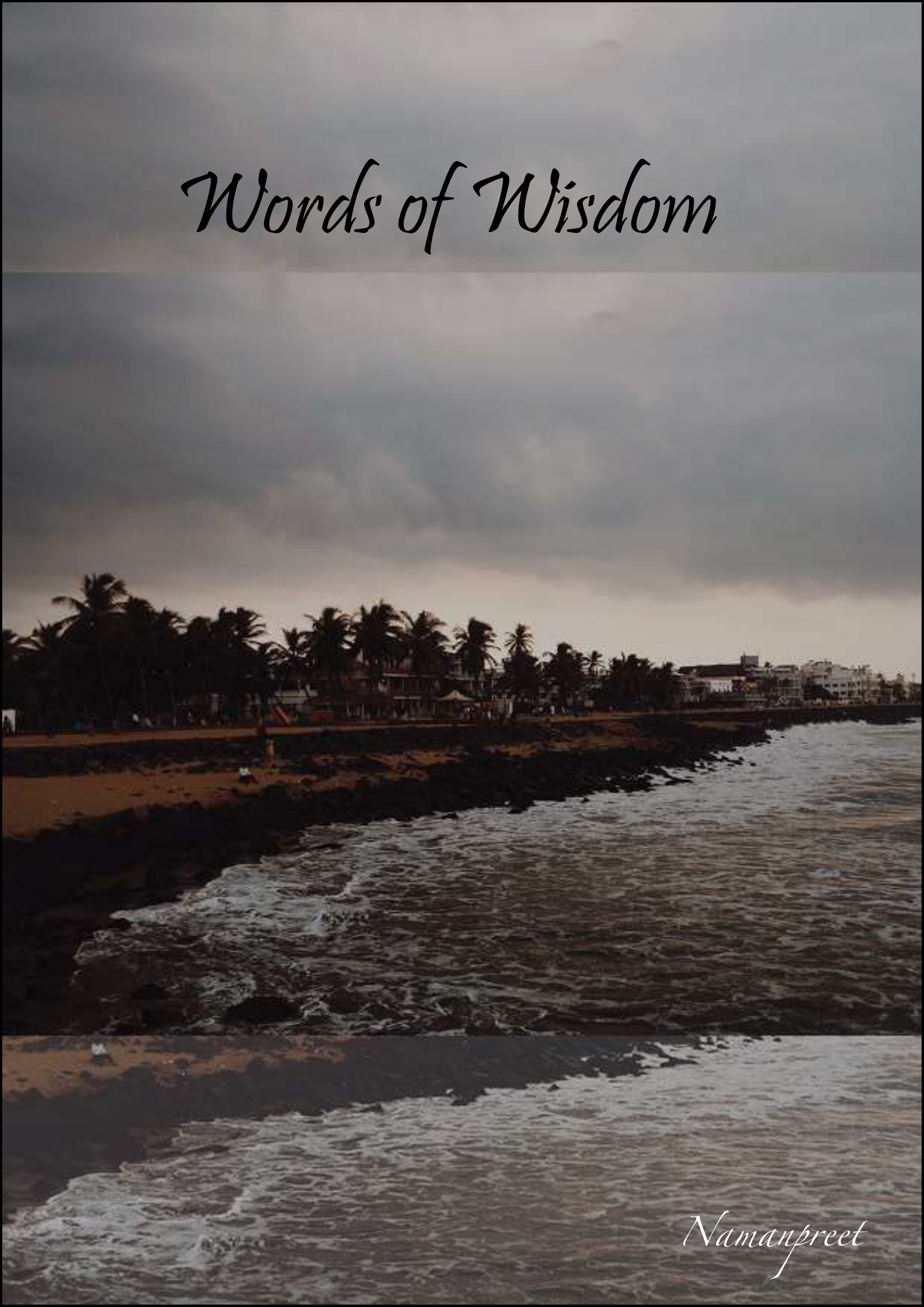
-By Preksha Mandlecha (M.Sc. MBT)


MANIPAL SCHOOL OF LIFE SCIENCES
International Women's Day
March 7, 2020
Chief Guest
Guest of Honour
Dr. Padma Rani, Director


International Women's Day
Chief Guest
Preeti Gehlot, IAS
Guest of Honour
Padma Rani, Director
Institute of Communication


SCHOOL OF LIFE SCIENCES
Gehlot
Dr. Padma Rani

Words of Wisdom



Namanpreet

Interview with Mr. Annamalai, IPS

Mr. Annamalai
Mr. K Annamalai is a former IPS officer who served as the Superintendent of Police in Udupi and Chikkamagaluru district and Deputy Commissioner of Police in Bengaluru (South). He is the Founder and a Chief Servant of the organization called 'We The Leaders'.
During his visit to MSLS, he consented to talk to the Student Council of our School. Here are the excerpts.

We would like to start with the question: what was your motivation to become an IPS officer?

I think I would like to answer a modified version of this question: what was the problem that I noticed that I was interested in solving? And the answer to that was that I wanted to solve the problems of inequality, corruption, inefficiency in governance, the gap between the police and the people and so on. In short, I wanted to address the issue of me not getting enough respect as a citizen, and I wanted to achieve this either through government or civil service.
Even after quitting the service, I'm still motivated to solve these same problems, maybe through politics or other avenues. In the past it was taking up specific professions, like 'IPS' or 'IAS'; now, youngsters like you or me should instead look at it as a problem that we must solve.

To all the aspiring students out there, what would your suggestions be with regards to clearing competitive exams?

I think every aspiring candidate needs to ask himself/herself a question: whether they are really interested in clearing the exams, meaning, do they really want civil service? Writing it because you have a passing phase or simply because someone else is writing it is not a valid reason.
The first thing you need to consider is whether there is a problem that you want to tackle by becoming a part of the service. Once you get a definitive 'yes', then you need to put your heart and soul into it. The examination process spans a full year; people need to be very motivated to last that full year. The service only needs people who say, "I'm writing the exam because I really want it" and that is all there is to it.
If you are good enough to crack 10th grade, then you can crack CS too. It is just that unlike other exams, it's a drawn out process rather than a one day exam, so motivation is a key factor. I cannot guide them to a specific book or something because the syllabus has changed, and keeps changing, but I can provide a general direction of how much time and effort it is going to take.

Going back to the first question: considering how things work in our country, how did you hold on to that motivation to keep working towards solutions?

Well, I have always believed in one thing: if there is something that the mind can conceive, then it can certainly act on it as well. The country is in a bad state because so-called 'good' people cannot spare their time to make it better. None of us actually wants to get into politics or civil service, instead preferring degrees in other countries. We have a massive paucity of truly committed people.
However, something good emerging from social media over the last decade is the increasing awareness among people, leading to a lot of people entering into public policy and so on; and, because a lot of people are entering the service, an upheaval is happening and very soon you will see a great country.

According to you, what is the most effective way to utilize social media?

Buddha has said that everything in life must be in moderation. With social media, even if you want to avoid it, it is very hard because it has already created cravings in us.
People post on the internet because they really want to be noticed, to be valued; social media gives them exactly that. You feel validated and important because someone is seeing and reacting to what you do every time you post something. The problem, like with anything else, is that it is very easy to use it in excess.
People need to be realistic in their expectations from social media: after you cross that 'Lakshman Rekha' of moderation it is definitely going to cause you harm. Thus, maintaining self-limitations is very important, like having a set amount of time for social media every day. It is not at all possible to cut it out completely; social media is definitely here to stay. But, we need to minimize it.

What is the one irreparable thing in society that has always troubled you?

The lack of honesty. I have observed that somehow, we are not a very open culture. We want to please people and appease sections of society. Not being open has let us down and we really need to change that.
You can always be open and still respect someone. I can give someone respect but at the same time am able to call a spade a spade. In India, however, we do not tend to call out the bad apples in the basket. Brutal honesty is definitely the need of the hour, and I hope and pray that the current generation at least can be absolutely certain of what they want and demand it while still being respectful. It is only through such openness that a culture of accountability can be created.

Could you illustrate any interesting experience that you have had while in the service?

One such experience is something that happened in Manipal itself, which is a veritable hub of students. The general rule of thumb with students is that they tend to do what you tell them not to. This becomes tricky when we have to address issues like drug abuse, following traffic rules or being disorderly in public.

I have fond memories of having tackled such problems because we used a lot of innovative methods to change their mindset. They are put off by advice if a cop is issuing it; but if you approach them as a friend, they realize it is for their own good and genuinely change their behaviour. I think we were able to subtly impress upon them that there is a fine line between enjoyment and irresponsibility. It isn't ideal if you just follow an arbitrary law for the sake of it, a change in mindset is much more crucial and is what we went after.

What is your take on the perceived rise in major crimes in the country?

I think the irony is that contrary to popular belief, overall, playing the numbers game, you are actually much safer in a city like Bengaluru than say New York or London. In that regard, India is actually a very safe country. The problem lies in the fact that the country has enabled a culture of sensationalism, which causes every incident to be deeply etched into our minds.

I'm not saying that there's nothing happening out there, many horrifying incidents occur on a daily basis. But we aren't sitting quietly either; we are always actively in the process of passing and implementing laws that help us combat such crimes. However, we still need to own up to stuff, considering that a lot of such crimes follow a certain pattern, be it being taken advantage of by a known person or by someone in a position of power. We need to have an open discussion about this in our country because, again, we are a naturally closed up society that does not encourage such topics. Thankfully, an increment in such discussions has led to a steady decrease of such atrocities, but I do hope that they do not become overly sensationalized.

How do you think a society like ours can develop its conscience? This is especially the case when we consider the youth pulling free from societal norms. Their breaking of tradition is represented as being against our culture and so on. What is your stance on this dichotomy?

Again, true development only really comes about when we are ready to have honest conversations with each other. An integral part of this is to respect one another, not because of our social standing or anything else but because we are all fellow human beings. Society can only build its conscience if it is absolutely clear with respect to the equality of the treatment it gives to everyone. It has to be by not taking any of caste, creed, religion, basically, any sort of majoritarian policy.

Your generation is so much more different than mine; our ideas on issues are very varied, just as my ideas on certain topics are worlds apart from my father's. This shift in mindset is a sign that India's ideals are maturing. You're thinking about issues with respect to your personal opinion, you don't give a damn about who is providing their two cents on the matter as long as it makes sense. People have become more vocal purely because of society having developed this inner voice.

Not everything about our culture is bad; our culture is actually quite well crafted but unfortunately, there are also quite a few bad elements incorporated into it too. This makes it necessary that we choose what we need from our culture to utilize for our benefi t. For example, we still warm up to the idea of a joint family, or with our use of honorifi cs. These aren't detrimental in any way and serve as an indication of togetherness and respect. Other things such as the caste system and basically practices that enforce inequality of any sort need to be called out, and the younger generation is very vocal in doing so. My only advice to the youth in this regard is that you need to realize that your culture is what ties you down to society and keeps you grounded.

-Interviewed by
Preksha Mandlecha (M.Sc. MBT)
Snigdha Chatterjee (B.Sc. BT)
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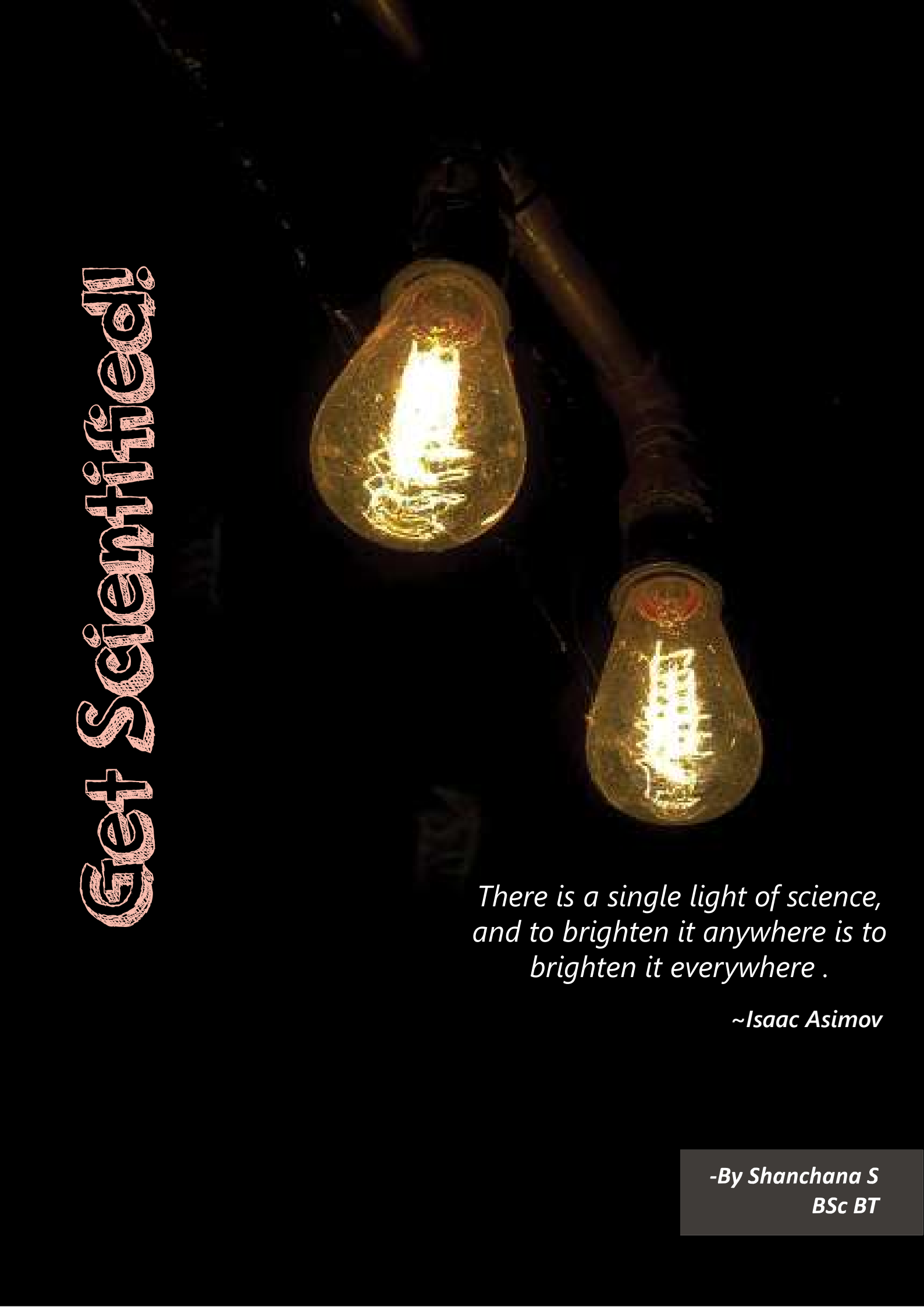

There is a single light of science, and to brighten it anywhere is to brighten it everywhere .

~Isaac Asimov

-By Shanchana S
BSc BT

The Complement - Behind Enemy Lines

It is indeed a rarity to witness first-hand, the possible wonders one can achieve on completion of formal tertiary education. Most are dazed and require a kindle to set them onto a likeable career path. For you, however, the story is quite dramatic, as you are being educated in the life sciences and in the midst of a global health emergency - career opportunities are opening themselves up for you. Despite the devastating times, you are considered to be on an enviable platform as this pandemic is a knell that summons you to equip yourselves with scientific temper and grit and help the society. On this note, I shall present to you a tale with several players, most of whom you would have already familiarized yourselves within the classroom, and the conundrums they have put forward during this pandemic.

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV2) is the etiologic agent of the disease, COVID-19, which has infected more than 30 million individuals and caused over 900,000 deaths worldwide (as I write). The clinical presentation of COVID-19 is considered to be broad as patients present themselves as either asymptomatic carriers, patients with mild to moderate symptoms that do not require hospitalization, or those with severe COVID-19. A significant portion of those with severe disease, progressively worsen and often require ventilatory support from intensive care units (ICUs). Critically ill patients have been observed to develop acute respiratory failure, acute renal failure, circulatory shock, and thrombotic complications. In India, of the 5 million SARS-CoV2 cases, less than 2% have required ICU-based care, but it is likely that this figure will rise, as the struggle against COVID-19 ensues. Despite there being a plethora of scientific literature available on SARS-CoV2, particularly on pre-print servers and from studies on SARS-CoV and MERS-CoV, there is still a great deal of uncertainty. In particular, there is a lack of understanding of viral pathophysiology and host immune responses during SARS-CoV2 infection, impeding the identification of new therapies that will ultimately aid in the treatment and management of the disease.

The current understanding of the development of severe disease is that it is not only a consequence of viral infection but is also due to a dysregulated adaptive immune response, resulting in a cytokine storm phenomenon. However, most recently, scientists have begun to explore the role of the complement in COVID-19 infections. The complement system forms part of the innate immune system and comprises of over 30 proteins, organized into three pathways - the classical, the lectin and the alternative. These components act to complement the activities of antibodies and phagocytes through opsonization of pathogens, recruitment of neutrophils and monocytes to the site of injury, and enhancement of the adaptive immune response. The three pathways converge on the C3 component of the system, triggering the formation of the final component, the membrane attack complex (MAC or C5b-9), leading to cell lysis. Undoubtedly, the complement is a robust defender against pathogens, but it is also well established that uncontrolled complement activation can result in damage to tissue, leading to sepsis and multi-organ failure. This suggests that in clinical settings, in the presence of hyper-inflammation and thrombotic events, it is worthy to evaluate the beneficial effects of complement activation with its deleterious ones.

A major indicator of complement's role in COVID-19 stemmed from studies in SARS-CoV, where the development of acute respiratory distress syndrome (ARDS) was attributed to complement activation. Mice deficient in C3 were observed to have reduced infiltration of monocytes and neutrophils in the lungs and lung damage was also found to be lessened, compared to the control group. In a recent pre-print report, immunohistochemistry (IHC) analysis of lung tissue from patients who had suffered from ARDS, as a result of COVID-19, revealed the presence of

complement components, including, mannose-binding lectin (MBL), C3, and C5b-9 in alveolar epithelial cells. Another study reported findings of C5b-9 deposits in the proximal tubular cells of the kidney in COVID-19 patients, suggestive of its contribution to acute kidney injury (AKI). Moreover, a study observed high levels of C3a and C5a in the serum of patients suffering from severe COVID-19, compared to those displaying mild symptoms, indicating the presence of complement components in circulation. An interesting observation made by Margo et al., is the presence of microvascular injury in the skin and lung tissue of COVID-19 patients. These events have brought into consideration a possible crosstalk between two dynamic systems: the complement system and the coagulation pathway. It is speculated that upon SARS-CoV2 infection, complement activation triggers a serine protease, MASP-2 to initiate the coagulation cascade, while anaphylatoxins C3a and C5a stimulate neutrophil extravasation to endothelial cells. The latter triggers the formation of neutrophil extracellular traps (NETs), which can act as a scaffold for further clot formation. The complement system, an important artillery of the innate immune system, normally interacts with the coagulation pathway to ensure physiological equilibrium. Here, however, an inflammatory feedback loop between the two systems triggers extensive tissue damage and thromboses, ultimately resulting in a destructive response that is detrimental to the host. It is with this consideration that clinicians and scientists have turned to analyzing the complement-coagulation interplay as a crucial factor that requires management during SARS-CoV2 infection.

Taking into consideration these challenges, complement-targeted therapies are of considerable interest. Several clinical trials are under way, targeting either specific components of the pathway or the entire pathway. Earlier this year, AMY-101, a C3 inhibitor was used to successfully treat a patient with COVID-19 and this inhibitor has progressed to Phase II clinical trials. Eculizumab, a C5 antibody-based therapy, typically used for atypical hemolytic uremic syndrome, was reported to have been used to treat 4 COVID-19 patients. This anti-C5 treatment was carried out in combination with antiviral therapy, anti-coagulant therapy, hydroxychloroquine, cephalosporin and vitamin C. Another study that employed IFX-1, an inhibitor of C5a, has progressed to Phase II/III clinical trials. In spite of the demand for an effective therapy, caution is relayed to clinicians whilst engaging in the readily available literature on SARS-CoV2, for a critical examination is required before its application to the clinics. In addition to discovering suitable therapies that would curb complement-mediated inflammation, another focus would be to identify robust biomarkers to help identify patients who are likely to progress to severe disease and in determining a window for therapeutic intervention. Taking into account that the complement, by default, is a protector against pathogens, the involvement of host factors in disease progression also highlights the need for genetic studies in the population to ascertain individuals who could be considered at risk of developing severe disease.

Snapshots into the arena of pathogen biology highlights gaps in our knowledge and emphasizes the need to view infectious diseases, like COVID-19 from a damage-response framework (DRF), where the host immune response needs to be included in the outcome of viral pathogenesis. This could help in the understanding of severe disease states, particularly where the virus is merely an initiator of severe disease and the host immune response is the culprit that brings about tissue and organ damage. Ultimately, this conceptual tool will assist clinicians and scientists alike, with observations from the clinics to the bench side, making the management of infections in an integrated manner, a reality. An urgent need of the hour.

References:

1. Gralinski LE et al., Complement activation contributes to severe acute respiratory syndrome coronavirus pathogenesis (2018), Host Microbe Biology, 9(5): e01753-18, https://doi .org/10.1128/ mBio.01753-18

2. Java A et al., The complement system in COVID-19: friend and foe? (2020) Journal of Clinical Insight, 5(15): e140711, https://doi.org/10.1172/jci.insight.140711.

3. Magro C et al., Complement associated microvascular injury and thrombosis in the pathogenesis of severe COVID-19 infection: A report of 5 cases (2020), Translational Research, 220, 1-13, https:// doi.org/10.1016/j.trsl.2020.04.007

4. Mastaglio S et al., The first case of COVID-19 treated with the complement C3 inhibitor AMY-101 (2020), Clinical Immunology, 215: 108450, https://doi.org/10.1016/j.clim.2020.108450

5. Merrill JT, Erkan D, Winakur J, and James JA, Emerging evidence of a COVID-19 thrombotic syndrome has treatment implications (2020), Nature Reviews Rheumatology, https://doi.org/10.1038/ s41584-020-0474-5

6. Noris M, Benigni A and Remuzzi G (2020), The case of complement activation in COVID-19 multi-organ impact, Kidney International, 98: 314-322, https://doi.org/10.1016/ j.kint.2020.05.013

7. Oikonomopoulou K et al., Interactions between coagulation and complement: their role in inflammation (2012), Seminars from Immunopathology, 34(1):151-165, doi:10.1007/s00281-011-0280-x

8. Pirofski L and Casadevall A, The damage-response framework as a tool for the physician-scientist to understand the pathogenesis of infectious diseases (2018), Journal of Infectious Diseases, https://doi.org/10.1093/infdis/jiy083

9. Polycarpou A et al., Rationale for targeting complement in COVID-19 (2020), EMBO Molecular Medicine, 12; e1262

10. Risitano AM et al., Complement as a target in COVID-19 (2020), Nature Reviews Immunology, 20, 343-344, https://doi.org/10.1038/ s41577-020-0320-7

11. Tao T et al., Highly pathogenic coronavirus N protein aggravates lung injury by MASP-2-mediated complement over-activation (2020), https://doi.org/10.1101/2020.03.29.20041962 (pre-print)

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-By Ms. Lakshmi Ramakrishnan
(Alumna, M.Sc. MBT, 2011-2013)

Newton-Bhabha Ph.D. Placements Programme

In October 2018, I was one of the 27 fortunate DST-INSPIRE fellows to be selected as recipients for the prestigious Newton-Bhabha Ph.D. Placement Fellowships 2018-2019. This fellowship is jointly funded by Department of Science and Technology (DST), Department of Biotechnology (DBT), Government of India and British Council to candidates who meet their exacting criteria from the field of STEM.

I have been working under the supervision of Dr. K Satyamoorthy (Professor and Director, MSLS, MAHE, Manipal) and Dr. Ranjitha S Shetty (Associate Professor, Department of Community Medicine and Coordinator, Centre for Indigenous Population, KMC, Manipal) in the field of viral screening for prevention of cervical cancer among the women of Udupi district. In view of this, we opted for collaboration with the University of Aberdeen, Scotland, UK, where Professor Margaret Cruickshank and her group has been working on management of women with lower genital tract intra-epithelial neoplasia and the impact of human papillomavirus (HPV) vaccination on HPV-related diseases.

I spent four months (March to June 2019) in Aberdeen and worked primarily at the Aberdeen Centre for Women's Health Research (ACWHR) but also travelled for various conferences and meetings to Edinburgh, Inverurie, Perth and Stirling. I was also placed at Queen's Medical Research Institute (QMRI), Edinburgh, where I carried out the experiments for my project. Professor Cruickshank and her colleagues at ACWHR and University of Aberdeen were very encouraging and accommodating for me to visit and observe the functioning of the various departments including the departments of cytology, pathology, and global health.

Through the fellowship, we worked on an exploratory study on the type and pattern of HPV infection among young women immunized against the virus. The study helps to compare the finding from two different settings: one with minimal screening and vaccination and the other with regular cervical screening and prophylactic immunization. The collaborative work, therefore, indicates the need for implementation of regular screening and vaccination in India, especially among vulnerable populations, to control the high prevalence and incidence of cervical cancer among our women.

Recently, our study compiled over several weeks as a collaborative effort by nine people from four different specialties over three cities, has been selected as one of the three studies to be featured on the global website of British Council as a part of their Impact Case Study. The testimonial can be found at:

https://www.britishcouncil.org/education/science/news/indian-scholars-receive-boost-vaccine-research

I am grateful to Manipal Academy of Higher Education, DST and British Council for this incredible opportunity and I feel really blessed that I got to work with some of the best scientific minds in India and Scotland. It has been a tremendous learning experience and has considerably enhanced the breadth and outlook of my insight as a Ph.D. scholar.

-By Ms. Supriti Ghosh (Ph.D. Scholar)

Creative Corner

-By Shalon Suzanne Pinto
(B.Sc. BT)

Colours

When I heard colours, the first thing I thought of was, which one?
Because you see, there is strength and fire in red, but there is blood and war too.
And blue is the sky and the ocean, but you know and I know that your blue ocean is different from hers. Your blue ocean is where you went for your Sunday swims and her blue oceans are where she lost her father.
It's still blue though.
Wait! Before you scratch your heads, it'll all become clear.
You see, I love pink, because I love basking in its femininity and because it is the colour of my favourite lip balm.
You like pink too, because it stands for breast cancer.
All I'm trying to say is the yellows and oranges and purples of my sky may be the exact same as his. But my sunsets means I'm going home when it gets dark, and his sunsets mean he's going back to the dark street.
I know that small boy prayed to be colour blind that day so the sunset wouldn't remind him of his misery.
And a large part of this world wants to change the colour black into something they think is more beautiful.
To them I say, do you not know that for a blind person, black is their rainbow and black is their sunset. How dare you call it ugly?
And the colour white. GOD the colour white.
White is the sheet you painted your first painting and your mother smiled wide at your crooked tree. But she never told you that the colour white for her was the saree that she draped when her husband died.

They say colours are beautiful, but I think, colours are life, and life is not always beautiful, or at least not for everyone.
So next time you wonder why someone doesn't like your favourite colour as much as you do, remember this poem.

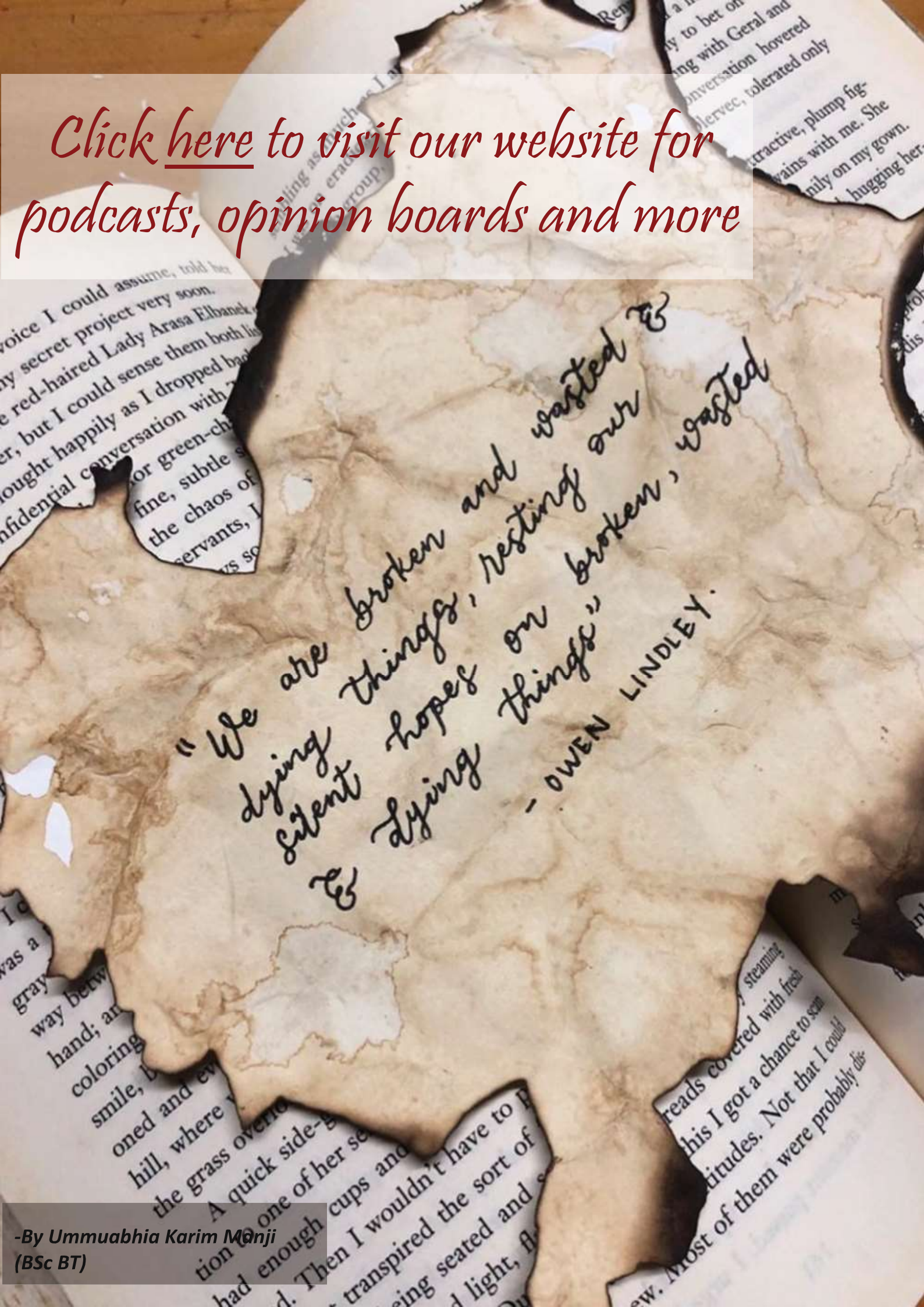
-By Ummuabiha Karim (B.Sc. BT)
First prize in Poetry-English, PRIMER 2020


Snapshots Sketches and more
Namanpreet

-By Priyasha De
(B.Sc. BT)


-By Anaswara Sugathan
(M.Sc. MBHG)

-By Bhagesh Hunakunti (M.Sc. BI)



-By Ummuabhia Karim Manji
(BSc BT)