

ST. XAVIER'S COLLEGE

Mapusa - Goa

MICROSCOPE... SEE THE UNSEEN!



Department of Microbiology

Newsletter

2020-2021

Volume 16



~ Art by Jesmine Costa, F.Y.B.Sc. (1st Place, Art Competition: Today for Tomorrow)

Words of Wisdom from The Administrator...

Science plays a great role in our day-to-day life. In fact, without science our life would have been adrift. And perhaps, the branch of science that is intermingled with the quotidian life is Microbiology.

Microbiologists study microbes, and some of the most important discoveries that have underpinned modern society have resulted from the research of famous microbiologists, such as Jenner (vaccine against smallpox), Fleming (discovery of penicillin), Marshall (link between *Helicobacter pylori* infection and stomach ulcers), and Zur Hausen (link between papilloma virus and cervical cancer). We also take recourse to microbiological expertise to test the quality of drinking water and water from rivers, lakes, and ponds. Recent studies on the rivers criss-crossing our beautiful State of Goa including rivers Mandovi, Zuari, and Sal show that the pollution has reached alarming levels threatening the local flora and fauna.

But while Science gives us results, the action depends on us. We are far too much used to thinking of our water bodies as dumping grounds for our waste. It is a sight to see how, without any remorse, people dump flower garlands offered to deities into the rivers in the morning while on their way to work. Science by itself will not depollute the environment, that action should come from us. Science is the messenger. As we progress, such life sciences take on added importance and we, the lay persons, look up to those opting to study them, that they will use their scientific expertise to better our lives and the environment.

I congratulate the teachers and the students of the Department of Microbiology, the future scientists, as they release their newsletter, and hope that the students will take up studying the subject very seriously considering the great role they can play in the society.

God bless you all.

Fr. Tony Salema

A message from The Principal ...

I am greatly excited to announce the release of the 16th Volume of the Newsletter *Microscope ... see the unseen!* by the Department of Microbiology for the academic year 2020-2021. Bestowed by the Grace of Almighty and the care and concern of everyone, we have been able to move ahead during the current pandemic situation.

A newsletter serves as the mirror of the department, reflecting not only the teaching of the curriculum but also its vibrancy and innovation.

I wish everyone an enjoyable time reading the updates of the Department and I hope this edition will serve as a source of inspiration and motivation for the department to continue to do its best. May God bless each student and faculty of the Department of Microbiology for their selfless service and ever readiness to be of help to others.

I express my Congratulations and deep gratitude to the Editorial Team, for their efforts in making possible the release of this newsletter.

God Bless All your Future Endeavours.

Prof. Blanche Mascarenhas

A Warm Welcome from the Head of the Department . . .

The academic year 2020-21 will go down in history, for the coronavirus pandemic closed schools and colleges, making teaching learning extremely challenging with the switch to the online mode. Staff members reporting to work were welcomed by a deserted campus. Teachers were trying to come to terms with teaching in empty classrooms as students were getting accustomed to the challenges of virtual learning.

For us at the Department of Microbiology, our field of study seemed more significant than ever before, as news channels and social media were flooded with posts on viruses, respiratory droplets, hand sanitization, contact transmission, RT-PCR, vaccines and the likes. Through all this, our dedicated staff members, both teaching and non-teaching, strived to make the best of the opportunities available while giving utmost importance to the safety of our students. As a few offline sessions resumed we received the wholehearted cooperation from our students who adjusted beautifully to the “changed laboratory practices” that soon became the “new normal”.

I would like to congratulate all our students, especially our microbiology finalists, all 45 of the Batch of 2019-20, who did well despite the challenges faced! Our FY and SY students too! For one, you are living through history, future batches probably will look back on the work that you are putting in now, to understand this period of study during the COVID-19 pandemic.

Microscope...see the unseen! was a biannual newsletter of the Department; we have been releasing two issues every year for the last 15 years. As an initiative towards saving paper, henceforth, a single issue of the newsletter will be released as an e-copy. I sincerely appreciate and applaud the efforts put in by the Editor of this Volume 16 of the newsletter, Dr. Trelita de Sousa, along with the Editorial Team members.

On behalf of all of us at the Department of Microbiology, I take this opportunity to welcome our new Administrator, Rev. Fr. Antonio Salema and convey our grateful thanks to our Principal and Administrator for all the support rendered in all our endeavours in the interest of our students.

Wishing all a healthy and fulfilling year ahead!

Ursula Barreto

From The Editor's Desk ...

*"Light tomorrow
with today!"*

- Elizabeth Barrett Browning

On behalf of the Department of Microbiology, I am simply delighted to present our humble newsletter, *Microscope ... see the unseen!*

To say that this year has been challenging would be an understatement! But even as the world comes to grips with the "new normal" that the coronavirus has fashioned, the academic world continues to deliver high quality education. In doing so, Our Department has come together like never before. Following strict COVID-19 protocols to keep everyone safe, our students and faculty have worked tirelessly to ensure that despite the pandemic, no student is denied the achievements they hope for. Our students have displayed extraordinary levels of resilience, determination, creativity, and courage to inspire hope for a better future. No doubt, there is still a cloud of uncertainty hovering over us, but there is much more going on today to make us optimistic for tomorrow!

In view of the current scenario, we thought it apt to go with the theme "Today for Tomorrow!" for Our Newsletter. Living through the pandemic has been strange, sudden, scary, and unprecedented. But sometimes that's just what it takes for our best selves to emerge. And although we haven't been able to do as much as we normally would, in terms of activities on account of the COVID-19 SOPs, our students have continued to enthral us with their ingenious articles, witty poems, imaginative paintings, baffling puzzles, and bewildering facts.

I thank Our Administrator, Rev. Fr. Antonio Salema and Our Principal, Prof. Blanche Mascarenhas for their unwavering support, Our Head of Department, Mrs. Ursula Barreto for her relentless encouragement, my colleagues for their invaluable help, and most of all, my dear students for their overwhelming response. This edition of the newsletter offers a glimpse of their ingenuity and we hope that it makes for a stimulating read!

Dr. Trelita de Sousa

MICROSCOPE . . . SEE THE UNSEEN!

**Department of Microbiology Newsletter
2020-2021
Volume 16**

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GENOMIC SURVEILLANCE: PUTTING THE BRAKES ON COVID-19?

We know that the SARS-CoV-2 virus causes the Coronavirus Disease 2019 (COVID-19) which impacts the lower respiratory tract. But within a short span of time, we've encountered several mutations causing different variants of this deadly virus. Every time I hear of a new variant, the first question that comes to my mind is 'How did they find that out?' The answer to that is a not-so-simple process called Genomic Surveillance.

Genomic Surveillance is a method of genome analysis of different samples of a virus or other organisms to understand its mutations and spread in a population. Knowing the genome sequence helps researchers understand how the virus is mutating into variants and how it is traveling from person to person. Diagnosing COVID-19 depends upon the detection of the viral genetic material (RNA) in a nasopharyngeal swab or sputum sample and it requires polymerase chain reaction (PCR), a technology that amplifies the amount of genetic material to detectable levels. Recently, rapid molecular tests using automated platforms have come into use which takes about 45-60 minutes. Next-generation sequencing methods like "sequencing by synthesis" technique and "long-read sequencing" (by Oxford Nanopore Technology) are currently used to detect viral genome and identify new mutations.

This brings us to another pertinent question: How does the virus mutate? The coronavirus genome contains around 30,000 nucleotides and each time the virus undergoes replication, errors called mutations occur. Genome sequencing allows us to keep track of the genetic model and understand the mutations in the virus. Scientists across the world are using this technique to track how the virus is being transmitted and potentially provide warning signs as the world battles different waves of this virus. Phylogenetic trees mapping the SARS-CoV-2 virus are the reason why we can differentiate between the varied outbreaks. Direct RNA sequencing (without reverse transcription) has further allowed the detection of RNA modifications on the genomic RNA. By combining sequencing and RNA modification data, scientists in South Korea have identified 41 potential RNA modification sites that may be important for virus replication and associated pathogenesis.

Sequences of SARS-CoV-2 have now been reported from many parts of the world, and this data has proved to be useful in tracking the global spread of the virus. Studying the mutation in the virus potentially helps scientists to understand which mutations can be possible threats, for example, the spike protein of the virus that helps it enter human cells. In humans, the ACE2 gene encodes the angiotensin-converting enzyme-2. Evidence from recent studies suggests that ACE2 is the host receptor for the novel SARS-CoV-2. ACE2 is primarily found in the lower respiratory tract of humans on epithelial cells lining the lung alveoli and bronchioles as well as the endothelial cells and myocytes of pulmonary blood vessels, partly explaining the severe respiratory syndrome associated with these viruses. Interestingly, ACE2 is also found on the enterocytes in the small intestines, which may further explain the gastrointestinal symptoms associated with the viral infection as well as its detection in faeces. We also know that it has been shown that the ACE2 gene displays single-nucleotide polymorphism with differential allele frequency across the world. It is interesting to note that the allele frequency for the host gene was also shown to be different between males and females. In the recent past, researchers linked Brazil's resurgence of SARS-CoV-2 to the emergence and rapid spread of a new SARS-CoV-2 variant, P.1 (*Gamma*). Genomic surveillance data revealed that the P.1 variant had acquired 17 new mutations. Ten were in the spike protein of the virus that binds onto human cells and is the target of current COVID-19 vaccines. Rapidly spreading new variants like the B.1.351 (*Beta*) from South Africa

(May 2020), B.1.1.7 (*Alpha*) from United Kingdom (September 2020), P.1 from Manaus, Brazil (November 2020), and B.1.617.2 (*Delta*) from India (October 2020) have all been classified as ‘Variants of Concern’ by WHO.

The COVID-19 Genomics UK Consortium (COG-UK) was launched in March 2020 to help enable the tracking of SARS-CoV-2 transmission, identify viral mutations, and integrate with health data to assess how the viral genome interacts with cofactors and consequences of COVID-19. This helped the UK to identify the new variant in a matter of three months. In India, the earliest documented samples of the Delta variant were found in September 2020 but were recognized only in April 2021. In India, we have the Indian SARS-CoV-2 Genome Sequencing Consortia (INSACOG) – a consortium of ten National laboratories in four cities (Bengaluru, Hyderabad, New Delhi, and Pune), set up in December 2020, which aims to monitor the genomic variations of the SARS-CoV-2 virus.

Genomic surveillance provides up-to-date information on viral genomics and transcriptomics which is crucial for understanding the origins and global dispersion of the virus, providing insights into viral pathogenicity, transmission, and epidemiology, and enabling strategies for therapeutic interventions, drug discovery, and vaccine development. A large, robust, and efficient Genomic Surveillance system is a crucial advantage for the future. It can help in the prevention of the spread of more infectious and deadly microbes, take measures to improve the efficacy of vaccines, find effective drugs, and can, not only potentially help eradicate COVID-19, but also prevent future pandemics.

~ Grazielle Serrão, F.Y.B.Sc.



~ Digital Art by Grazielle Serrão, F.Y.B.Sc.

VACCINE DEVELOPMENT IN COVID TIMES

“Every day do something that will inch you closer to a better tomorrow”

– Dough Firebaugh

There is no greater teacher than life itself and no better lessons learnt than those from our past and present which pave the way for a better future. While sipping on a cup of hot coffee on a glorious Sunday morning in December 2019, shutting out plans for an outing with friends just to stay in by myself, neither did I nor anyone else expect that unprecedented times were lining up ahead to bring about a catastrophic shift in our “normal lives”.

Undoubtedly the COVID-19 pandemic was accompanied by various inconveniences, knocking the world off its axis in terms of health, education, economy, and other sectors of modern society. While people were getting accustomed to the adversities caused by the imposition of social distancing, research scientists across the globe were working diligently round the clock to find a vaccine. The history of vaccine development was not encouraging either. For instance, it took 26 years to develop the human papilloma virus vaccine. It has been 50 years and counting and researchers have yet to find a licensed vaccine against respiratory syncytial virus, one of the leading causes of infectious disease mortality in infants. But the covid-19 vaccines did not come from nowhere. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus that causes COVID-19, is a coronavirus. Research over the past two decades on the SARS virus and its close relative, the virus that caused Middle East Respiratory Syndrome (MERS), enabled virologists and vaccine designers to have a huge head start as they had begun making vaccines for SARS and MERS during their outbreaks in 2003 and 2012, respectively. Although their efforts took a back seat when the outbreaks receded, research was renewed with the covid-19 outbreak. Researchers already knew a great deal about the coronaviruses. For instance, the ideal target for a vaccine was identified. The spike protein sits on the surface of the virus, and it can be stabilised so it holds its shape during vaccine production. Even so, the speed at which these COVID-19 vaccines have been developed is remarkable. The regulatory approvals for the three-phase clinical trials were fast tracked, eliminating all the time lapses between the pre-clinical and clinical trial stages. Furthermore, there was an unprecedented influx of funds and scientists and regulators worldwide worked in tandem, thereby expediting the entire process.

Rome was not built in a day. Likewise, it took decades of intense research by tens of thousands of scientists worldwide who put in place critical knowledge and methods that paved the way for today’s ‘warp speed’ covid-19 vaccines. This pandemic allows us to rethink preparedness for the next time around. To be in a better position, experts should now start to develop at least one prototype vaccine for each virus family known to infect people. In this way, whatever virus emerges next, vaccine developers will have a known starting point, as in the case of covid-19 (as a lot is dependent on how much information is available about a disease). The pandemic posed serious challenges to education, healthcare, and economy, further emphasising global connectivity, vulnerability, and inequities. The lack of essential infrastructure and equipment in developing countries exacerbated the situation. The effect on the education system is still apparent with the shift from contact teaching to online classes, making it inconvenient to both teaching and learning. Internet connectivity and device access are major hindrances in remote areas even today. The pandemic has helped shed light on the short-comings and emphasises the need to have hands-on technology for students, teachers, and everyone else. Administrative authorities and organisations need to work out ways to improve the health, education, industry, and commercial facilities made available to people. Research should be encouraged, supported, and substantially funded to favour the emergence of new innovations. We must come out of this pandemic determined to do better. Working today will help us live better tomorrow.

~ Magleeta Pereira, T.Y.B.Sc.

SOWING THE SEEDS OF SUSTAINABLE LIVING WITH MY GARDEN OF HOPE

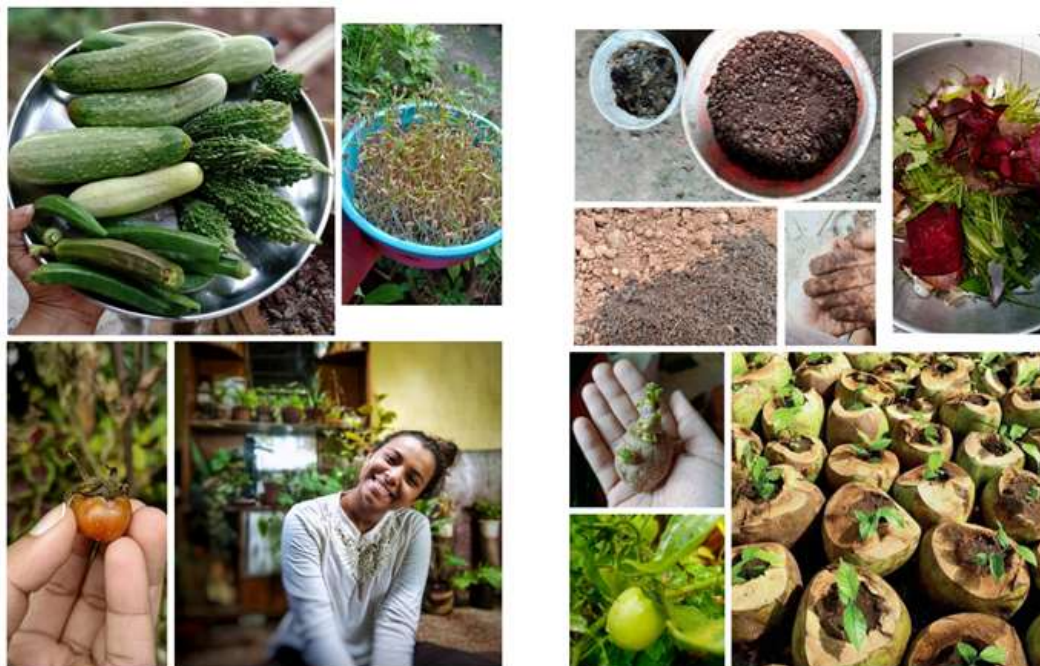
What can be the best use of knowledge that we acquire than to put it into practice to make a Harmonious living with Mother Earth? Sowing the seeds of ‘Sustainable living’ and reaping a life of fullness filled with joy, which gets us close to Mother Nature and its countless magical powers. Does that sound impossible? Well, it is not. One should only need to live a little consciously and be careful of daily choices that we make.

The passion for gardening and organic farming has disclosed the miraculous teachings of Nature to everyone who has done it. It changes you as a person, making you live by the rules which Nature has set for us. Composting and its various forms, study of microbes and the soil, knowledge of the basics of plant life and its various benefits, all that we learn have their use deeply rooted in Nature. It is so fascinating to witness the growth of the food which derives energy from nature to nurture our body, mind, and soul. “What comes from Nature, Goes Back to Nature”, thus making me understand the world around better. One of my small goals in life is to grow Indian Medicinal Plants which boost immunity and health, such as Giloy, Brahmi, Insulin plant, Adulsa, Shatavari etc., and pass them on to ensure the chain of plant growth never ends. My motto is to inspire as many young minds out there as possible to take up planting and prosper in Agriculture.

The Pandemic which I refer to as ‘THE GREAT REALISATION’ further illuminated my love for gardening. During the lockdown I began my ‘green importance of healthy food’. Fruits and vegetables are the real energy givers and help restore good health. This boosted me to start my own little kitchen-garden by growing little jewels that we consume on a daily basis like herbs, cucumbers, tomatoes, karelas, ladyfingers, chillies, curry leaves, carrots, etc. This has helped me better understand the role of microorganisms in composting and plant growth promotion. It is such a joy to bring out the knowledge from my books into my garden, quite literally! Learning the functions of our body and its co-existence with Nature has given me a totally different perspective on living which has helped me grow tremendously into an individual living in harmony with Nature.

The world is evolving every second of the day, but food as a source of energy will never cease to exist. So I invite all of you to explore sustainability for a better tomorrow. One step and it can lead to a cascade of actions towards better living. It is ‘Today’ that we sow the seeds of ‘Tomorrow’ for mankind to reap the wholesomeness of Nature.

~ Saiely Shirvankar (@apni_suppani), T.Y.B.Sc.



FOOD MICROBIOLOGY AND PUBLIC HEALTH

“For he who has health has hope; and he who has hope, has everything”

– Owen Arthur

Food microbiology is the study of microorganisms associated with food. The study is diverse and includes the role of microbes in food preparation, food spoilage, food-borne diseases, and measures towards food safety, sanitation, and safe processing. Foodborne diseases are commonly caused due to improperly processed, handled or cooked food at home, industry or service establishments. Food spoilage not only causes economic loss, but is also a waste of resources. Microbes claim a fundamental role in the food life, contributing towards digestion, immunity, and detoxification of harmful chemicals. They are instrumental in the production of fermented food products which we enjoy on a daily basis, such as cheese, yogurt, bread, beer, and wine. However, some microbes can also release toxic compounds, the most notorious being biogenic amines and aflatoxins.

The increasing incidence and severity of foodborne illnesses worldwide has raised public awareness of food safety. Modern links between diet and health have resulted in a greater demand for safer food. But rapid movement of people across the globe, increased international circulation of food commodities, and better connectedness has introduced new food safety risks. Food safety institutes, public health organisations, and food microbiology laboratories provide reliable updates on pathogen detection, characterization, and identification required for the prevention and control of infectious diseases, especially in light of the prevalent food epidemics.

"Prevention is better than cure!" Good hygienic and manufacturing practices are crucial to prevent food contamination and ensure food safety. Food technology should be directed towards the development of simple, easy, inexpensive and rapid tests to diagnose the cause of foodborne infections. The isolation and diagnosis of pathogens in food and food products must be an important component of any integrated programme to ensure the safety of food throughout the food supply chain. The global governance of food safety and quality should be further strengthened to reap tomorrow's benefits. Policy makers must work hand-in-hand with scientists, epidemiologists, and clinicians towards the common goal of safe and healthy food for all!

~ Ashweta Uttam Parsekar, F.Y.B.Sc.



~ Art by Shaina Rebello, S.Y.B.Sc.

MICROBES HELP THE GLOBE

Didn't you know?
That nature is where you grow
Stop chopping trees
Or you will pay dreadfully
With that plastic load our waterways are choked
Only because you were given what you could never afford
Stop these acts, know the real facts
Before it's too late, before you ruin your fate
Open your eyes, there's still hope
Little microbes help the globe
Microbes make it all fine
Eating garbage, both yours and mine
Fermentation, decomposition, and bioremediation
They may be tiny, but they work like a battalion
Microbes are a boon, so take to them soon
Because of them the Earth will shine like the moon!

~ Vaishnavi Dhuri, S.Y.B.Sc.



~ Art by Vaishnavi Dhuri, S.Y.B.Sc.

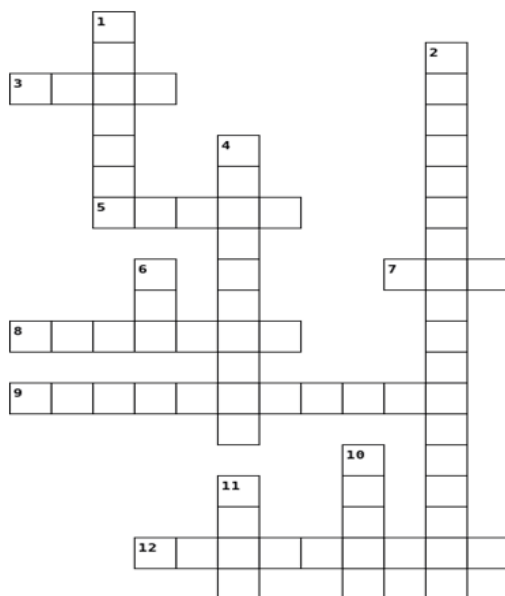
FIND ME!

1. Process of ageing of lakes
2. The relationship in which one organism benefits but the other organism is neither harmed nor helped
3. Enzyme that unwinds the DNA double helix during replication
4. Study of lakes
5. Solid coagulated fraction of milk after it is been digested by lactic acid bacteria
6. The phenomenon of emission of light by living cells
7. The process by which sugar is converted to alcohol
8. Pioneer of aseptic surgery
9. Technology which uses living organisms to clean up contaminated soil and water
10. A tubular instrument used for withdrawing or introducing fluids from or into a body cavity

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

~ Siddhi Nadodkar, T.Y.B.Sc.

CROSSWORD



Across

3. Face covering which covers your mouth and nose
5. Variant that originated in Brazil in November 2020
7. A technology used to amplify the amount of genetic material to detectable levels
8. Russian Vaccine
9. RNA-dependent RNA polymerase inhibitor antiviral medication used to treat influenza in Japan
12. An important symptom of COVID-19 is difficulty in _____

Down

1. Indian Consortium to study variations in the virus
2. A drug used for the treatment of malaria
4. An adenosine analogue prodrug with a broad antiviral spectrum
6. Classic adaptive immunotherapy that has been applied to many infectious diseases
10. Variant that originated in the United Kingdom in September 2020
11. The host receptor for SARS-CoV-2 that interacts with the viral spike protein to gain entry into human cells

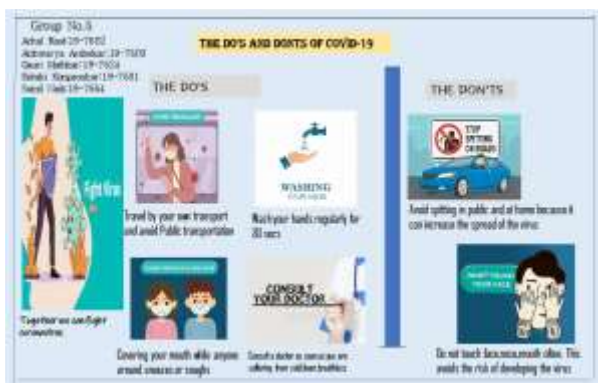
Down: 1 NSACOG; 2 hydroxychloroquine; 4 remdesivir; 6 CPT; 10 alpha; 11 ACE2
 Across: 3 mask; 5 gamma; 7 PCR; 8 sputnik; 9 favipiravir; 12 breathing

~ Grazielle Serrão, F.Y.B.Sc.

HELP STOP THE SPREAD OF CORONAVIRUS!

In view of the ongoing Covid-19 pandemic, on 21st October 2020, the Department of Microbiology, St. Xavier's College, Mapusa, initiated an awareness drive through e-posters, with the objective of sensitizing youngsters on the importance of following SOPs, thus contributing to flatten the curve and perhaps prevent the second wave of the Covid-19 pandemic in Goa. All the students of the S.Y.B.Sc Class of Microbiology participated in making the e posters. The importance of social distancing in pandemic times and importance of wearing a mask and wearing it correctly was effectively conveyed through their creatively designed posters which were circulated and displayed to create awareness on the proper wearing of masks and social distancing procedures.

~ Swizel Anoushka D'Souza, Diandra Pinto, S.Y.B.Sc.



PANDEMICS: THE PAST, PRESENT, AND FUTURE

The Department of Microbiology, St. Xavier's College Mapusa, organised an e-Poster Competition to celebrate National Science Day on 28th February 2021. It was open to all current students of St. Xavier's College, Mapusa on the theme "Pandemics: The Past, Present and Future". Participants were invited to register using a Google Form link and upload their poster files. Three winners were selected from the 11 enthusiastic responses received. The First place was won by Ms. Magleeta Pereira from T.Y.B.Sc. Ms. Amber Barretto (F.Y.B.Sc.) won the Second place for her poster entry and Mr. Vallanco Fernandes from F.Y.B.Sc. secured the Third place. The event was coordinated by Ms. Nadine de Souza.



1st place



2nd place



3rd place

HERE TODAY, GONE TOMORROW!

The Department of Microbiology, St. Xavier's College Mapusa, organised an online Art Competition, entitled "Today for Tomorrow" in order to sensitise our students towards sustainable living. The participants submitted their artwork via Google Forms. The nine entries received were scrutinised on the relevance to the theme, creative skills, and visual impact and three winners were selected. Ms. Jesmine Costa (F.Y.B.Sc.), Ms. Nicole D'souza (F.Y.B.Sc.), and Ms. Leanne D'souza (T.Y.B.Sc.) bagged the first, second, and third places, respectively. The event was coordinated by Dr. Trelita de Sousa.



~ Art by Kevian Fernandes, F.Y.B.Sc.

T.Y.B.SC. MICROBIOLOGY PERFORMANCE FOR 2019-2020

Students Appeared: 45
Grade O (Outstanding): 7
Grade A+ (Excellent): 21
Grade A (Very Good): 12
Grade B+ (Good): 4
Grade B (above average): 0
Grade C (Average): 0
Grade P (Pass): 0
Grade F (Fail): 1
Pass Percentage: 98%

S-T-E-P-S

Our footsteps moving forward
A harbinger of chaos and destruction
An imminent doom lingering
Over the future of the planet

Soil stripped bare of grass
Etched in concrete
Leaving trails of land
The lack of verdant indiscreet

Shiny plastics afloat
Oceans suffocating
Engulfed by heat
A planet dying

Tiny saviours put in efforts
In unseen ways
Rectifying our mistakes
Step by step

Filling the giant impressions
that we leave behind
measuring up to them
with every poignant step

Cleaner fuel and bioremediation
Exploring new ways with our invisible companions
Fertile land and untainted waters
Oh! Microbes are full of wonders!

Let us take *micro* steps ahead **today**
To save the world on a *macro* scale
For a better **tomorrow** we hope
Reversing the curse onset
On our lone and lovely home...

~ Arzoo Mulla, S.Y.B.Sc.

MICROMAZE

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

- 1) Microorganisms can be seen with the help of a _____
- 2) Viruses that infect bacteria are _____
- 3) Disease that affects many people at differential countries is termed _____
- 4) The smallest known bacteria are _____
- 5) Bacteria that grow in the absence of oxygen are _____

~ Eden D'Souza, S.Y.B.Sc.

NATIONAL LEVEL WEBINAR ON “PANDEMICS: THE PAST, PRESENT AND FUTURE”

To commemorate National Science Day on 28th February 2021, the Department of Microbiology, St. Xavier’s College Mapusa, organised a National Level Webinar “Pandemics: The Past, Present and Future” on February 26-27, 2021. The webinar was held across six sessions and the speakers invited included renowned scientists and professors who gave knowledgeable talks. The Organising Secretary, Dr. Marielou Ferrao made the opening statements. The Chief Guest and Keynote Speaker, Dr. A.M. Deshmukh, Ph.D., President, Microbiologists Society India (MSI), commended the Department on organising the Webinar on such a relevant theme. The Administrator of St. Xavier’s College, Rev. Fr. Antonio Salema, in his welcome address, spoke about the significance of this Webinar in view of the current global Covid-19 pandemic situation. The Principal of St. Xavier’s College, Prof. Dr. (Mrs.) Blanche Mascarenhas then addressed the participants. The Convenor of the Seminar and Head of Microbiology, Mrs. Ursula Barreto delivered the Vote of Thanks.

The Webinar garnered a good response with 176 registered participants from within and outside Goa including undergraduate, post graduate students, research scholars and faculty members.

Dr. A.M. Deshmukh delivered a thought-provoking lecture on “Vaccines: the past, present and future”. He provided the participants with information regarding the progress in the field of Vaccine development. Dr. Pavithra Venkata Gopalan, Ph.D. Lab Director, Care Health Diagnostic Lab, Chennai gave insights on “Molecular Biology of Corona Virus, Vaccine design & effect of the Variants on the effectiveness of the Vaccine” during her presentation. The session was very engaging and interesting. Dr Vinod Scaria, M.B.B.S., Ph.D, Principal Scientist, IGIB, New Delhi presented a stimulation session on the topic “Genomes and Variants of SARS-CoV-2 in India - what did we learn?”. The second day of the Webinar began with an interesting and informative history lesson with Dr. Sandeep Naik, MBBS, MS, IMA President, Bardez- Goa who took the participants through the history of the pandemics. Dr. Ira Bhatnagar, Ph.D. Senior Scientist, CCMB, Telangana through her presentation explained the meaning of nanotheranostic interventions and the uses of nanoparticles in the field of diagnostics with special emphasis on Covid-19.

The last session of the Webinar was conducted by Dr. Yogesh Gurav, MBBS, MD, M.Sc (Health Technology Assessment) Scientist E (Deputy Director), NIV, Pune on the topic “Pandemics of Viral disease: Lesson learned”. He enlightened the participants on various viral pandemics the world has seen. The Webinar turned out to be an enriching and informative experience for all the participants.

MICROMAZE

F	C	M	I	C	R	O	S	C	O	P	E	Y	Microscope
O	E	A	C	A	U	T	O	C	L	A	V	E	Autoclave
X	N	G	O	C	O	L	O	N	Y	F	F	P	Colony
E	T	A	L	G	A	E	A	F	L	U	R	R	Algae
O	R	R	O	Z	Y	E	X	F	O	N	Y	O	Microbiology
M	I	C	R	O	B	I	O	L	O	G	Y	T	Sterile
V	F	W	I	B	R	E	I	A	P	I	E	O	Bacilli
I	U	X	M	A	O	Y	N	M	X	M	A	Z	Virus
R	G	D	E	C	T	S	Z	E	R	D	S	O	Centrifuge
U	E	M	T	O	H	A	V	B	F	U	T	A	Colorimeter
S	W	Z	E	O	B	A	C	I	L	L	I	M	Broth
S	T	E	R	I	L	E	G	X	K	Y	P	A	Loop
													Fungi
													Yeast
													Protozoa

~ Vaishnavi Dhuri, S.Y.B.Sc.

A VIRTUAL INTERACTION WITH A CYTOGENETICIST FROM THE CENTRE FOR DNA FINGERPRINTING AND DIAGNOSTICS (CDFD), HYDERABAD

A talk on “Molecular Diagnostic Methods for Identification of Genetic Disorders” organised by the Department of Microbiology of St. Xavier's College, was held on the Google platform on 6th March 2021, at 11.00 am. The Resource Person was Dr. Usha R. Dutta, a Cytogeneticist at the Centre for DNA Fingerprinting and Diagnostics (CDFD), Hyderabad. The Head of the Department, Ms Ursula Barreto welcomed and introduced the Resource Person, after which Dr. Usha started the session with a brief introduction on human genes. The session focused on single gene disorders, such as autosomal dominant, autosomal recessive, X linked, and Y linked disorders and detection of the same by different types of polymerase chain reaction (PCR). The audience was enlightened on the different types of PCR available including standard PCR, multiplex PCR, RFLP PCR, quantitative real time PCR and sequencing PCR. She briefed the students on the principle, components used, and procedure of standard PCR. She also elaborated on the designing of primers using a browser and on Sanger sequencing. Later, she discussed how Duchenne Muscular Dystrophy can be detected by multiplex PCR, RFLP PCR, real time PCR with Taqman probes. She beautifully elucidated the Southern Blotting and Microarray techniques. Multiplex ligation dependent probe amplification (MLPA) was also discussed. Dr. Usha also discussed genome sequencing and DNA fingerprinting technique and showed and explained the DNA profile of an individual. In her concluding remarks she gave a brief overview of the Institute CDFD, and explained the type of work that is carried out by scientists. The session was then open for discussion where the participants clarified their doubts. Overall, the students found the session to be informative and interesting.

~ Darshana Shetty, T.Y.B.Sc.



~ Art by Anirudhana, T.Y.B.Sc.

GETTING TO KNOW OF CAREER OPPORTUNITIES IN MICROBIOLOGY

A webinar on career guidance was organised by the Department of Microbiology, St. Xavier's College, Mapusa, on 15th December 2020. Dr. Trelita de Sousa, Assistant Professor, Department of Microbiology, delivered the online session titled, "Career Opportunities in Microbiology".

Dr. Valerie Gonsalves welcomed the student participants and introduced Dr. Trelita de Sousa. Dr. Trelita took off by telling the participants about Microbiology being a fascinating subject with wide applications across the globe and that the key to making a success in the field was to develop subject interest, curiosity, determination, and perseverance, and to view the career path with a fearless and stress-free attitude. Dr. Trelita elucidated the various career paths and options in Microbiology available for students after graduation and post-graduation. She enlightened the audience with different strategies and approaches to develop a successful career plan in the ever-growing field of Microbiology and shed light on upcoming and interesting fields that can be pursued in light of the Corona virus pandemic. She addressed all the short-comings and concerns one faces while planning a career and advised that the best way to overcome these was to be aware, prepared, and open-minded. The students participated enthusiastically during her interactive session and enjoyed her hint of humour. She got the students to put on their thinking caps and quizzed them on simple yet stimulating questions.

At the end of the session the students were invited to send in their queries related to the topic, and were encouraged to clarify their doubts with regards to prospects in microbiology. The webinar ended with the vote of thanks proposed by Ms. Ursula Barreto, Head, Department of Microbiology. She took a moment to encourage the students to pursue a career in the field and wished them the very best for their future.

~ Rachel D'Souza, S.Y.B.Sc.

TODAY'S GAIN TOMORROW'S PAIN

I saw a beautiful world in my dream
The pride of the Gods so pure so free,
No child, no mother, no father
Everything so green, whole and complete
The trees swaying with joy around one other

As years went by I saw disasters
The greed of man unleashed
Our planet destroyed, never to be the same
No tree or creature
Where did it all go, who was I supposed to blame?

How we began this journey and how is it going?
What was before and how's it going to be?
The fresh flowing waters running dry
The safe haven where life exists
Are we just going to pollute it more and create a mess?

They say that Today's pain is Tomorrow's gain
But what if the reverse were also true
If we toil today, tomorrow successful we will be
Take a micro step towards saving our earth
Knowing what our future generations will see...

~ Agnelo Silveira, F.Y.B.Sc.

MAKING A CAREER IN MICROBIOLOGY IN THE PHARMACEUTICAL INDUSTRY

The Department of Microbiology, St. Xavier's College, Mapusa, conducted a webinar on "A Career in Microbiology in the Pharmaceutical Industry" on 21st March 2021 for the Microbiology students of SYBSC and TYBSc. The Resource person for the Webinar was Mr. Fergus Gonsalves, Deputy General Manager, Corporate Quality, Unichem Laboratories Ltd. Ms. Ursula Barreto, Head of Department of Microbiology welcomed the Resource person and participants. Mr. Fergus enlightened the students on the various career options after obtaining a degree in Microbiology with special emphasis on the pharmaceutical industry. He briefed the students on the tremendous growth of the pharmaceutical industry in India and the opportunities available to be a part of it. He reiterated the requirement of a sound knowledge in the basic techniques of microbiology. He explained the various functions of a pharmaceutical microbiologist and the career growth prospects. He ended by motivating and encouraging the students to be passionate no matter what they choose to do. The enriching and informative session concluded with feedback from the participants and the vote of thanks.

~ Swizel Anoushka D'Souza, S.Y.B.Sc.

THE MICROBIOLOGY MUSEUM

The image is scarce
Beyond the microbiology lab
To have a museum to see
Something that is quite tiny.

Often ignored,
The microbe and its chore
For the future to see,
The microorganisms and their role.

The museum will hold
Petri dishes with beautiful colonies
Pigments, enzymes, antibiotics
Scope for subsequent studies.

Sir Alexander Fleming,
Who came up with Penicillin
A testimony of greatness,
Preserve them to sustain!!

The museum would delineate to the world its play
Of the microorganisms saving the day!!
For man to fight disease and illness,
The microbiologist and his discoveries have a huge role to play.

~ Divika Narvekar, S.Y.B.Sc.

CONSULTANCY SERVICE IN TESTING POTABILITY OF DRINKING WATER

In an endeavour to reach out to society, the Department of Microbiology offers a consultancy service in water testing, in order to determine the potability of drinking water. Various water samples are assessed for bacteriological load and certified in accordance with the standards laid down by Indian Standard DRINKING WATER – SPECIFICATION (Second Revision). Thirteen samples were analysed in the year 2020-2021. In addition to these samples, the drinking water filters on campus were also assessed for potability. Samples are analysed for a nominal fee of Rs. 200/- and the service was coordinated by Ms Ruella D’souza with assistance from TY student volunteers who imbibed valuable hands-on skills and training during their service.



~ Art by Swizel Anoushka D’Souza, S.Y.B.Sc.

WORD SEARCH

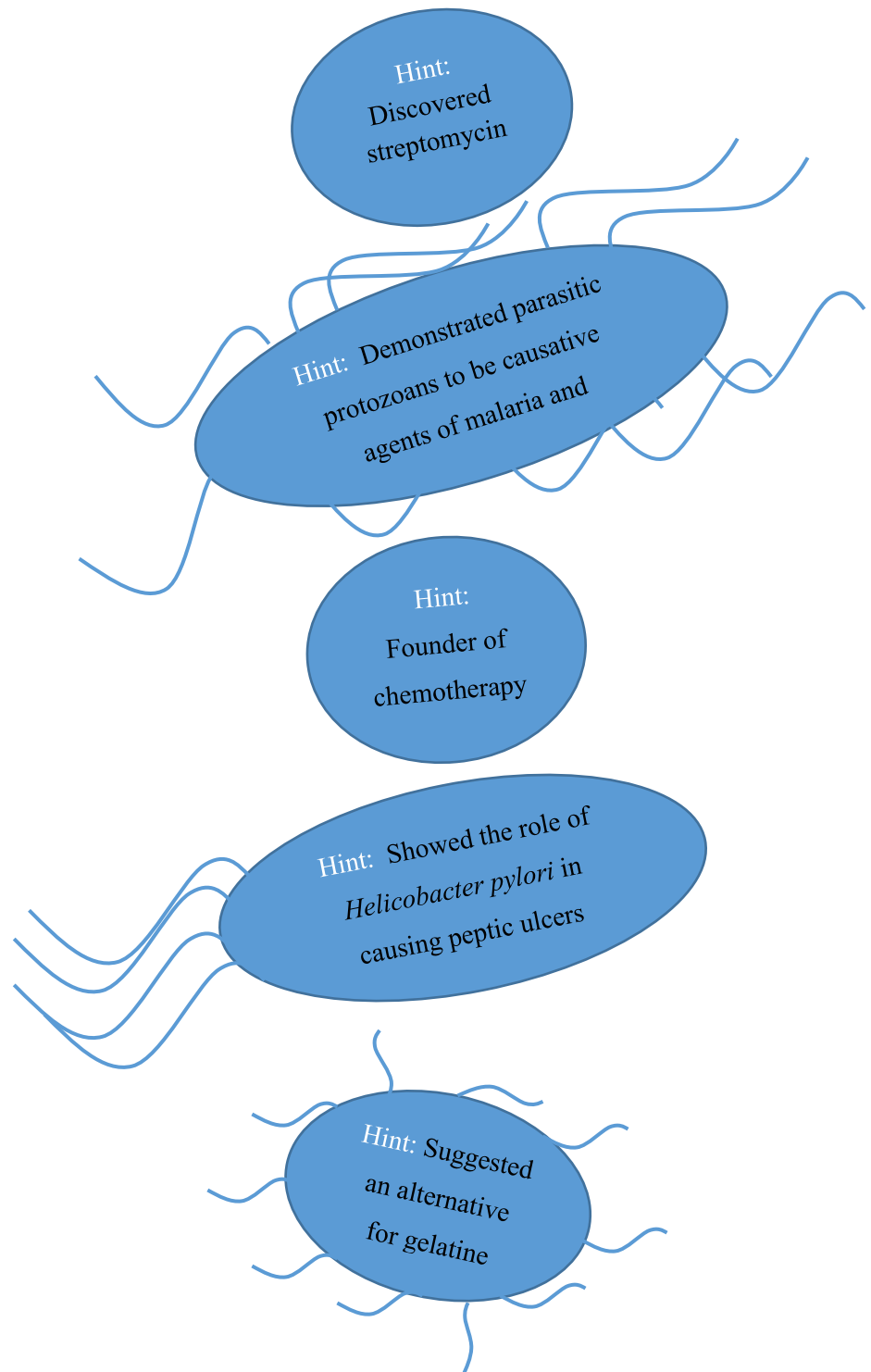
M	C	E	N	T	R	I	O	L	E	O	A	T	N	W
I	A	P	W	E	D	O	A	R	O	P	X	U	C	B
C	R	O	C	D	E	A	R	B	A	B	C	C	U	B
R	D	C	J	I	K	L	I	A	V	L	M	F	I	T
O	O	A	I	C	L	O	B	G	E	H	I	O	Z	F
F	J	B	H	L	O	E	O	U	Q	B	T	G	F	L
I	V	J	P	Y	I	T	S	U	Z	P	O	B	O	A
L	P	K	L	S	F	A	O	K	Q	D	C	I	R	G
A	R	N	A	O	U	L	M	D	B	A	H	T	E	E
M	S	Q	Y	S	R	Y	E	R	S	S	O	J	S	L
E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

- | | |
|-----------|---------------|
| CENTRIOLE | MITOCHONDRIA |
| LYSOSOME | MICROFILAMENT |
| NUCLEUS | PEROXISOME |
| RIBOSOME | ENDOSOME |
| CILIA | FLAGELLA |

~ Alysa D’Souza, S.Y.B.Sc.

GUESS WHO??

Discern the names of the microbiologist from the hint provided



~ Sonu Parwar, S.Y.B.Sc.

Selman Waksman; Alphonse Laveran; Paul Ehrlich; Barry Marshall; Fanny Hesse

IT'S GOING TO BE OKAY!

Hi! I'm your senior. I passed out a year and a half ago and I'm currently doing something that has absolutely nothing to do with what I spent three years studying. At least that's what everyone tells me. A year and a half ago, I was where many of you probably are right now, Third Year Microbiology, anticipating the finals! Excited about the finals, apprehensive about the future. So much has changed.

When I started college, I thought I knew what I wanted to do. Three years in and I wasn't so sure anymore. Realising that you want to take a path different from the one you always thought you wanted is a very terrifying feeling, believe me.

I loved Science, I loved Microbiology. I still do. But love is such that it is unlimited, in a sense. There's so much to try, to do, to feel. I like to think of education, or rather, learning, as an operational investment that you can sort of build on, as opposed to a one-time capital investment that you only pay for once. Now I don't know enough about Commerce to know if what I said makes any sense but let me try to explain it – you can't ever expect to be free from education. The human condition demands education, constantly and persistently. You can only choose how you would like to be educated, be it in college or at work, or gardening or carpentry, or swimming, or a million other options and a million other combinations of those options. It's limitless. It's like a database / treasure trove that you can take from whenever you need to.

Getting back to what I said earlier. People ask me why I'm doing something unrelated to what I majored in in college. But that's not how I see it. I know that I'm getting vaccinated, and I know that amylase is used in beer production to make sugar from starch, and I know why plastic takes 400 years to decompose, and how compost can get hot enough to catch fire. And each of these things have come in handy at some point. Microbiology specifically, in fact, is the future. Which means you're the future.

I realise that these are terrible times. But time is a continuous cycle, and things will get better in some way at some time. When they do, make sure you enjoy every second, every class, every experiment, every aimless stroll around the campus! And never stop learning! I hope you're young and hopeful, not young and cynical. There are far too many cynics in the world. I consider myself to be an optimistic nihilist. Nothing means anything and therefore everything means something. Believe in something, love something – a subject, a place, a feeling. Give yourself as much as you can – time, knowledge, patience. Invest in yourself and see where life takes you!

~ Jerusha D'Souza
Associate, Sensible Earth Goa
T.Y.B.Sc. (Class of 2019-2020)

THE SKY IS YOUR LIMIT!!

Ever since the first year of my B.Sc. course, I was taught about the importance of Microbiology, its role in various sectors and the way it impacts life. This couldn't have been proved truer especially in the present time amidst the COVID-19 pandemic when scientists particularly in our field of expertise all over the world were called together to help combat this crisis. As a student who was just about to graduate, the internship opportunities I had working at pathology labs as part of my degree gave me the experience and the confidence to apply for covid testing roles and do my part towards society.

With the extensive support of my family and teachers, I was able to secure admission and receive a scholarship to pursue my dreams and study a postgraduate degree at one of the world's most prestigious universities based in the UK. Moving to another country meant adapting to a whole new way of life, interacting with people who themselves are from different nations and backgrounds, all of which have been pleasant experiences.

Though there was quite a vast difference in the teaching and learning methods from what I was usually accustomed to, I personally believe that my B.Sc. degree at St. Xavier's prepared me well for this enabling me to be in a lecture hall interacting with other students on an international level and being able to confidently voice my opinions on various subjects. One example is that during the process of preparing notes, most of the reference work had to be from up-to-date scientific papers rather than textbooks. This skill of paraphrasing research articles and papers was something I first learnt during one of my ISAs and later while writing my dissertation. During group presentations, I got the chance to interact with many of my fellow classmates coming from different cultures all over the world and this gave me a whole new perspective on various matters of discussion.

All in all, I am grateful for the opportunity that I got to study abroad which made me realize that all the hard work and effort that I put in towards curricular and co-curricular activities during my undergraduate degree was all worth it. What I would suggest to every student is that no matter what route you wish to take after graduation, whether it is in academia, in research or even in the industrial sector, set your goals and work towards it making memories along the way. From what I have experienced, our family and teachers are always there to guide and support us even on days when we are overwhelmed. What may seem today as something far from being possible, with a little determination and giving it our best, tomorrow that would turn into an achievement.

~ Selvin Solis
M.Sc. student
University of Nottingham, United Kingdom
T.Y.B.Sc. (Class of 2019-2020)



~ Art by Nicole D'Souza, F.Y.B.Sc. (2nd Place, Art Competition: Today for Tomorrow)



~ Art by Leanne D'Souza, T.Y.B.Sc. (3rd Place, Art Competition: Today for Tomorrow)