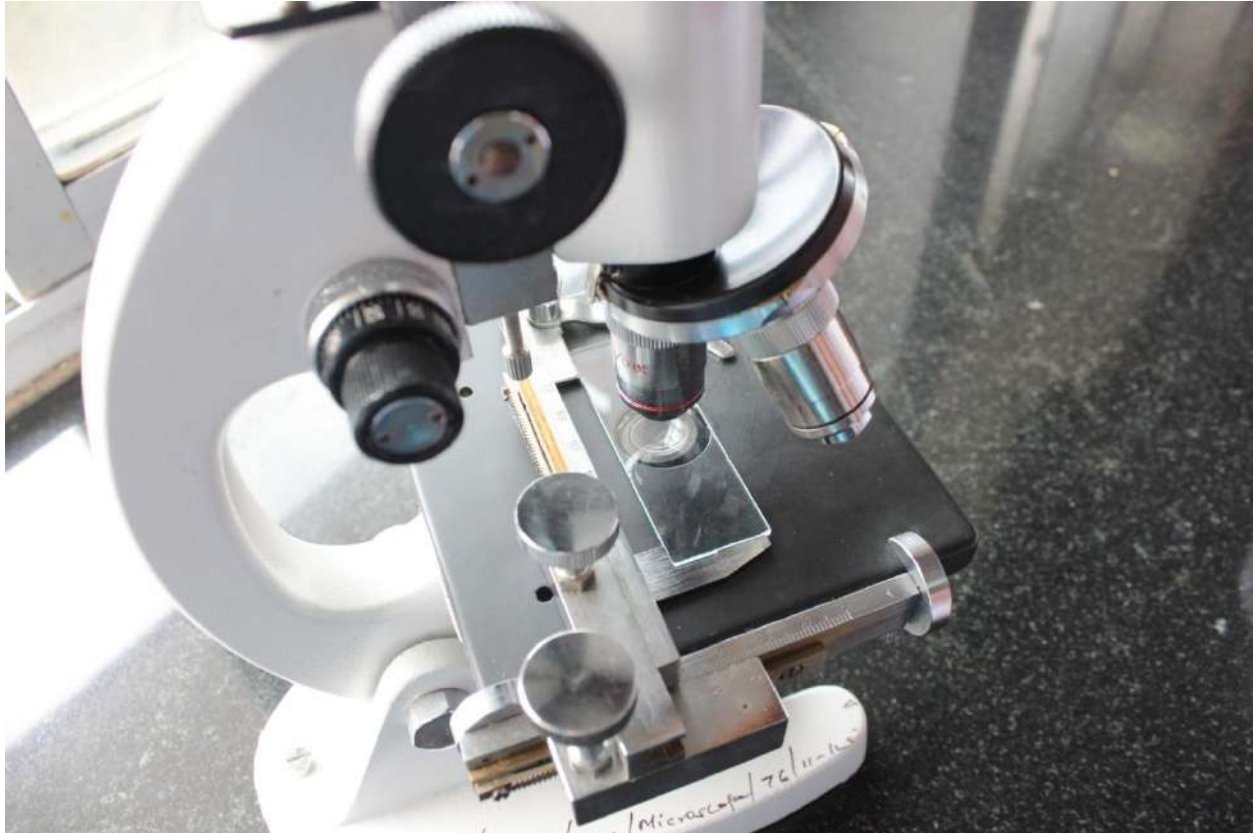


ST. XAVIER'S COLLEGE

Mapusa - Goa

***Microscope*... see the unseen**



Department of Microbiology

Newsletter

2019-2020

Volume 15

Issue 2

MICROVISTA 2K20



'Mr. and Ms. Microvista'



Overall Winner of 'Microvista 2K2.0'

Microscope... see the unseen
Department of Microbiology Newsletter
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Volume 15 Issue 2

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EDITORIAL

Dear avid readers, we are happy to release the second issue of our departmental newsletter, Microscope – see the unseen for the year 2019-20. COVID-19 pandemic had a massive impact on our usual day to day routine and has certainly also affected the release of this newsletter. The activities lined up for the year could not be completed as planned due to the lockdown scenario from March. We did manage to conduct some promising activities for the year such as the student exchange programme Phase II, National Level seminar on Bioremediation, Intercollegiate competition called Microvista 2k20 etc. I am sure you will gain some valuable insights into the field of microbiology going through this newsletter.

- *Siddhesh Menon*

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STUDENT EXCHANGE PROGRAMME – Phase II

**Department of Microbiology, St. Francis College for Women (Autonomous), Hyderabad
and
Department of Microbiology, St. Xavier's College, Goa**

As part of the Exchange Programme students of St. Francis College for Women (Autonomous), Begumpet, Hyderabad, visited St. Xavier's College, Mapusa, from 22nd to 25th January 2020. A total of 33 Undergraduate and Postgraduate students participated in the programme, accompanied by two faculty members.

Upon arrival, the Hyderabad team was welcomed by the Administrator, Rev. Fr. Zeferino D'Souza and the Principal, Dr. Blanche Mascarenhas, the Head of the Department of Microbiology Ms. Ursula Barreto and the faculty members of the Department of Microbiology, St. Xavier's College, Goa.

Over the first two days, four technical sessions were organized for the participants. Dr. Trelita de Sousa delivered a session on "Bioremediation". She elucidated on the adaptive strategies employed by indigenous denitrifying bacteria to increasing benzoate concentrations. Dr. Marielou Ferrao spoke on "Pigmented Yeasts" from water bodies along the coastline of Goa and enlightened the students on the statistical methods used therein. Dr. Valerie Gonsalves gave a session on 'Extremophiles'. She introduced the students to the lesser known world of halophilic fungi and elaborated on their response to salt. Dr. Sheryanne Velho-Pereira delivered a session on 'Bioprospecting'. She enlightened the students on the process of epibiosis, the potential of haloarchaea for bioprospecting for antimicrobial, antioxidant and hemolytic compounds.

Two practical sessions were organized, one on "Nanoparticle analysis using XRD". The other was on "Analysis of Bioactive molecules using IR Spectroscopy". Dr. Reshma Raut Desai, Dr. Hari Kadam and Ms. Flavia Travasso conducted the practical sessions for the participants.

The Exchange Programme also provided an opportunity for the participants to take part in an intercollegiate National Level event on Life Sciences called "MICROVISTA 2K2.0" as well as a National level Seminar on 'Bioprospecting for Sustainable Development' which was held from 23rd to 25th January 2020.

The students were taken on a tour of the College Campus and were shown the different facilities that the College has, the teaching and administrative blocks, the gardens, the orchidarium, the sports ground, library, chapel and the various laboratories of the Life Sciences.

The Exchange Programme culminated with a colourful display of culture where the Goan students presented the “Mando” and the Goan folk dance –“Dhekni” and the students of Hyderabad showcased their through a vibrant dance performance. The programme concluded with a feedback from the participants and the distribution of certificates.



Student from St. Francis College, Hyderabad receiving certificate

STUDENT EXCHANGE PROGRAMME - AT XAVIER'S COLLEGE, GOA Phase II



Certificates presented to the faculty members of St. Francis College, Hyderabad



A group photograph of TY microbiology students of St. Xavier's College, Goa and students of St. Francis College, Hyderabad along with the faculty members.

CERTIFICATE COURSE ON MICROBIAL FERMENTED FOODS

A Certificate Course on 'MICROBIAL FRMENTED FOODS' was conducted for the F.Y.B.Sc. and S.Y.B.Sc. Students of Microbiology from Nov 2019 to March 2020.

The Course comprised of 3 different modules namely Wine making, Fermented Dairy Products and Production of Mushrooms. The modules were tailored to enable students to have a hands-on experience in the preparation of this microbiology - based products.

The certificate course was coordinated by Ms. Arina Frank.



Delicacies prepared by students using fermented dairy products



Students posing with the lab-made wine filled bottles.



Students happily engrossed in Mushroom cultivation

**National Level Seminar on ‘Bioprospecting for Sustainable Development’ organised by the
Department of Microbiology, St. Xavier’s College, Mapusa**

The Department of Microbiology, St. Xavier’s College, Mapusa, organised a National level Seminar on ‘Bioprospecting for Sustainable Development’ on January 24-25, 2020. Mr. Michael D’Souza, Director, Goa Institute of Public Administration and Rural development (GIPARD), and former Director of Department of Science, Technology and Environment (DSTE), was the Chief Guest. Pertaining to Goa, Mr. Michael D’Souza drew the attention to the patent of “feni”. He focused on the idea of bioprospecting in association with access benefit sharing, and how traditional knowledge and the access of endemic species to local communities contributes to sustainable development. The Keynote Speaker, Prof. Chandrashekher Rivonker, Professor of Marine Sciences at the School of Earth, Ocean and Atmospheric Sciences, Goa University, and the Director-in-Charge, UGC-Human Resource Development Centre, Goa University, enlightened the audience about the impact of bioprospecting on the marine diversity and ecosystem functioning and elucidated the concerns of over exploiting marine resources. The Administrator of St. Xavier’s College, Rev. Fr. Zeferino D’Souza, in his welcome address, spoke about the significance of Sustainable Development. The Principal of St. Xavier’s College, Dr. (Mrs.) Blanche Mascarenhas, addressed the need for responsible bioprospecting in today’s world. The Organising Secretary, Dr. Trelita de Sousa explained the significance of the seminar, emphasising the role of sustainable bioprospecting for environment preservation and economic development. The Convenor of the Seminar and Head of Microbiology, Mrs. Ursula Barreto delivered the Vote of Thanks.

The seminar gathered a very good response with 149 registered participants including 39 from outside Goa and allowed deliberations from the most eminent resource persons with profound experience. Dr. Anand Jain, Project Scientist C, National Centre for Polar and Ocean Research enthralled everyone with his presentation on the implications of microbial metagenomics in ecology and bioprospecting. Dr. Pramod Shinde, Senior Scientist, Natural Products and Green Chemistry, CSIR-Central Salt & Marine Chemicals Research Institute, Gujarat delivered thought-provoking talks on the advances in microbial drug discovery and on endophytes as a rich source of bioprospecting. Dr. Sourav Bhattacharya, Assistant Professor, Department of Microbiology, School of Sciences, JAIN (to-be-deemed University), Bangalore, presented

stimulating sessions on the prospects of microbial degradation of polycyclic aromatic hydrocarbons with special reference to benzo [a] pyrene and on the current and future prospects of bioprospecting for prolific lactic acid bacteria.

The participants presented their novel ideas and exciting research through vivid oral presentations chaired by Dr. Trelita de Sousa and an interactive poster session. The Seminar turned out to be an enriching experience for all the participants.



The release of the Book of Abstracts at the National level Seminar on 'Bioprospecting for Sustainable Development' organised by the Department of Microbiology, St. Xavier's College, Mapusa, at the hands of the Chief Guest, Mr. Michael D'Souza, Director, Goa Institute of Public Administration and Rural development (GIPARD).



The Principal presenting the Keynote Speaker, Prof. Chandrasekhar Rivonker, Professor of Marine Sciences at the School of Earth, Ocean and Atmospheric Sciences, Goa University, with a memento as a token of appreciation



Poster presentations: The participants depicting their innovative ideas that were judged by Dr. Pramod Shinde and Dr. Sourav Bhattacharya

VISIT TO ICAR – CCARI, GOA

The Third year B.Sc. students of the department of Microbiology, St. Xavier's College, visited ICAR CCARI research institute. Students were accompanied by 2 faculty members, Ms. Katelyn Gonsalves and Ms. Linette De Souza.

Students along with the faculty members left college at 9:30 am and reached the institute around 11 am. A couple of staff members of ICAR welcomed us at the institute and asked us to explore different plants and trees existing in the campus. A class group picture was then clicked at the entrance of the institutes' main building.

The group then proceeded to the conference hall where Dr. R. Ramesh, Principal Scientist, Dept. of Plant pathology, introduced the topic of pathogenesis in plants and highlighted several examples of plant diseases especially those which are prominently seen in Goa. After the lecture, a video on the establishment of ICAR and all the crops grown in the institute was presented before us.

Students along with the faculty members then visited the instrumentation room where different instruments and equipments like Laminar air flow, electrophoresis unit, Gel doc were being shown along with the explanation regarding the working of these instruments. The research scholars briefly spoke regarding the field of research.

After the instrumentation room visit, the group proceeded to explore different crops grown in the campus such as brinjal, chillies, cow peas etc and also the fisheries and animal husbandry unit.

It was truly an enriching experience helping students gain lot of insights in the field of plant pathology. The visit ended at around 1:30 pm.



Practical Session on Analysis of Bioactive molecules using IR Spectroscopy



Practical Session on Nanoparticle analysis using XRD



Display of Goan culture through the Traditional Folk Dance – ‘Dekne’



Enthralling the audience through the traditional Goan musical form – ‘Mando’

NATIONAL SCIENCE DAY CELEBRATION

2019 – 2020

The Department of Microbiology, St. Xavier's College, Mapusa Goa in collaboration with the Microbiologists Society India, Student Unit organized National Science day celebrations on 22nd February and 28th February 2020. As part of the celebration, three activities were conducted, namely, a career guidance talk, an oral paper presentation competition and a competition of fermented foods.

A talk on career guidance, titled 'Career Opportunities in Biological Sciences' was delivered by Dr. Roshan Naik, Research Fellow, Lee Kong Chian School of Medicine, NTU, Singapore. Dr. Roshan enlightened the audience with his career journey and spoke about his research work. He introduced various academic career options and alternate career opportunities. He briefed them about scholarships, funding agencies and application procedures. The session was attended by the students of Microbiology and Biotechnology.

An oral paper presentation on the theme 'Microbes for a clean environment' was conducted. A total of 22 teams registered for the competition. The orals session provided a platform to the students to showcase their thoughts and ideas. Some of the topics included bioremediation, composting and biofertilizers. In Division 1, the first prize was awarded to Ms. Anushka Kaskar, the second place was bagged by Ms. Sameena Khwaja and Ms. Saiely Shirvankar and the third place by Ms. Riya Colaco. In Division 2, the first, second and third place was awarded to Ms. Darshana Shetty, Shweta Tha and Ms. Siddhi Nadodkar, respectively. Certificates of merit were awarded to the first three winners from each class and certificates of participation were presented to all speakers.

On the 28th February 2020, 'Microbiome' an exhibition cum competition of fermented foods was organized. The completion saw a total of 17 enthusiastic teams, who presented delectable dishes. The first place was bagged by Ms. Divika Narvekar and Ms. Saloni Sukhi of the first year B.Sc. The second place was shared by Ms. Yuvrani Halarnkar and Ms. Upeksha Kasar, and Ms. Hritva Pangam and Ms. Rochan Mahale, all from the Second Year B.Sc. The winners were awarded

with certificates of merits and hamper. All participants were presented with certificates of participation.



Our students all excited to display their assortment of fermented foods



Getting tasted! Our students getting their fermented foods tasted by the judges

MICROVISTA 2K2.0 – National Level Inter Collegiate Event on Life Sciences

On 22nd January 2020, the Department of Microbiology of St. Xavier's College, Goa, hosted a National Level Intercollegiate Event - MICROVISTA 2K2.0, the sequel to last year's Microvista 1.0. The Event comprised various competitions based on the study of Life Sciences. It was a wonderful opportunity for teaching and learning through an innovative display of talent, coupled with fun filled team work. A total of 08 teams including two from Hyderabad participated in the Event.

The Event was declared open by the Administrator of the College, Rev. Fr. Zeferino D'Souza who also unveiled the Microvista 2K2.0 trophy. The Principal, Dr. Blanche Mascarenhas, in her welcome address, applauded the efforts put in by the organisers in conducting such an event. Among the dignitaries present on the dais were the Vice Principals - Dr. (Fr.) Jeronimo D'Silva, Ms. Sandra Fernandes and Ms Ursula Barreto, and the Student Co ordinator of the Event Mr. Selvin Solis. Ms.Ursula Barreto the Convenor of the Event, in her introductory address pointed out that all the items of the Event were meticulously planned so as to promote interdisciplinary learning and provided a platform for display of skill and talent.

A total of 11 competitions were organised, comprising of on stage items such as: ***Funguy at the puff ball***- a duet dance competition on the topic 'fungal associations'; ***Algae for tomorrow***- an opportunity for students to showcase their acting skills and creativity in a mad ad competition advertising for an imaginary algal product; ***Microbes for a clean environment***- an oral paper presentation competition; ***Microbes walk the ramp***- a Fashion show on the theme 'Ecosystem', and ***Mr. and Ms. Microvista*** .

The off stage events included ***Biosphere in a flash***- a photography competition with the topic given on the spot; ***MicroBio Trivia*** on the topic 'Biology an intriguing science'; ***Prototoons***- a cartooning competition on the theme 'Protozoa'; ***Bacteria Kombat***- a competition where participants had to assume they were microorganisms growing on a plate of mixed cultures, fighting for dominance; ***μ-Quest***- a treasure hunt competition and ***Micro Surprise***, which was a surprise event with the rules given on the spot.

The student volunteers were at their best showcasing their creativity, organisational skills, team spirit and time management. The participants were seen having a field time striving to do their best. The day long programme ended with a short valedictory session during which Mr. Selvin Solis proposed the vote of thanks. The Post Graduate Microbiology Goa University Team bagged the Winners trophy and Government College Khandola PG Microbiology Team walked away with the Runners Up trophy.

All in all MICROVISTA 2K2.0 was an exciting and enriching experience.



The Administrator of St. Xavier's College declaring the event "Open"



Mad Ad competition. Theme: 'Algae for tommorrow'



Fashion show on Ecosystems. Theme: 'Microbes walk the ramp'

SOCIAL OUTREACH PROGRAMME HELD ON 18TH DECEMBER 2019

The staff and third year students of the Department of Microbiology of St. Xavier's College have an annual outreach programme. It is an endeavor to instill in the students a spirit of gratitude for the blessings they have and to encourage the art of giving back to the less fortunate.

On the 18th of December, in collaboration with Street Providence, the dept visited the 20 inmates of the home in Assanora and spent time with them .

The trip began at 11 a.m. with everyone piling into the bus and setting off to the house, situated at the end of a long road at the very top of a hill. There we were welcomed by Mr Anslem who is a volunteer with Mr. Donald Fernandes, the founder of Street Providence. Everyone was ushered into the hall and the interaction began with a welcome by Ms Ruella D'souza. The HoD Ms Ursula Barreto greeted everyone and the programme began with a Hindi song- "Love you Zindagi". This was followed by a quick game of 'passing the parcel' for the men. the girls then put up a graceful group dance performance dance to hindi film tunes. In keeping with the spirit of Christmas, the students put up a beautiful Christmas tableau and sang Christmas carols.

The programme then ended on a prayer and reflection with an enactment of the parable of the good Samaritan. The theme- "Go and do likewise". Mr Anslem then spoke to the students and briefed them on the inception story of Food Bank and Street Providence. He also suggested to the staff and students the right way to handle homeless persons and strongly advised them against giving money to such people, but rather to help them by calling the right people.

He also acknowledged the efforts of the residents who manage the home and. Mr Anslem appreciated the efforts of the students and commended them on the accurate representation of the bible passage and asked them to keep him and his work in their prayers. He was presented with a cheque in aid of the efforts of Street Providence, from the principal of the college.

Lunch was provided to the inmates and after a few group photographs the group returned back to college.

Social Outreach – Visit to Street Providence Home, Shelter for abandoned and homeless



Giving back to society: Our students visiting the Street Providence home at Assonora



Our students interacting with the inmates of the Street Providence home at Assonora

Insights into the field of Food Microbiology

“Let your food be your medicine & your medicine be your food”. ~ Hippocrates

Food, Microorganisms and Humans have had a long and interesting association that developed long before recorded history. Microorganisms can be used to transform raw foods into gastronomic delight, including chocolates, cheeses, pickles, wines, and other alcoholic products through microbial activity. On the other hand, microorganisms can degrade food quality and lead to spoilage. Foods also serve as vehicles for disease transmission. Despite constant advancements in technology and our knowledge of food safety, foodborne illness due to consumption of unwholesome food remains a critical problem worldwide. Therefore interestingly food microbiology focuses on a wide variety of current research microbes that have both beneficial and deleterious effects on the safety and quality of foods.

Over the last several thousand years, fermentation has been a major way of preserving food. Consumption of probiotics improves general health, produces important B and K vitamins, enhances immunity and also helps in the process of digestion. Another interesting group used in milk fermentations are *Bifidobacteria*. They help maintain the normal intestinal balance, also promote calcium absorption and synthesis of B-complex vitamins. A vast array of Cheeses is also produced around the world. Some of which include Roquefort cheese used for salad dressing, Swiss cheese which contains holes formed by carbon dioxide from a *Propionibacterium* fermentation. *Pediococcus cerevisiae* and *Lactobacillus plantarum* are most often involved in sausage fermentation. A variety of plants that contain adequate carbohydrates can be used to produce alcoholic beverages. Wine making is one such example. Besides wine, Beer and Ale production uses cereal grains such as barley, wheat and rice. Bread too is one of the most ancient of human foods and is produced with the help of microorganisms. Besides microorganisms action in fermentation they themselves can be used as animal and human food sources. Mushrooms are one of the most important fungi used directly as a food source. Another microbial food supplement is the *Cyanobacterium*, *Spirulina* which is used as a food source in Africa.

Some of the microorganisms could be really detrimental to the human health. Because foods are such excellent sources of nutrients, microorganisms grow rapidly and convert an attractive and appealing food into a sour, foul-smelling or fungus covered mass. Meat and dairy products with

their high nutritional value, fats and proteins provide ideal environments for microbial spoilage. Proteolysis and Putrefaction are typical results of microbial spoilage of such high protein materials.

Fruits and vegetables have a lower protein and fat content and undergo a different kind of spoilage initiated by moulds. These organisms have enzymes that contribute to the weakening and penetration of the protective outer skin. Even the slightest bruising of the tomato skin, exposing the interior, will result in rapid fungal growth. This affects the quality of tomato products including tomato juices and ketchups. Fungus derived carcinogens include the aflatoxin which are produced most commonly in moist grains and nut products. Thus to avoid all of this, foods can be preserved by a variety of methods like the removal of microorganisms by centrifugation, low temperature like freezing, high temperature which include pasteurization and canning, and chemical based preservation.

Food borne illnesses impact the entire world. All of these food borne diseases are associated with poor hygienic practices. *Clostridium perfringens* food poisoning is one of the most widespread food intoxications. To avoid all of this from happening, hygiene must be monitored carefully, proper cleaning of cutting boards and utensils. A major problem in maintaining food safety is the need to rapidly detect microorganisms in order to curb outbreaks that can affect large population. Fluorescent antibody, enzyme linked immunoassay (ELISA) and radioimmunoassay techniques have been of great help and can be used to detect small amounts of pathogen specific antigen. Molecular techniques are also increasingly used in identification.

Its very important that all food industry organizations should strictly follow the protocols of Food Safety Management systems given by authorities based on HACCP principles. Living amidst the COVID-19 pandemic has made us even more health conscious. Coronavirus is something that is having a major impact on the eating and drinking habits of people and this could be really stressful. Intake of nutritious and low- calorie food will help maintain a balanced diet. Proper diet care helps improve immunity due to which everyone will be able to fight against the virus and enhance the quality of life. Thus one should eat healthy and be safe.

Chrisann Braganza

S.Y.BSc.

AUTOBIOGRAPHY OF A MICROSCOPE

Hello everyone, my name is Compy, the compound microscope. I was born in a place with a lot of moving machinery and people and I could see how I was fitted together and finally packaged.

In a few days time I was sent to this place called the microbiology lab at St. Xavier's College, and I see some sticker at my foot which says SXC and a unique number. Well since nobody has been coming here lately, it's been really lonely, so I thought of sharing about myself as to how we microscopes came into existence on this planet, to the other lab mates present here especially to petri dishes and test tube racks who are real good listeners.

I do not know much but I heard from my cousin Erik, the electron microscope once told me how we came to being. It started many many years ago probably after some geniuses noticed how a stick appeared bent when placed in water, due to refraction of light. Then in the first century A.D someone named Seneca described actual magnification by a globe of water. He said that letters could be made large and clear by viewing through a glass globe filled with water. Then after about a thousand years later an Arabian scholar named Alhazan wrote a major work on optical principles and gave in detail how the anatomy of how the eye and the lens focuses images.

Many people made all kinds of lenses but they weren't so good and never gave clear images. And even though the credit for the creation of my great great grandfather like the first one was given to Zacharias Jansen and the famous Robert Hooke was the first person to observe the cork cells it wasn't until a Dutch man named Antoine van Leuwenhoek who constructed lenses of remarkably high quality which laid the foundation of modern biology. He looked at fleas and saw even some small creatures. He spent a lot of time studying hair, skin and even his own teeth scrapings. But his greatest surprise was when he saw a drop of rain water which was still for a while on his garden pot. In this he observed tiny globs with horns moving about, he saw slipper shaped creatures gliding here and there with particular feet. His curiosity was too large, he is credited with discovery and describing bacteria, spermatozoa, protists, nematodes, and many other things even though he didn't know what they were.

Apart from my great grandfathers, even my cousin's great grandfathers some of the earliest electron microscopes were used to observe biological nature specifically and today their application to biological materials has exceeded its use in all other fields. There is hardly a

hospital where my cousins aren't present because they are needed for medical diagnostic purposes as well as biological research. And the early interest of looking at biological materials with my great grand uncles was first done by L.L Marton after he constructed an electron microscope and thought that biological materials would be an interesting and valuable subject.

Ok, I think I've said enough about my cousin and his great grand uncles so I shall tell more about myself. As you know that Zacharias Jansen first created us but that time the parts weren't many as of how I am now. Now I have a nice eyepiece, a smooth sliding rod, a coarse adjuster and illuminating mirror, different types of magnifiers and many other parts all the way down to my foot. And just like how humans need be in a good mood to function well, I too need good lightning, a clean illuminating mirror and a proper adjustment to operate well.

Back when the lab used to be buzzing we'd be helping them humans to see different microscopic stuff, sometimes I had to dip my eye in oil, at times everyone complaining if someone's eye wasn't clean, and we saw many stuff like bacteria, fungi yeast and protists. And it was really nice to see them finding a place with sufficient light for us. We really miss them humans and am sure they miss us too.

Mark D'costa

S.Y.B.Sc.

Career Guidance session on ‘Prospects in Microbiology’



Mrs. Meghna Chakraborty delivering a talk to our S.Y. students on “Prospects in Microbiology”

Career Guidance Session on ‘Career Opportunities in Biological Sciences’



Dr. Roshan Naik delivering the session

